I/30255/2023

सत्यमेव जयते

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

विषय: उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 210वीं बैठक का कार्यवृत |

Subject: Minutes of the 210th OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 210वीं बैठक दिनांक 16.08.2023 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 |

The 210th meeting of the Operation Co-ordination Sub-Committee (OCC) of NRPC was held on 16.08.2023. 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

Signed by Santosh Kumar
Date: 12-09-2023 16:52:48
Reason: Approved
(संतोष कुमार)
अधीक्षण अभियंता (प्रचालन)

सेवामें,

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

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 210 वीं बैठक का कार्यवृत्त

The 210th meeting of OCC of NRPC was held on 16.08.2023 through video conferencing.

खण्ड-क:उ.क्षे.वि.स. PART-A:NRPC

1. Confirmation of Minutes

Minutes of the 209th OCC meeting was issued on 04.08.2023. OCC confirmed the minutes.

2. Review of Grid operations of July 2023

Anticipated vis-à-vis Actual Power Supply Position (Provisional) for July 2023

Reasons submitted by States for significant deviation of actual demand from anticipated figures during the month of July 2023 are as under:

- **Delhi**

Delhi experienced early arrival of monsoon and heavy rainfall in July 2023 so, peak demand and energy consumption was on lower side than expected.

- **Himachal Pradesh**

The Anticipation in Energy Requirement as well as peak demand in respect of Himachal Pradesh for the month of July, 2023 came on the lower side due to heavy rains.

- **Punjab**

It is intimated that actual maximum demand and actual energy requirement are less as compared anticipated maximum demand and actual energy because of rainfall in Month of July 2023.

- **Rajasthan**

The Actual Energy requirement and peak demand w.r.t. Anticipated Energy requirement and peak demand for the month July' 2023 increased by 8.0% and 7.6% respectively due to scattered rains / no rains in some areas during the month of July 2023 in Rajasthan state.

- **Haryana**

The variation in Anticipated & actual demand and energy requirement in the month of July-23 was due to the effects of the heavy rain due to unexpected Biparjoy cyclone.

- **Uttarakhand**

The negative variation in actual Energy consumption w.r.t. anticipated Energy requirement and peak demand are due to record heavy rainfall in Uttarakhand in the month of July, 2023 compared to previous years.

3. Maintenance Programme of Generating units and Transmission Lines

The maintenance programme of generating units and transmission lines for the month of September 2023 was deliberated in the meeting on 14.08.2023.

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

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

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	190	350	No Revision submitted
	Requirement	180	410	
	Surplus / Shortfall	10	-60	
	% Surplus / Shortfall	5.6%	-14.6%	
DELHI	Availability	4684	7000	14-Aug-23
	Requirement	3600	7000	
	Surplus / Shortfall	1084	0	
	% Surplus / Shortfall	30.1%	0.0%	
HARYANA	Availability	6522	11463	08-Aug-23
	Requirement	6522	12865	
	Surplus / Shortfall	0	-1402	
	% Surplus / Shortfall	0.0%	-10.9%	
HIMACHAL PRADESH	Availability	1062	1744	07-Aug-23
	Requirement	1059	1775	
	Surplus / Shortfall	3	-31	
	% Surplus / Shortfall	0.3%	-1.7%	
J&K and LADAKH	Availability	1780	3510	No Revision submitted
	Requirement	1560	3290	
	Surplus / Shortfall	220	220	
	% Surplus / Shortfall	14.1%	6.7%	
PUNJAB	Availability	7960	14100	15-Aug-23

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Requirement	8060	14900	
	Surplus / Shortfall	-100	-800	
	% Surplus / Shortfall	-1.2%	-5.4%	
RAJASTHAN	Availability	9130	18500	14-Aug-23
	Requirement	9375	17000	
	Surplus / Shortfall	-245	1500	
	% Surplus / Shortfall	-2.6%	8.8%	
UTTAR PRADESH	Availability	14520	28000	11-Aug-23
	Requirement	14250	28000	
	Surplus / Shortfall	270	0	
	% Surplus / Shortfall	1.9%	0.0%	
UTTARAKHAND	Availability	1320	2250	08-Aug-23
	Requirement	1314	2300	
	Surplus / Shortfall	6	-50	
	% Surplus / Shortfall	0.5%	-2.2%	
NORTHERN REGION	Availability	47168	79800	
	Requirement	45920	80400	
	Surplus / Shortfall	1248	-600	
	% Surplus / Shortfall	2.7%	-0.7%	

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

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

5.2. In 210th OCC, 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.

6. NR Islanding scheme

6.1. In the meeting, AEE(SS) apprised forum that a meeting was conducted on 02.08.2023 with UPSLDC and UPPTCL to review the implementation of Lucknow-Unchahar and Agra islanding scheme. AEE(SS) apprised forum that in the cited meeting, some changes were suggested in the study report of CPRI and based on that final report from CPRI is awaited.

6.2. Representative from UPPTCL apprised forum that with regard to Lucknow-Unchahar islanding scheme, relay procurement is under progress and the

delivery of UFR has started. Further, he intimated that UFR installation would be completed by September 2023.

6.3. AEE(SS) apprised forum that in the previous OCC meeting, OCC Forum in principle approved the revised Delhi islanding scheme and asked DTL to bring the scheme in upcoming 68th NRPC meeting for final approval from the NRPC board.

6.4. With regard to Kullu-Manali Islanding scheme, representative from HPSLDC apprised forum that there were some shortcomings in the format submitted by HPSEB. HPSLDC has reverted to the HPSEB asking them to address these shortcomings at the earliest and re-submit the cited islanding scheme at the earliest.

6.5. With regard to Shimla-Solan islanding scheme representative from HPSLDC apprised forum that they have done correspondence with BHEL regarding switching of Bhaba HEP to automatic mode during the situation of islanding formation but no response has been received from BHEL till date.

6.6. Further, with regard to Patiala-Nabha Power Rajpura islanding scheme representative from Punjab SLDC informed that technical specifications for procurement of UFR relays have been submitted for approval of their management.

6.7. Representative from Rajasthan STU intimated forum that preparation of DPR for Jodhpur-Barmer Rajwest and Suratgarh islanding scheme is expected to be finalized by the October 2023 and thereafter would be shared with NRPC Sectt. and NRLDC.

7. Coal Supply Position of Thermal Plants in Northern Region

7.1. In the meeting, NRPC representative apprised the forum about the coal stock position of generating stations in northern region during current month (till 07th August 2023).

7.2. Average coal stock position of generating stations in northern region, having critical stock, during first seven days of August 2023 is as follows:

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd. (Days)	Actual Stock (Days)
TALWANDI SABO TPP	1980	61.14	22	2.7

7.3. In the meeting, above mentioned generating station was requested to take adequate measures.

8. In principle approval for Insulator replacement of 500kV HVDC Ballia-Bhiwadi (Agenda by Powergrid NR-3)

8.1. In the meeting, Powergrid NR-3 intimated that Presently, insulator cleaning and insulator replacement with CLR is being carried out at major crossings and polluted stretches in ±500kV HVDC Ballia-Bhiwadi based on previous history.

8.2. With the use of CLR Insulators, chances of tripping/auto re-closer due to deposition of dust, bird excreta etc can be minimized. The same results have been achieved in ±500kV HVDC Rihand-Dadri transmission line. To avoid frequent tripping/breakdown, porcelain insulator at all the balance locations are required to be replaced by CLR insulator.

8.3. In view of system improvement and grid stability, Powergrid NR-3 requested that proposed outage of HVDC Ballia-Bhiwadi Pole-1&2 for approx. 10 days each (one by one) may be considered as deemed available in view of system improvement action at POWERGRID's own cost.

8.4. MS, NRPC was of view that the request of Powergrid NR-3 for consideration of proposed outage of HVDC Ballia-Bhiwadi Pole-1&2 for approx. 10 days each (one by one) as deemed available in view of system improvement action at POWERGRID's own cost. would be examined by NRPC Sectt.. as per CERC tariff regulation, 2019.

8.5. CTU representative stated that Powergrid may be advised to be cautious in future of planning such activity before the reversal of HVDC link, so as to avoid RE curtailment.

Decision of the OCC Forum:

- *The request for deemed availability of the proposed shutdown of HVDC Ballia-Bhiwadi Pole-1&2 for approx. 10 days each (one by one) would be examined by NRPC Sectt.. as per CERC tariff regulation, 2019.*

9. Operational Perspective of NEA Multi-terminal 800 KV HVDC AGRABNC HVDC Transmission System (Agenda by Powergrid NR-3)

9.1. In the meeting, Powergrid NR-3 intimated that during the winter season, reduced power levels are available for the HVDC link and for reverse direction, mono pole operation is being carried out as per instruction of NLDC with metallic return mode through the conductor of another pole.

9.2. Further, he stated that In view of negligible voltage on metallic return conductor during monopole operation, line becomes vulnerable for theft of line materials (spacer, corona ring etc). This condition of conductor (very low voltage) can also be easily identified from ground through corona sound.

9.3. Henceforth, he mentioned that it is required to run NEA HVDC poles in bipole operation only to prevent theft of transmission line fittings and accessories, avoid monetary loss & unnecessary tripping of HVDC lines and to enhance system reliability.

9.4. NRLDC representative apprised the forum that the impact of additional filter bank at BNC end, when fault level is already low, prima facie appears to be 6kV voltage rise, which is undesirable considering that many 400kV lines around BNC end are already kept open.

9.5. Further, he added that if additional filter is also taken into service for bipolar operation, then it would be difficult to manage the voltage at BNC end.

9.6. Therefore, attempts would be made to operate in bipolar mode to the extent possible as per the system requirement.

Decision of the OCC Forum:

- *Grid-India to attempt to operate NEA Multi-terminal 800 KV HVDC AGRABNC HVDC Transmission System in bipolar mode to the extent possible as per the system requirement.*

10. Compliance of N-1 contingency of 400 KV Muzaffarnagar - Vishnuprayag – Alaknanda – Muzaffarnagar circuit. (Agenda by AHPCL)

10.1. The minutes of the discussion for cited agenda is placed under point no. 27.

11. Modification in existing SPS at Gumma for Naitwar Mori HEP (Agenda by SJVN)

11.1 In the meeting, SJVN mentioned that it is in the process of commissioning of its 66 MW Naitwar Mori HEP by September, 23 and requested for shutdown on SPS at Gamma (only for Swara-Kuddu Leg) for modification in existing SPS of NJHPS, RHPS, Karcham and Sawra Kuddu for integration of Naitwar Mori HEP.

11.2 NRLDC representative asked SJVN to plan the shutdown on SPS at Gumma tentatively by 15th September in sync with the commissioning of Naitwar Mori HEP.

Decision of the OCC Forum:

- *SJVN to plan the shutdown on SPS at Gumma tentatively by 15th September in sync with the commissioning of Naitwar Mori HEP.*

12. Disabling Auto-reclosure mode of Transmission Line to facilitate Hot line maintenance on real time basis (Agenda by Powergrid NR-3).

12.1. In the meeting, Powergrid NR-3 requested OCC forum to allow HOT LINE maintenance of transmission line without OCC approval on real time as per system requirements to fix issues like hotspot by disabling Autoreclosure mode of Transmission Line.

12.2. NRLDC representative stated that they would take up the matter internally and accodingly decide whether to incorporate the said request of Powergrid in the outage planning procedure.

12.3. Further, NRLDC asked Powergrid to submit the SoP about how they plan to carry out the Hot line maintenance activity.

Decision of the OCC Forum:

- *Powergrid NR-3 to submit SoP to Grid-India on carrying out the Hot line maintenance activity.*

13. Implementation of AGC in UP control area for Intra-state generators (Agenda by PPGCL)

13.1 PPGCL Bara representative informed forum that as the scheduling of inter-state generators is through NRLDC, they are able to implement SRAS. However, the scheduling of intra-state generators is through respective SLDC they are facing issues in the implementation of AGC.

13.2 Representative from UPSLDC informed that they have received similar request from other intra-state generators also and they have conducted a feasibility study on the cited issue. However, he also mentioned that necessary directions have not been received from UPERC in this regard.

13.3 Representative from PPGCL Bara suggested that UPSLDC may approach UPERC on behalf of all intra-state generators for necessary directions for implementation of AGC in UP control area.

13.4 SE (O), NRPC suggested that PPGCL Bara to approach UPSLDC for further taking up the matter with UPERC.

Decision of the OCC Forum:

- *PPGCL Bara to approach UPSLDC for further taking up the matter with UPERC.*

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

14. NR Grid Highlights for July 2023

Major grid highlights of July 2023 were presented in the meeting:

i) Demand met details of NR

S.No.	Constituents	Max Demand met (in MW)	Date & Time of Max Demand met	Max Consumption (in Mus)	Date of Max Consumption	Average Demand met (in Mus)
1	Chandigarh	371	25.07.23 at	8	21.07.2023	6

			15:00			
2	Delhi	7398	21.07.23 at 15:10	149	21.07.2023	126
3	H.P.	1775	21.07.23 at 10.00	36	28.07.2023	32
4	Haryana	12227	03.07.23 at 14.45	254	24.07.2023	217
5	J&K	2590	12.07.23 at 12.00	59	13.07.2023	51
6	Punjab	14831	21.07.23 at 10:45	319	21.07.2023	269
7	Rajasthan	14204	05.07.23 at 15:00	301	05.07.2023	269
8	Uttarakhand	2223	21.07.23 at 21:00	50	21.07.2023	44
9	U.P.	28284	24.07.23 at 21:43	577	24.07.2023	494
10	**Northern Region**	**77145**	**21.07.23 at 13:00**	**1728**	**21.07.2023**	**1509**

ii) **Northern Region all-time high value recorded in July'23:**

States	**Max. Demand Met during the day (MW)**		**Energy Consumption (MU)**	
	As per Format28/hourly data Submitted by	**As on date**	**As per**	**As on date**

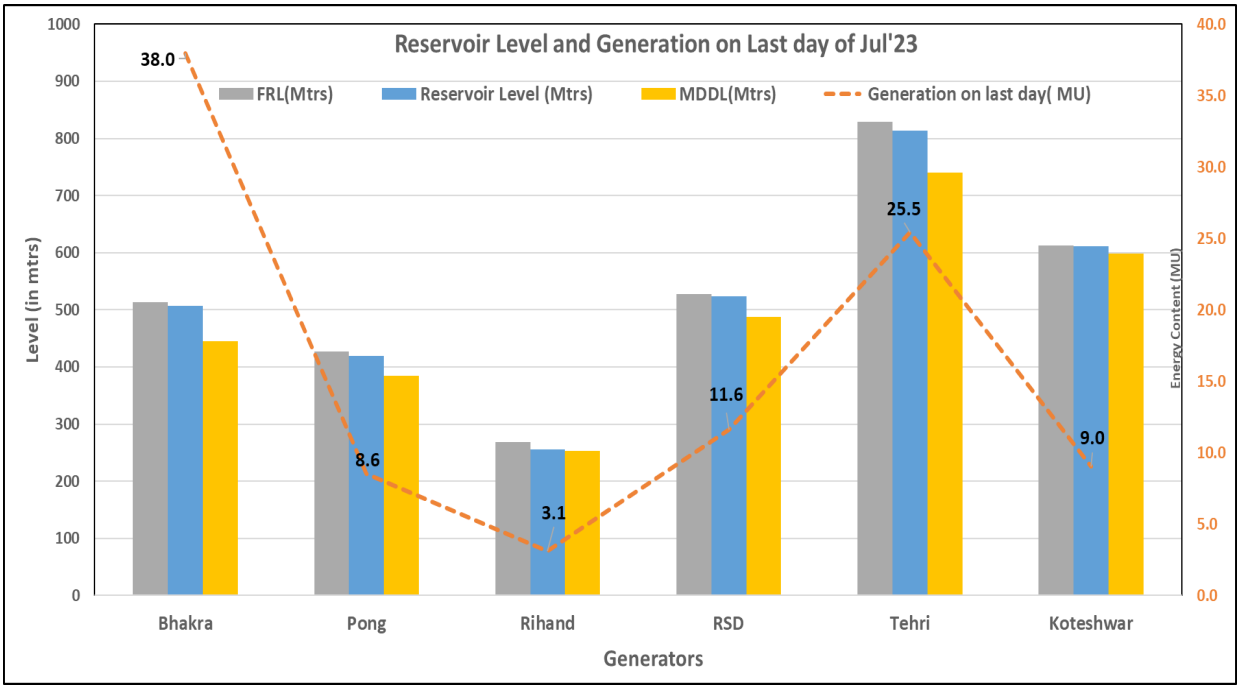
	States (MW)		PSP (Mus)	
Uttar Pradesh	28284	24-07-2023 21:43 hrs	577.5	24.07.23

All Time High Record		
Generation	Value (MU)	Achieved on
Hydro Generation	440.8	30.07.2023

iii) Frequency profile

Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
July'23	50.01	50.42 on 30.07.23 at 13:01:50 hrs	49.58 on 03.07.23 at 19:43:40 hrs	4.60	**74.96**	20.44
July'22	50.00	50.30 on 14.07.22 at 13:14:10 hrs	49.42 on 18.07.22 at 19:20:00 hrs	7.83	**73.45**	18.72

iv) Reservoir Level and Generation on Last Day of Month



Detailed presentation on grid highlights of July'2023 as shared by NRLDC in OCC meeting is attached as Annexure-B.I.

15. SPS in Western Rajasthan ISTS RE Complex

In 209 OCC meeting, NRLDC representative shared concerning information about the significant number of grid events (over 30 incidents) involving RE generation loss that occurred between January 2022 and May 2023. The most severe event resulted in a maximum RE generation loss of 7120 MW, which took place on 15th May 2023. Such substantial losses in RE generation pose a serious threat to grid security, as they have the potential to trigger cascade tripping and lead to electricity supply disruptions over wide areas.

To evacuate the mentioned ~12.4 GW of ISGS RE generation, the Northern region relies on 16 number of 765kV lines. These transmission lines play a critical role in transferring the renewable energy from the generating sources to the consumption centers. Ensuring the reliability and proper functioning of these lines is of utmost importance to maintain grid stability and meet the increasing demand for renewable energy in the region.

NRLDC representative addressed the recent outage of 400kV and above transmission lines due to tower collapses and proposed several measures to enhance the reliability and resilience of the grid, especially in the context of the Rajasthan RE complex. The proposed suggestions are as follows:

1. Review of Wind Zones:

2. Single Circuit Lines in Critical Corridors:

3. n-2 Reliability Criteria for Prone Areas:

However, while these long-term suggestions are being implemented on the field, the NRLDC representative proposed a SPS Scheme logic for the ISTS RE complex to ensure n-1-1/n-2 compliance during events like tower collapse. NRLDC representative also briefed the forum about the basecase assumptions considered while doing the study for SPS requirement. Proposed SPS logic is attached as Annexure-B.I of Agenda.

CTUIL representative requested NRLDC to share the basecase used for conducting the SPS study. CTUIL wanted to re-verify the study and provide their inputs to ensure its accuracy and effectiveness. NRLDC agreed to share the basecase for review and incorporation of additional insights. CTUIL recommended that designing the SPS logic may be done based on the loading of lines rather than the combined RE generation quantum.

In 210 OCC meeting, NRLDC representative reiterated that since large amount of RE is being commissioned in the complex at rapid pace whereas the associated transmission system is slightly delayed, so lot of power is also being evacuated under short term open access. Since large number of lines are on D/C tower, in case of tower collapse or any other event it may become a bottleneck for safe evacuation of power. Therefore, SPS was proposed in the complex and was also discussed in detail in the last OCC meeting. NRLDC representative further displayed the base case and updated SPS logic after implementation of inputs given by CTUIL i.e inclusion of line loading in SPS logic.

Assessment of Generation backdown of n-2 SPS requirement for 765kV lines of Rajasthan RE pocket

Basecase assumption

400kV Bhadla(RS)-Bikaner(RS) D/C	in service
400kV Bikaner(PG)-Bikaner_2(PG) D/C	in service
STATCOM -1 and 2 @ Bhadla_2	in service
STATCOM-1 @ Bikaner_2	in service
All 400kV lines presently out in Rajasthan	in service
Rajasthan demand	15500 MW
Raj Solar	3400 MW
Raj Wind	1500 MW

Result :

Contingency / Line Loading	Loading of 765kV Fatehgarh2-Bhadla2 D/C > 2000 MW and < 2200 MW	[Loading of 765 kV Fatehgarh2-Bhadla D/C > 1350 and < 1450] or [Loading of 765kV Fatehgarh2_Bhadla2 D/C > 2200 And < 2400]	[Loading of 765 kV Fatehgarh_2-Bhadla D/C > 1450] or [Loading of 765kV Fatehgarh2_Bhadla2 D/C > 2400] or [Loading of 765kV Bhadla2-Ajmer D/C > 3200]
765kV Fatehgarh2-Bhadla D/C	no SPS required	200 MW generation backdown at Fatehgarh-1/2	500 MW backing at Fatehgarh-1/2
765kV Fatehgarh2-Bhadla2 D/C	100 MW backing at Fatehgarh_1	500 MW backing at Fatehgarh-1/2	800 MW backing at Fatehgarh-1/2
765kV Bhadla-Bikaner D/C	no SPS required	no SPS required	no SPS required
765kV Bhadla2-Bikaner D/C	no SPS required	no SPS required	no SPS required
765kV Bhadla2-Ajmer D/C	no SPS required	400 MW backing at Bhadla_2 (due to overloading of Jodhpur-Kankroli/ Bhadla-Jodhpur)	500 MW backing at Bhadla_2 (due to overloading of Jodhpur-Kankroli/ Bhadla-Jodhpur)
765kV Bikaner- Moga D/C	no SPS required	no SPS required	no SPS required
765kV Bikaner- Khetri D/C	no SPS required	no SPS required	no SPS required

CTUIL representative stated that they are still examining the previous file shared with them and agreed to give comments on the latest logic discussed in this meeting. CTUIL representative further informed that inputs from their side will be shared by 1st week of September.

Powergrid representative stated that implementation of logic can be done without any issues

OCC asked all members to submit their comments by first week of Sep.

16. Opening of 400 KV Singrauli(NT)-Anpara(UP) to control fault level

As per the recommendations of the 1st Meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP), 400 kV Singrauli – Anpara has to be opened to control the high fault levels in Anpara – Singrauli – Rihand complex.

Extract from the meeting are shown below:

6.13. After deliberations, following was agreed:

(i) The transmission system for evacuation of power from Singrauli III:

I. LILO of both circuits of Tie line (Vindhyachal Stage-IV to Vindhyachal Stage-V 400kV D/C Twin Moose line) at Singrauli Stage-III- under the scope of NTPC.

II. Reconductoring of Singrauli Stage-III - Vindhyachal stage-IV 400 kV D/C TM line (formed after above proposed LILO) with HTLS conductor - under the scope of NTPC

III. Singrauli-III–Rihand-III 400kV D/c line- under ISTS scope

IV. 2x125 MVAR Bus Reactor at Singrauli-III generation switchyard- under scope of NTPC

(ii) Singrauli- Anpara 400 kV line will be kept normally open (can be closed in emergency conditions) after commissioning of Anpara D –Unnao 765kV line to restrict high short circuit level in Singrauli-Anpara complex.

(iii) The short circuit level in Singrauli will again be studied by CEA and CTU and accordingly, would be discussed in the next NRPCTP meeting.

The above scheme may also be rectified in next NRPCTP meeting.

NRLDC representative informed the forum that a meeting was organized on 10.07.2023 among NLDC, NRLDC & SLDC – UP to discuss on the constraints faced in the operation of HVDC back-to-Back Vindhyanchal in WR to NR direction due to high loading of 400 kV Anpara – Obra. In the meeting it was discussed & agreed that:

- As per the recommendations of the 1st Meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP), 400 kV Singrauli – Anpara will be opened to control the high fault levels in Anpara – Singrauli – Rihand complex. NRLDC & SLDC - UP shall conduct a study to observe the impact of opening 400 kV Singrauli – Anpara on the fault level of the complex.
- Also, the opening of 400 kV Singrauli – Anpara will relieve the loading of 400 kV Anpara – Obra and provide flexibility in the operation of HVDC back-to-Back Vindhyanchal in both directions. The same shall be studied by NRLDC & UP – SLDC to identify operational issues with 400 kV Singrauli – Anpara in

open condition. The contingencies/planned outages which may require closing of the line will also be identified.

- For due consultation with all the stakeholders i.e. POWERGRID, NTPC & UP, the matter shall be taken up in the OCC forum before implementation.

NRLDC representative further shared the observations of the study conducted to assess the effects resulting from the opening of the 400 KV Singrauli(NT)-Anpara(UP) (PG) transmission line on the system, and the fault level of the Anpara-Singrauli generation complex, along with the potential contingencies that could occur.

Singrauli	1850 MW
Rihand	1856 MW
Anpara A&B	1546 MW
Anpara C	1100 MW
Anpara D	944 MW
Vindhyanchal BTB	500 MW towards NR
Obra	903 MW
Bara	1760 MW
NR Demand	73200 MW
UP Demand	27000 MW

HVDC Rihand Dadri : 1400 MW towards Dadri
HVDC Balia Bhiwadi : 250 MW towards Bhiwadi

Sl. No	Bus number	Substation	Voltage level	Case: Maximum Generation		After opening 400kV Anpara-Singrauli		Relief
				Fault MVA	Fault current	Fault MVA	Fault current	
1	154056	SINGRL4	400	33.32166	48095.7	22.17586218	32008.1	16087.6
2	154014	ANPARA4	400	37.90139	54705.9	28.11090748	40574.6	14131.3
3	154016	ANPARAC	400	37.11426	53569.8	27.78389629	40102.6	13467.2
4	154015	ANPARA-D	400	33.37294	48169.7	25.77984422	37210	10959.7
5	154057	RIHAND-G	400	22.57143	32579	19.22666463	27751.3	4827.7
6	157000	ANPARAC	765	35.06184	26461.4	32.26407693	24349.9	2111.5
7	157001	ANPARA-D	765	35.23052	26588.7	32.45792719	24496.2	2092.5
8	154018	OBRA4	400	18.54675	26769.9	17.59133154	25390.9	1379
9	157027	OBRA_C_TPS	765	21.62366	16319.5	20.69268716	15616.9	702.6

From the study results, it is clear that the fault level in the Singrauli-Anpara complex has significantly decreased. Maximum relied is observed at Singrauli (16kA), Anpara TPS (14kA), Anpara C (13kA) and Anpara D (11kA)

S.No.	Name of elements	Basecase flow	Case-1: Rihand-Dadri D/C out	Case-2: 765kV AnparaD-ObraC out	Case-3: 765kV AnparaC-Unnao out	D.F. Case-1	D.F. Case-2	D.F. Case-3
1	400kV Rihand-Singrauli ckt 1	-81	403	-79	-78.72	34.57%	0.21%	0.22%
2	400kV Rihand-Singrauli ckt 2	-77	386	-75	-75.26	33.07%	0.21%	0.17%
3	400kV Rihand-Allahabad ckt 1	305	534	302.34	302.09	16.36%	-0.28%	-0.28%
4	400kV Rihand-Allahabad ckt2	305	534	302.34	302.09	16.36%	-0.28%	-0.28%
5	400kV Singrauli-Allahabad ckt 1	438	655	434	433.45	15.50%	-0.42%	-0.44%
6	400kV Singrauli-Allahabad ckt 2	395	591	391.29	390.93	14.00%	-0.39%	-0.39%
7	400kV Singrauli-Allahabad ckt 3	411	616	408	407.51	14.64%	-0.31%	-0.34%
8	400kV Singrauli-Lucknow	444	580.96	457	457.91	9.78%	1.36%	1.35%
9	400kV Singrauli-Fatehpur	454	643.98	457	457.16	13.57%	0.31%	0.31%
10	400kV Anpara-Singrauli	0	0	0	0	0.00%	0.00%	0.00%
11	400kV Anpara-Mau	315	323.35	391.46	401.94	0.60%	8.02%	8.43%
12	400kV Anpara-Sarnath ckt 1	442	444.02	532	544.24	0.14%	9.44%	9.91%
13	400kV Anpara-Sarnath ckt 2	442	444.02	532	544.24	0.14%	9.44%	9.91%
14	400kV Anpara-Anpara_D ckt 1	-10.23	-6.23	-88	-92.89	0.29%	-8.16%	-8.01%
15	400kV Anpara-Anpara_D ckt 2	-10.23	-6.23	-88	-92.89	0.29%	-8.16%	-8.01%
16	400kV Anpara-Anpara_C ckt 1	-26.7	-18.7	-177	-203.62	0.57%	-15.76%	-17.15%
17	400kV Anpara-Anpara_C ckt 2	-26.7	-18.7	-177	-203.62	0.57%	-15.76%	-17.15%
18	400kV Anpara-Obra	362.26	329.17	545	570.28	-2.36%	19.16%	20.17%
19	765 Anpara_D-ObraC	953.64	965.16	0	1465.48	0.82%		49.62%
20	765 Anpara_C-Unnao	1031.57	1044.05	1528.6	0	0.89%	52.12%	
21	HVDC-Rihand Dadri ckt 1	700	0	700	700		0.00%	0.00%
22	HVDC-Rihand Dadri ckt 2	700	0	700	700		0.00%	0.00%
23	HVDC Vindyachal BTB	500	500	500	500	0.00%	0.00%	0.00%

NRLDC representative stated that as per the study conducted for various contingencies the system was seen to be N-1 Compliant and stable.

Other major findings of the study:

i. The system is compliant w.r.t to N-2 contingency of HVDC Rihand Dadri D/c.

ii. However, Singrauli complex would be N-1 non-compliant w.r.t further tripping of any one ckt of 400kV Singrauli-Allahabad, 400kV Singrauli-Lucknow, 400kV Rihand-Allahabad. By shifting Vindhyachal towards WR (Western Region) with a minimum of 200 MW, the system becomes N-1 compliant

Action: *Therefore, in case of tripping on any one ckt in Singrauli complex power flow in HVDC Vindhyachal may be shifted towards WR with a minimum of 200 MW*

iii. The system is compliant w.r.t to N-1 contingency of 765 kV Anpara_C – Unnao and 765 kV Anpara D – Obra_C. No major contingency was observed

iv. However, if the generation at Obra is below 400 MW before the tripping incident, it would result in an overload on the 400 kV Anpara-Obra line after the tripping of any one of the 765 kV line.

v. In order to maintain N-1 compliance, the safe limit for HVDC Balia-Bhiwadi power transfer should be **300 MW** from Bhiwadi to Balia which was **400 MW** prior to opening of 400 KV Singrauli(NT)-Anpara(UP) (PG).

The study results and basecase were shared with UP SLDC on 02.08.2023.

NRLDC representative requested SLDC UP to provide the results of the study carried out on their part and requested CTUIL to provide their comments**.**

SLDC UP representative stated that they received similar results from the study conducted at their end and will share the observations with NRLDC shortly.

NTPC and POWERGRID were also requested to provide any comments from their side.

OCC asked all members to submit their comments by first week of September 2023.

17. Transmission related issues observed during high demand season

As discussed in previous OCC meetings, 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.

Latest state wise issues are listed below:

Haryana:

TTC: 9100MW

ATC: 8800MW

In 209 OCC meeting, following was discussed:

- NRLDC representative requested HVPN to expedite commissioning of new elements which would help to meet higher demand with minimal transmission related issues.
- HVPN representative stated that 500 MVA ICT at Kurushetra is expected by August 2023.
- Work on 220kV Jajji –Rai D/C line is almost complete. Some relay work is pending at Powergrid end and the work will be completed within 2 weeks.
- Revised timeline for the commissioning of the 220kV Sec 32 Panchkula and 220kV lines to Panchkula (PG) is now set for September 2023 due to ROW issues

- No timeline provided for 400/220kV Deepalpur ICT augmentation works.

In 210 OCC meeting, NRLDC representative requested HVPN to share the status of new elements to be commissioned.

HVPN representative stated that:

- As intimated by powergrid 500 MVA ICT at Kurushetra is delayed due to system constraints as shutdown of ICTs was not possible and is likely to be commissioned by Oct 2023.
- FTC documents for 220kV Jajji –Rai D/C line has already been submitted.
- Revised timeline for the commissioning of the 220kV Sec 32 Panchkula and 220kV lines to Panchkula (PG) is set for September 2023 as of now.
- No definite timeline was given for Deepalpur ICT.

NRLDC representative stated that enhanced ATC-TTC of Haryana will be implemented once Kurukshetra ICT comes into service and requested HVPN to expedite work of Kurukshetra ICT.

Punjab:

TTC: 9500MW

ATC: 9000MW

In 209 OCC meeting, following was discussed:

- NRLDC representative requested Punjab to expedite commissioning of Dhanansu S/S which would help to meet higher demand with minimal transmission related issues.
- Punjab SLDC was asked to ensure that loading of 400/220kV ICTs is within their N-1 contingency limit during the paddy season.

NRLDC representative requested Punjab SLDC to share update regarding 400/220kV Dhanansu S/s.
Punjab representative stated that the revised timeline for Dhanansu S/S is September end and ATC for this season shall remain unchanged.

Delhi:

TTC: 7300MW

ATC: 7000MW

In 209 OCC meeting, following was discussed:

- DTL representative stated that mock testing of SPS at Bawana will be done and report will be submitted before next week.
- ATC/TTC of Delhi control area would be changed as per reassessed figures after mock testing of SPS at Bawana.

NRLDC representative stated that ATC of Delhi has been updated to 7100 MW as per reassessed figures after mock testing of SPS at Bawana and report submission.

Rajasthan:

TTC: 7600MW

ATC: 7000MW

Raj SLDC was requested to share ATC/TTC limits for summer/ monsoon 2023 at the earliest. NRLDC has shared comments on limits and base case submitted by RVPN

In 209 OCC meeting, following was discussed:

- Rajasthan representative stated they have made the necessary changes and the revised basecase will be shared shortly with NRLDC.

NRLDC representative requested Rajasthan SLDC to share ATC/TTC limits for summer/ monsoon 2023 at the earliest. However, no update was given from SLDC Rajasthan regarding the same.

UP:

TTC: 16100MW

ATC: 15500MW

In 209 OCC meeting, UP SLDC representative informed:

- Plan to manage loading of 400/220kV Mau, Allahabad, Orai, Azamgarh & Sarnath area
- Shared their revised ATC/TTC assessments for monsoon 2023.

At number of substations across different states, loading of major 400/220kV ICTs were observed to be beyond their N-1 contingencies. Plots attached as Annexure-B.II of Agenda.

NRLDC representative showed constraints observed at of major 400/220kV ICTs of different states for the last 30 days. Following points were highlighted:

- For Punjab – Ludhiana ICT loadings were near N-1 limit during early week of the month, Nakodar ICTS were N-1 non-compliant, SLDC Punjab was requested to expedite augmentation of 2nd ICT at Nakodar.
- For Delhi – ICT loadings were well within range.
- For UP – Azamgarh, sarnath, obra, Allahabad and lucknow ICT loadings were near N-1 limit, However, in Gorakhpur N-1 violations has been observed, augmentation at Gorakhpur needs to be expedited for resolution.

For Haryana – Deepalpur ICTs are N-1 non-compliant at many incidents. Panipat and Kurushetra ICT loadings are near N-1 limit

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.

As discussed in last several OCC meetings, all SLDCs need to furnish ATC/TTC details of their control area at respective SLDC websites. Now, it is being observed that most of the SLDCs except J&K are uploading ATC/TTC limits on their websites.

SLDC	Link for ATC on website
UP	https://www.upsldc.org/documents/20182/0/ttc_atc_24-11-16/4c79978e-35f2-4aef-8c0f-7f30d878dbde
Punjab	https://www.punjabsldc.org/downloads/ATC-TTC0321.pdf
Haryana	https://hvpn.org.in/#/atcttc
Delhi	https://www.delhisldc.org/resources/atcttcreport.pdf
Rajasthan	https://sldc.rajasthan.gov.in/rrvpnl/scheduling/downloads
HP	https://hpsldc.com/mrm_category/ttc-atc-report/
Uttarakhand	https://uksldc.in/ttc-atc
J&K and Ladakh U/T	**NA**

All SLDCs were requested to regularly update ATC/TTC limits after mutually agreement between SLDC and NRLDC.

NRLDC representative requested all the constituents to timely update ATC/TTC limits.

18. Grid operation related issues

a) Draft Outage Planning procedure:

As per Regulation 32(4) of Indian Electricity Grid code (IEGC) 2023, RPCs are required to formulate a common outage planning procedure. To promote consistency and streamlined outage planning procedures, a draft outage planning procedure has been prepared in consultation with all the five RLDCs. This draft proposes to align the provisions and timelines envisaged in the IEGC 2023. Procedure is attached as Annexure-B.III of Agenda.

NRLDC representative requested all the constituents to go through the new draft procedures from NLDC regarding processing of outages.

Following types of outages were discussed:

1. Planned outage category – outages which are planned in OCC meetings for next month.

2. Post outage category – if outages due to any exceptional cases was not covered in OCC, constituents shall request the outage on D-5 basis to RPC. Once approved from RPC, NRLDC will approve the outage on D-4 onwards.

3. Emergency Category – Emergency nature of outage shall be taken in real time directly from control room as usual. However, certain documents may be required before shutdown as mentioned in the procedure.

NRLDC representative briefly discussed timelines given in the procedure for different outage category and requested all the constituents to go through the procedure.

OCC asked members to go through the procedure and provide comments. Comments may be mailed to "nrldcoutage@grid-india.in".

b) High Voltage issue at 220kV Phaphund Railway S/s

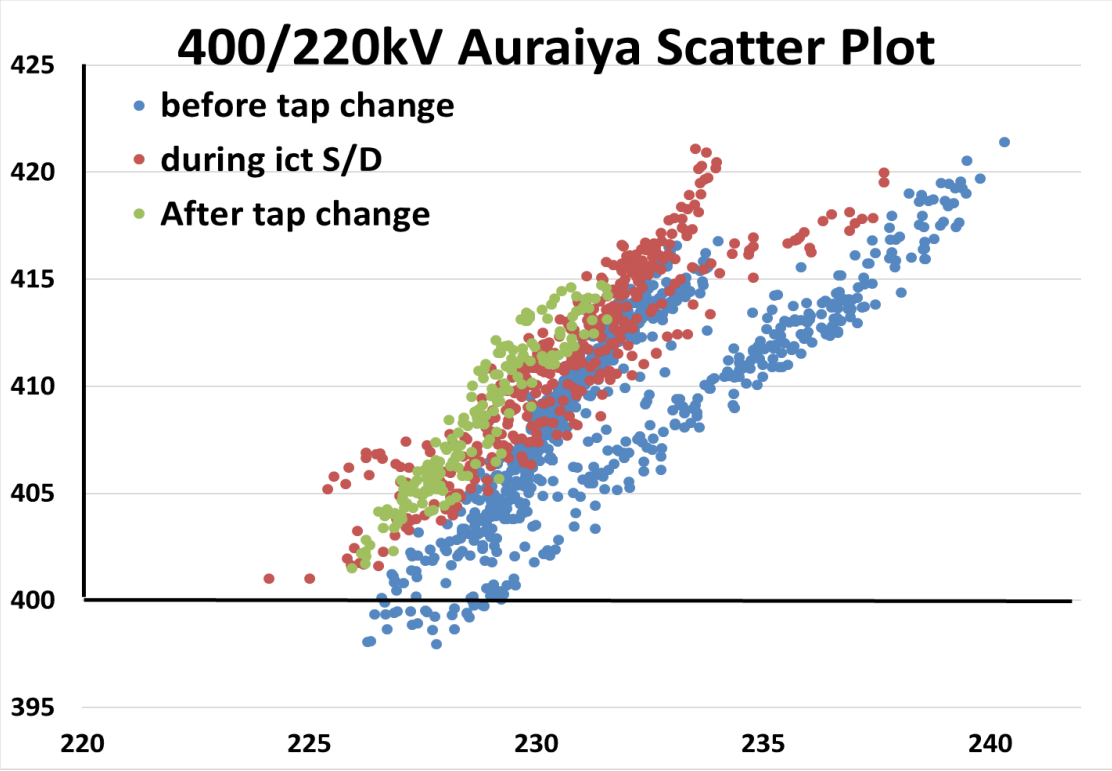
Issue of voltage is being observed at 220kV Phaphund Railway feeders which are connected from 220kV Auraiya NTPC. North Central Railway vie their letter (Annexure-B.IV of Agenda) dated 31.07.2023 have requested for actions to control overvoltage in 220kV ckts. supply from Auraiya S/s to Phaphund Railway GSS.

Generally, units at Auraiya are not running, so they are able to provide reactive power support and maintain voltages in the area.

After examining the voltage profile of 400/220kV Auraiya S/s, NRLDC asked NTPC Auraiya to change (reduce) tap position of 400/220kV ICTs by 2 steps vide mail dated 31.07.2023. Subsequently, NTPC team informed that the last testing of both the ICTs was done more than one year ago with the stable tap position i.e. 11. Since the testing at different tap positions is not carried out for a long duration, it is essential to carry out all the tests such as winding resistance/Tan Delta/TTR/Magnetizing etc. before changing the tap position & requested for shutdown for at least three days for each ICT.

Shutdown of 400/220kV ICT 2 at Auraiya was availed from 03.08.2023 to 06.08.2023 for testing and tap change works. It can be seen from the plot below that voltage profile at 220kV improved by 8-10kV after tap change of one ICT.

In 210 OCC meeting, NRLDC representative discussed multiple incidents of high voltage issues in the month of July at 220kV Phaphund railway S/s at Auraiya. NRLDC representative informed the forum that the reactive power support from units at Auraiya is not available as units are not running due to less demand.



However, on further analysis it can be seen that voltage at 220kV Auraiya is significantly impacted by generation at 220kV Auraiya Gas generating units. Therefore, the issue of voltages reaching 240kV at Auraiya and Phaphund Railway GSS need to be analysed in detail and corrective actions need to be planned. NTPC, CTUIL and Railway are requested to provide update.

Moreover, NTPC is advised to ensure regular planned maintenance and testing of transformers so that in case of requirement, tap changes may be done immediately without need for ICT shutdown. It is also suggested to carry out tap change for ICT1 also at the earliest to avoid any circulating current flow.

NTPC, CTUIL and Railway were requested to plan for corrective action as issue of high voltage is persistent in the area.

NTPC was asked to ensure regular planned maintenance and testing of transformers so that in case of requirement, tap changes may be done immediately without need for ICT shutdown. It is also suggested to carry out tap change for second ICT also at the earliest to avoid any circulating current flow.

NTPC representative agreed for actions on the above requested points.

OCC asked NTPC, CTUIL and Railway for actions as discussed above.

c) Long outage of transmission elements and generating units

Following transmission elements and generating units are under prolonged outage.

Name of element	Owner	Outage time (in hrs) / date	Reason of outage
400/220 KV 315 MVA ICT 2 AT MUNDKA (DV)	Delhi	00.19/20.09.19	Tripped due to fire in ICT.
400/220 KV 315 MVA ICT 1 AT MURADNAGAR_1(UP)	U.P	02:46/13.03.20	Buchholz relay alarm and LBB protection operated. Tripped along with Hapur-Muradnagar line. Transformer tested and found damaged. It is to be replaced with New T/F.
400KV BUS 1 AT VISHNUPRAYAG (JP)	U.P	14.42/02.12.21	Bus bar protection operated at Vishnuprayag. Sparking in Bus Coupler CB.
400/220 KV 240 MVA ICT 3 AT MORADABAD (UP)	U.P	22.38/13.12.21	HYDROGEN GAS IN TRANSFORMER IS ABOVE PERMISSIBLE LIMIT. Permissible limit of H2 gas>100ppm Current level of H2 gas : 3501 ppm
220 KV KISHENPUR	JKPDD	21.45/19.02.22	Tower No. 170 collapsed

(PG)-MIR BAZAR (PDD) (PDD) CKT-1			near Batote
400KV BUS 1 AT PARBATI_3(NH)	PARBATI-III-NH	15.25/27.02.23	One pole of Bus Coupler CB has got stuck at Parbati-3.
400 KV NOIDA SEC 148-NOIDA SEC 123 (UP) CKT-2	U.P	17.28/08.03.23	LBB operated at Noida Sec 148 end.
UNITS			
250 MW CHHABRA TPS - UNIT 3	Rajasthan	04:03/24.05.2023	due to Station transformer -3 electrical fault

NRLDC representative requested utilities to expedite restoration of the Grid elements under long outage at the earliest and also provide an update regarding their expected restoration date/time in the meeting/ NRLDC outage portal and via mail to nrldcso2@grid-india.in.

NHPC representative informed that due to connectivity issues by road from Delhi to Parbati, transportation of breaker is getting delayed and shall be revived by the end of September 2023.

19. Frequent forced outages of transmission elements in the month of July'23:

The following transmission elements were frequently under forced outages during the month of **July'23**:

S. NO.	Element Name	No. of forced outages	Utility/ SLDC
1	220 KV Nara(UP)-Roorkee(UK) (UP) Ckt-1	7	UP/UK
2	220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2	4	Singoli/ UK
3	220 KV Saharanpur(PG)-Shamli(UP) (UP) Ckt-1	4	PG/UP
4	400 KV Bareilly-Unnao (UP) Ckt-1	4	UP
5	400 KV Heerapura-Hindaun (RS) Ckt-1	4	Rajasthan
6	220 KV NAPP(NP)-Khurja(UP) (UP) Ckt-1	4	NAPP/ UP

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

Discussion during the meeting:

- **220 KV Nara(UP)-Roorkee(UK) (UP) Ckt-1:** *NRLDC representative raised concerned on frequent tripping of line and non A/R operation in line. He further asked the status of actions taken w.r.t. Main-1&2 relays in reference of OCC 208 & 209 UP deliberation. UP representative informed that Main-1 relay has been replaced with a spare healthy relay on 28th July, 2023, A/R is also functional. Issue related to Main-2 relay not resolved yet, proposal to replace the Main-2 relay is still at head. Regarding frequent faults in line, UP representative informed that patrolling was done during each incidents, on 11th July fault, R-ph polymer insulator was found damaged at tower location no. 21, no fault was found in rest of the incidents. UP was requested to expedite the replacement of Main-2 relay and ensure the healthiness of protection system. UP agreed for the same.*

- **220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2:** *NRLDC representative raised concerned on frequent tripping of line and A/R operation. He further said that generation of Singoli Bhatwari HEP also get affected during tripping of both the lines. PTCUL representative informed that, on 03rd, 12th & 21st July, fault occurred during heavy rain and inclement weather condition and on 14th July, bus bar protection operated due to blast of ST. It was further informed that ABB engineer have tested the relays and taken necessary actions to rectify the A/R related issue.*

- **220 KV Saharanpur(PG)-Shamli(UP) (UP) Ckt-1:** *NRLDC representative raised concerned on frequent tripping of the line and non-operation of A/R during single phase to earth fault. UP representative informed that on 02nd July, B-ph polymer found damaged, on 28th July, earth wire found snapped at tower location no 175 and on 30th July, line successfully autoreclosed from Shamli end. UP was requested to take remedial actions to minimise the faults in line and POWERGRID was requested to ensure the healthiness and proper operation of A/R at their end during single phase to earth fault.*

- **400 KV Bareilly-Unnao (UP) Ckt-1:** *NRLDC representative raised concerned on frequent tripping of line and non-operation of A/R in line. He further said that issue related to Barielly-Unnoa ckt tripping were raised in last many OCC meeting however, no improvement is observed. UP representative informed that continuous follow-up has been done with Bareilly S/s but no response received from their end. UP Transmission wing said that they will share the present status and details of remedial action taken. NRLDC representative requested to expedite the necessary actions required to minimise the frequent tripping of the line. UP agreed for the same.*

- **NAPP(NP)-Khurja(UP) (UP) Ckt-1:** *NRLDC representative raised concerned on frequent tripping of line and non-operation of A/R in line. UP representative informed that on 15th July, fault was in reclaim time, on 19th & 26th July, line tripped due to A/R lockout issue and on 28th July, line tripped from remote end only in back up protection operation as CB at Sikandrabad end didn't open on fault in 220kB Khurja-Sikandrabad ckt and its LBB also didn't operate. It was further informed that issue w.r.t. A/R lockout has been taken up with relay engineer and report of the same will be shared when it get corrected and issue related CB stuck and LBB operation has been corrected. NRLDC representative requested to expedite the A/R operation related issue to minimise the frequent tripping of the line. UP agreed for the same.*

NRLDC representative emphasized that A/R (auto re-closer) issue was found in many of these tripping. He 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 reducing the reliability of the grid. All the utilities shall endeavor to keep auto re-closer in service and healthy condition of 220 kV and above voltage level transmission line. Issue of time syncing of DR/EL at many of the stations was highlighted, constituents were requested to ensure the time syncing of DR/EL. In addition, necessary actions also need to be taken to ensure the Right of Way to minimize the frequent faults in the line. All utilities agreed for the same.

OCC forum reiterated that frequent outages of such elements affect the reliability and security of the grid. Members were requested to look into such frequent outages and share the remedial measures taken/being taken in this respect.

20. Multiple element tripping events in Northern region in the month of July'23:

A total of 18 grid events occurred in the month of July'23 of which **09** are of GD-1 category, **05** are of GI-2 Category & **04** is of GI-1 category. The tripping 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 delayed clearance of fault observed in event of multiple elements tripping at 220kV Nara(UP) on 26th July, 2023. As per PMU, B-N phase to earth fault with delayed clearance of **1400msec** is observed.

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **10** events out of **18** grid events occurred in the month. The other major events with delayed clearance of faults are as follows:

i. Tripping at 220kV Bawana(DTL) at 12:24hrs on 03rd July, 2023, fault clearance time: 440msec:

Delhi representative informed that fibre wire of differential protection got cut and due to which fault cleared in Z-2 and thus delayed clearance of fault observed. Issue w.r.t. fibre wire has been taken up and will be completed at the earliest.

ii. Multiple elements tripping at 400/220kV Bhadla(RS) at 19:56hrs on 18th July, 2023, fault clearance time: 320msec:

Rajasthan representative informed that distance protection at Bhadla(RS) didn't operate due to issue in DC supply, same has been rectified. NRLDC representative asked the status of healthiness of differential protection in line. On this, Rajasthan representative informed that they will share the information in due course of time. Rajasthan was also requested to ensure the time syncing of the DR at Bhadla(RS). Rajasthan agreed the same.

iii. Multiple elements tripping at 220kV Majri(HP) at 07:07hrs on 26th July, 2023, fault clearance time: 400msec:

Uttarakhand representative informed that analysis report of the tripping event will be shared within a week.

03 (no.) of the grid events occurred due to maloperation of protection system in July 2023. Those event were as follows:

- Multiple elements tripping at 400/220kV Bareilly(UP) at 06:39hrs on 01st July, 2023: maloperation of bus bar protection of bus-1:

UP representative informed that bus bar relay is of non-numerical type and DR of the relay is also not available due to which exact cause of maloperation can't be ascertained. It was further informed that bus bar protection has been kept out of service to avoid any further maloperation. NLRDC representative requested to expedite the process of replacement of bus bar relay with numerical one at Bareilly (PG). UP agreed the same.

- Multiple elements tripping at 400/220kV Mandola(PG) at 20:21hrs on 23rd July, 2023: maloperation of bus bar protection:

POWERGRID representative informed that CT terminal wire at LV side of 400/220kV ITC-4 opened which led to the operation of bus bar protection. Issue

has been rectified. It was further informed that process of replacement if bus bar relay with new bus bar protection relay is in process.

- Tripping of 400kV Bikaner(PG)-Avada line: Maloperation of Z-4 distance protection at Bikaner(PG) end.

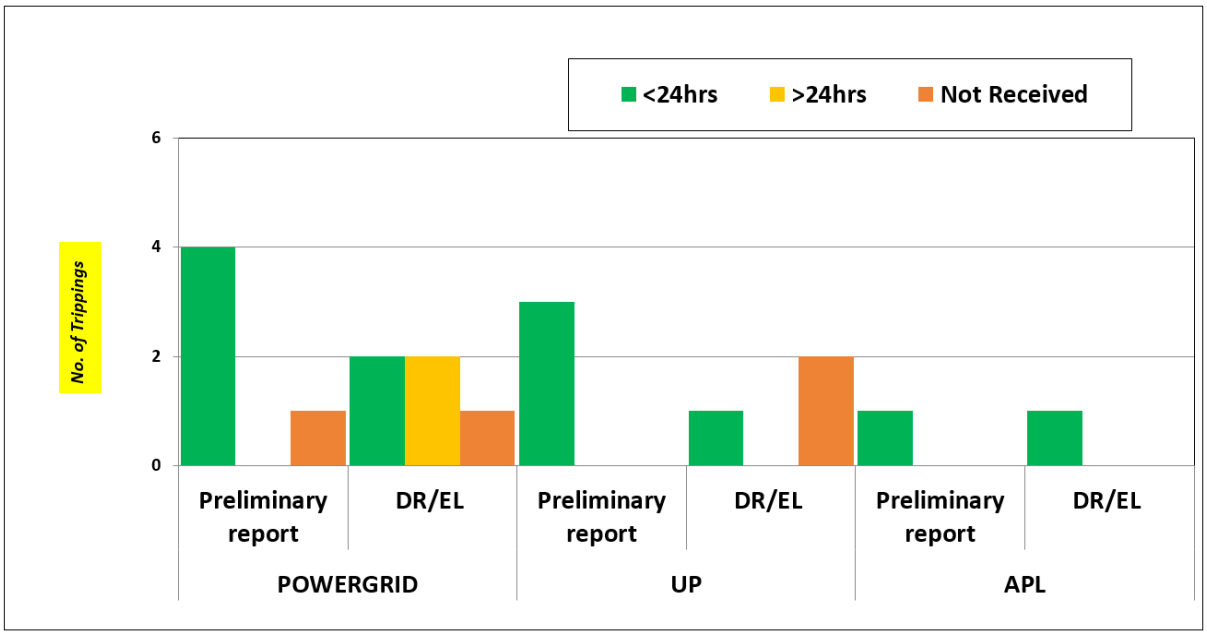
NRLDC representative requested concerned utilities to analyse the tripping incidents at their end and taken necessary actions to avoid the similar events in future. Also share the detailed report of the tripping incidents along with remedial action taken. Utilities agreed for the same.

OCC forum suggested all the NR constituents to update the information on tripping portal developed by NRLDC. All the constituents agreed to take proactive remedial 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 were further requested to ensure the time syncing of recording devices (DR, EL etc.) with GPS/NAVIK at substation of their respective control area. Members agreed to take action in this regard.

21. Details of tripping of Inter-Regional lines from Northern Region for July' 23:

A total of 09 inter-regional lines tripping occurred in the month of July'23. 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.



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

OCC forum emphasized the importance of inter- regional links and requested all the concerned utilities to take necessary corrective to minimise such tripping in future.

22. Status of submission of DR/EL and tripping report of utilities for the month of July'23.

The status of receipt of DR/EL and tripping report of utilities for the month of July'2023 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 reporting status of POWERGRID, UP & Uttarakhand was satisfactory, reporting status of Punjab & Delhi has improved in July, 2023 compared to the previous month. However, reporting status from Punjab, Delhi, HP, Rajasthan, Haryana & J&K need further improvement.

Delhi, Haryana & Punjab representative stated that they will further improve the reporting status in coming months.

NRLDC representative raised concerned over delay in reporting of DR/EL by Rajasthan which further delays the analysis of tripping events. Rajasthan representative informed that zone wise protection wing are formed in Rajasthan

control area and they only extract and collect the DR/EL from substations, there is no facility at substation to extract and submit the DR. This issue leads to delay in submission of DR/EL. NRLDC representative requested Rajasthan to take necessary follow-up actions to facilitate the DR extraction and sharing facility at substation also to minimise the delay in DR/EL submission and further analysis of the event.

OCC forum emphasized the importance of DR/EL & tripping report data for analysis of the trippings. In addition, these data are also base for the availability verification. Unavailability of these details delays the availability verification process also. Hence, timely submission of DR/EL & tripping report is very much necessary. Members were requested to comply the IEGC 5.2(r) and submit the details in time. Members agreed to take necessary follow-up actions 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.

23. 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.

*PSS tuning and Step Response Test of 6*68.67MW Rampur HPS was conducted during 06.07.2023 to 07.07.2023*

Members were requested to update about their future plan for PSS tuning.

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.

OCC forum deliberated 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. Members agreed for the same.

24. Frequency response characteristic:

Two FRC based event occurred in the month of **July-2023**. 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*	NR FRC during the event (%)
1	20-Jul-23	02:28hrs	On 20th July 2023 at 13:53 hrs, as reported, R-N fault occurred on 220kV Bhadla(PG)- MRPL ckt. Breaker at Bhadla(PG) end didn't open and therefore, LBB of MRPL bay at Bhadla(PG) operated. LBB operation led to the triping of RE station connected at 220kV Bus-1B at Bhadla(PG) i.e., MRPL, CSPJL,	50.06	50.01	*0.05*	46

			ACME & MAHOBA. At the same time, drop in RE generation at RE stations connected at other ISTS pooling station in Rajasthan RE complex also occurred on LVRT. As per PMU, total drop in RE generation was approx. 2526MW. Hence, generation loss of 2526MW has been considered for FRC calculation.				
2	31-Jul-23	10:36hrs	On 31st July, 2023, at 10:36:11 hrs, B-ph jumper at RSUPL end of 220kV Fatehgarh2-RSUPL ckt snapped. As per PMU, B-N & R-N fault is observed in the grid. At the same time, 220kV Fatehgarh2-Nokhra line also tripped on line over current protection. At the same time, drop in RE generation at RE stations connected at other ISTS pooling station in Rajasthan RE complex also occurred on LVRT. As per PMU, total	50.15	50.04	*0.11*	19

			drop in RE generation was approx. 1625MW. Hence, generation loss of 1620MW has been considered for FRC calculation.				

Status of Data received till date for 20th July, 2023 event:

Status of Field Data received of FRC of Grid event occurred at ISTS RE generation complex in Rajasthan in Northern Region at 13:53 Hrs on 20.07.2023			
Data Received from		Data Not Received from	
Koteshwar HEP	TSPL	Uttarakhand	APCPL Jhajjar
UP	Punjab	Kawai TPS	Rihand NTPC
Dadri NTPC	NJPS	Tehri HEP	Unchhahar NTPC
Haryana	Singrauli NTPC	HP	Delhi
BBMB	Karcham Wangtoo HPS		NHPC
Dadri NTPC	Rajasthan		

FRC of ISGS generators:

Generator	20-Jul-23 event	Generator	20-Jul-23 event
Singrauli TPS	9%	Salal HEP	-6%
Rihand-1 TPS	-11%	Tanakpur HEP	-8%
Rihand-2 TPS	-10%	Uri-1 HEP	-3%
Rihand-3 TPS	28%	Uri-2 HEP	0%
Dadri-1 TPS	180%	Dhauliganga HEP	112%
Dadri -2 TPS	189%	Dulhasti HEP	6%
Unchahar TPS	-4%	Sewa-II HEP	37%
Unchahar stg-4 TPS	289%	Parbati-3 HEP	0%
Jhajjar TPS	299%	Jhakri HEP	8%
Dadri GPS	2%	Rampur HEP	0%
Anta GPS	No generation	Tehri HEP	No generation
Auraiya GPS	-11%	Koteswar HEP	0%
Narora APS	12%	Karcham HEP	21%
RAPS-B	-9%	Malana-2 HEP	No generation
RAPS-C	14%	Budhil HEP	6%
Chamera-1 HEP	-2%	Bhakra HEP	-76%
Chamera-2 HEP	No generation	Dehar HEP	-1%
Chamera-3 HEP	-7%	Pong HEP	3%
Bairasiul HEP	0%	Koldam HEP	114%
		AD Hydro HEP	0%

FRC of State generators:

Generator	20-Jul-23 event	Generator	20-Jul-23 event
PUNJAB		UP	
Ropar TPS	2%	Obra TPS	-4%
L.Mohabbat TPS	139%	Harduaganj TPS	5%
Rajpura TPS	19%	Paricha TPS	-2%
T.Sabo TPS	10%	Rosa TPS	94%

Status of Field Data received of FRC of Grid event occurred at ISTS RE generation complex in Rajasthan in Northern Region at 10:36 Hrs on 31.07.2023

Data Received from		Data Not Received from	
NJPS	Haryana	Uttarakhand	APCPL Jhajjar
UP	Kawai TPS	HP	Rihand NTPC
Tehri HEP	Koteshwar HEP	Rajasthan	Unchhahar NTPC
Dadri NTPC	Singrauli NTPC	Punjab	Delhi
		Karcham Wangtoo HPS	NHPC
			TSPL
			BBMB

Status of Data received till date for 31st July, 2023 event

FRC of ISGS generators:

Generator	31-Jul-23 event	Generator	31-Jul-23 event
Singrauli TPS	3%	Salal HEP	-6%
Rihand-1 TPS	2%	Tanakpur HEP	-7%
Rihand-2 TPS	-6%	Uri-1 HEP	29%
Rihand-3 TPS	0%	Uri-2 HEP	0%
Dadri-1 TPS	No generation	Dhauliganga HEP	75%
Dadri -2 TPS	-48%	Dulhasti HEP	4%
Unchahar TPS	7%	Sewa-II HEP	0%
Unchahar stg-4 TPS	-64%	Parbati-3 HEP	0%
Jhajjar TPS	34%	Jhakri HEP	33%
Dadri GPS	No generation	Rampur HEP	35%
Anta GPS	No generation	Tehri HEP	3%
Auraiya GPS	No generation	Koteswar HEP	-6%
Narora APS	6%	Karcham HEP	72%
RAPS-B	-41%	Malana-2 HEP	No generation
RAPS-C	12%	Budhil HEP	-1%
Chamera-1 HEP	-8%	Bhakra HEP	0%
Chamera-2 HEP	-2%	Dehar HEP	-2%
Chamera-3 HEP	3%	Pong HEP	10%
Bairasiul HEP	0%	Koldam HEP	172%
		AD Hydro HEP	0%

FRC of State generators:

Generator	31-Jul-23 event	Generator	31-Jul-23 event
PUNJAB		UP	
Ropar TPS	-14%	Obra TPS	-2%
L.Mohabbat TPS	63%	Harduaganj TPS	61%
Rajpura TPS	22%	Paricha TPS	10%
T.Sabo TPS	-1%	Rosa TPS	9%
Goindwal Sahib TPS	96%	Anpara TPS	-6%
Ranjit Sagar HEP	No generation	Anpara C TPS	7%
Anandpur Sahib HEP	-1%	Anpara D TPS	23%
HARYANA		Bara TPS	3%
Panipat TPS	0%	Lalitpur TPS	66%
Khedar TPS	0%	Meja TPS	2%
Yamuna Nagar TPS	No generation	Vishnuprayag HEP	0%
CLP Jhajjar TPS	25%	Alaknanda HEP	0%
Faridabad GPS	No generation	Rihand HEP	No generation
RAJASTHAN		Obra HEP	-10%
Kota TPS	0%	UTTARAKHAND	
Suratgarh TPS	2%	Gamma Infra GPS	No generation
Kalisindh TPS	0%	Shravanti GPS	No generation
Chhabra TPS	No generation	Ramganga HEP	No generation
Chhabra stg-2 TPS	-123%	Chibra HEP	-2%
Kawai TPS	123%	Khodri HEP	0%
Dholpur GPS	No generation	Chilla HEP	-8%
Mahi-1 HEP	No generation	HP	
Mahi-2 HEP	No generation	Baspa HEP	4%
RPS HEP	0%	Malana HEP	0%
JS HEP	0%	Sainj HEP	No generation
DELHI		Larji HEP	No generation
Bawana GPS	50%	Bhabha HEP	0%
Pragati GPS	1%	Giri HEP	-6%
		J&K	
		Baglihar-1&2 HEP	No generation
		Lower Jhelum HEP	No generation

NRLDC representative stated that primary frequency response is not satisfactory at some of the ISGS and intrastate generating stations. States may plan to conduct

the primary frequency response testing of their generating stations. Any tuning required may also be conducted in coordination with OEM.

NRLDC representative stated that

- *FRC of Kawai Unit-2 is satisfactory however, unit-1 showed insignificant and early die out of response. No response observed in Kota TPS also. Rajasthan was requested to review the same and taken necessary actions required.*
- *Delayed frequency response observed in Singrauli and Dadri TPS generating units. Response in Rihand TPS units is not uniform. Individual units have different behaviour. NTPC is request to review the same.*
- *No response observed in Yamuna Nagar TPS Unit-1 and unsatisfactory response observed in Yamuna Nagar TPS Unit-2.*

Punjab representative informed that PFR testing at other generating stations (Ropar TPS, RSD HEP, Rajpura TPS) is also in process.

Rajasthan representative informed that approval for conducting PFR testing has been taken at plant level and further process are being done. Necessary actions are being taken to expedite the PFR testing process.

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.

OCC forum further requested to take corrective actions and also take initiative of conducting PFR testing of generating units for further turning and improvement. Constituents agreed for the same

25. 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.

Details are yet to be received from J&K.

Constituent wise status of bus bar protection where bus bar protection is either not installed or installed but not operational along with present status as per detail received from constituents is attached as **Annexure-B.X** of Agenda.

Constituents were requested to share the status of remedial action taken/to be taken regarding commissioning and healthiness of bus bar protection at 220kV & above substations.

NRLDC representative stated that as per details received from Haryana, bus bar protection has been commissioned at 220kV Jind on 27.06.2023 and at 220kV Fatehabad on 22.07.2023.

Rajasthan, UP, Punjab and BBMB was requested to share the present status of the bus bar protection and also take necessary actions to expedite the commissioning/restoration of bus bar protection at 220kV & above substations. Members agreed the same.

NRLDC requested all the concerned members to expedite the commissioning of bus bar protection at 220kV & above stations wherever it is not healthy/not commissioned. Constituents are also requested to ensure the healthiness of bus bar protection at stations of their control area.

OCC forum requested all the constituents to update the status of bus bar protection at S/s of their control area and also expedite the commissioning and implementation work of bus bar protection system. Members agreed for the same.

26. Replacement of electromechanical relays with numerical relays:

Clause-5.2(r) of IEGC, clause-15(4) of CEA Grid standards and clause-48(4) of CEA Construction Standards 2022 mandates that *''each line or transformer or reactor or any other bay shall be provided with facility for disturbance recording, event logging and time synchronizing equipment''.*

During analysis of grid incidents/disturbances, it has been found that there are few stations where electromechanical relays are still in use and thus disturbance recorder are not available there which accounts for violation of Clause-5.2(r) of IEGC, clause-15(4) of CEA Grid Standards and clause 48(4) CEA Construction Standards 2022.

In addition, clause-3 in part III (Grid Connectivity Standards applicable to Transmission Line and Sub-Station) of Standards for Connectivity to the Grid, 2007 reads as

‘*’Two main numerical Distance Protection Schemes shall be provided on all the transmission lines of 220 kV and above for all new sub-stations. For existing sub-stations, this shall be implemented in a reasonable time frame”*

It is known that Disturbance recorder (DR) is essential for analysis of grid incidents/ disturbances. Its non-availability eventually affects the proper analysis of grid incidents/disturbances and monitoring of protection system.

Deliberation on same subject has also been done during 207 OCC. During the meeting, all the constituents/SLDC/STU were requested to review the same in their control area and take expedite actions to replace electromechanical relays with numerical relays.

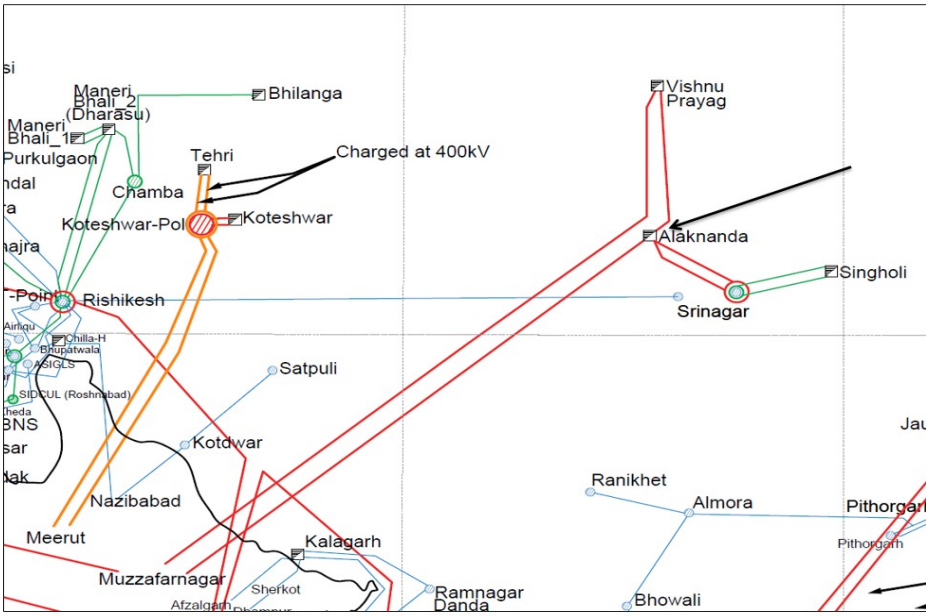
Constituents were requested to share the status of remedial action taken/to be taken regarding replacement of electromechanical relays with numerical relays w.r.t. their control area**.**

Constituent wise details of static/electromechanical type protection relays at their respective substations along with its present status per detail received from constituents is attached as **Annexure-B.XI** of Agenda.

NRLDC representative stated that constituent wise status of protection relays have received. There are significant number of elements at 220kV & above level where static/electromechanical type protection relays are in use. All the concerned constituents are requested to initiate the process of replacement of static/electromechanical type protection relays with numerical relays and share the present status of the same.

OCC forum requested all the constituents to update the status of type of protection relays at S/s of their control area and also expedite the replacement work of static/electromechanical type protection relays with numerical relays. Members agreed for the same.

27. SPS on 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) Ckt to ensure the safe evacuation of power of Alaknanda HEP, Vishnuprayag HEP & Singoli Bhatwari HEP:

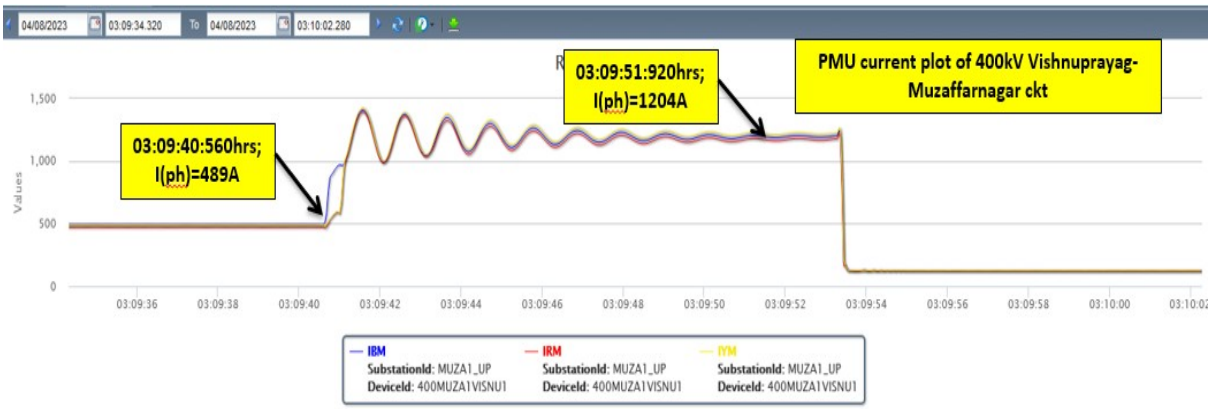


Power of 82.5*4 MW Alaknanda HEP, 100*4MW Vishnuprayag HEP and 33*3MW Singoli Bhatwari HEP evacuates through 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt and 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt. In case of tripping of any one line i.e., 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt or 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt, load will shift to another line and total power flow on remaining line may increase to ~880MW(~1270A). Conductors of all the 400kV lines are of Twin Moose type with thermal rating of approx. 900MW. So, remaining line can evacuates the power 880MW would be in its safe loading limit.

However, line CT at Vishnuprayag end in 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt is of rating 1000/1 and Vishnuprayag has also kept over current protection in the line at their end with pick up setting as 1200A(~831MW at 400kV). So, in case of tripping of 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt load will shift to 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt and in peak hydro period it may go up to ~880MW and line will trip on over current protection operation.

On 04th August, 2023 at 03:10hrs, similar tripping event had occurred. During the event, 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt tripped on B-N fault at 03:10:40 hrs and further after ~13sec, 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt tripped on over current protection operation at Vishnuprayag end. As reported, current in the 400 KV Muzaffarnagar(UP)-Vishnuprayag(JP) (UP) ckt went up to ~1252A (1204A as per PMU at Muzaffarnagar(UP)). With the tripping of 400 KV Muzaffarnagar(UP)-

Vishnuprayag(JP) (UP) ckt, al the generation of Alaknanda HEP, Vishnuprayag HEP & Singoli Bhatwari HEP lost (total ~880MW.



Similar event had occurred on 20th July 2021 and as a remedial action, NRLDC had suggested to replace the CT with higher rating. However, same 1000/1 line CT is in use and Vishnuprayag has informed that long planning will be required to change the CT as station is of GIS(SF6) type. So, SPS may be planned at Vishnuprayag end to ensure the safe evacuation of power from this hydro power complex during peak season. Tripping of 100*2 MW at Vishnuprayag HEP on line current going above 1150A (~796MW at 400kV) after tripping of 400 KV Alaknanda GVK (UPC)-Muzaffarnagar(UP) ckt may be implemented.

Therefore, Vishnuprayag and UPPTCL were requested to discuss internally the SPS logic (contingency and actions), finalize it and propose in OCC meeting for approval.

NRLDC stated that SPS would be implemented in Vishnuprayag, Alaknanda HEP complex. Logic of the same would be finalised in coordination with Alaknanda, Vishnuprayag HEP and UPPTCL. A separate meeting may be conducted in this regard and appropriate SPS logic may be finalised and presented in upcoming OCC meeting for further discussion and approval.

NRLDC representative also raised concern over A/R operation in the line at Alaknanda end during single phase to earth fault. It was requested to Alaknanda to share the Main-1&2 relay setting of the line protection and review the same at their end. Alaknanda HEP was further requested to ensure the A/R operation at their end during single phase to earth fault in the line. Alaknanda HEP agreed for the same.

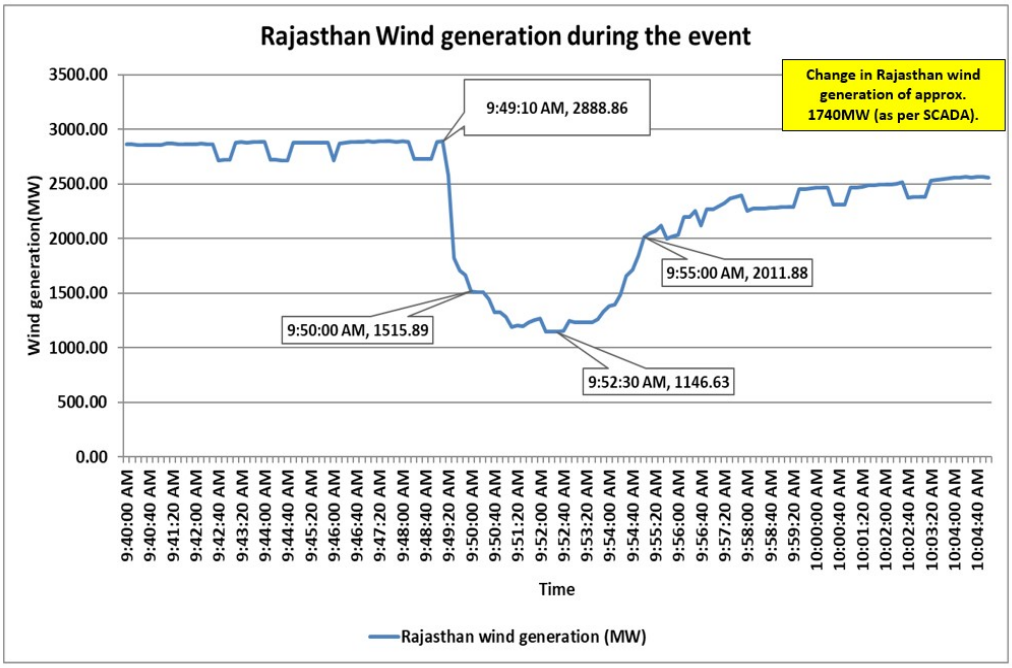
OCC forum requested UPPTCL, Alaknanda HEP & Vishnuprayag HEP to final the SPS logic for safe evacuation of hydro generation of Alaknanda, Vishnuprayag HEP complex and tp present in next OCC meeting for further discussion and approval. It was further requested to UPPTCL & Alaknanda HEP to take necessary corrective actions to ensure the proper operation of protection system and A/R operation in the line to minimise unwanted tripping of line.

28. Frequent incidents of Wind generation loss in Rajasthan control area:

In recent past frequent event of wind generation loss have reported in Rajasthan control area. Triggering incidents were fault in 220kV & 132kV lines at 220/132kV Amarsagar due to snapping of bus jumper. Brief of the events are as follows:

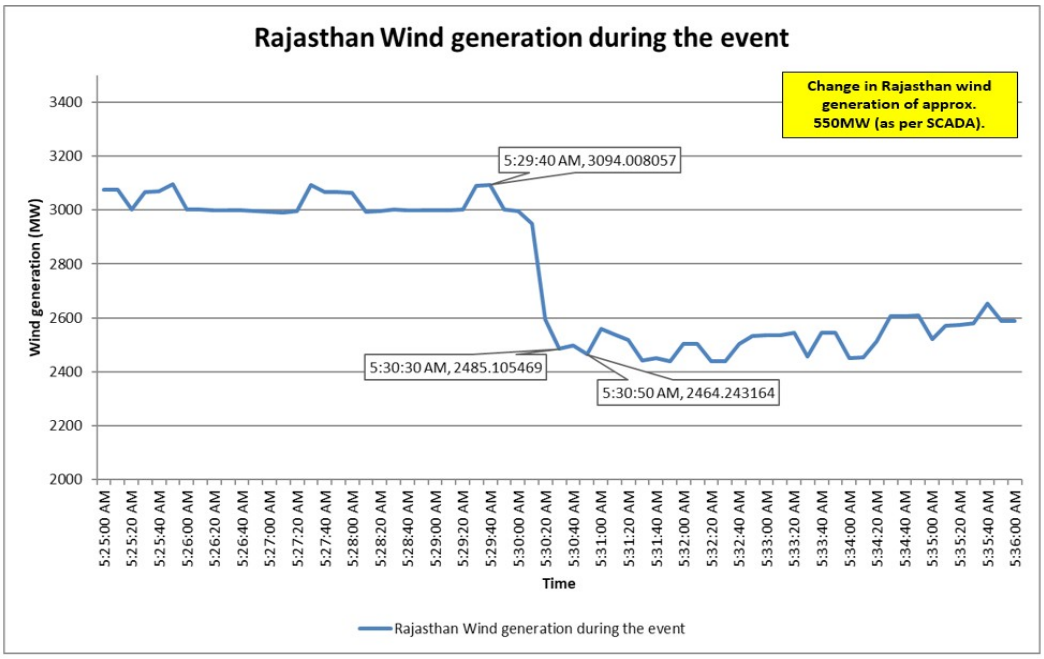
i) On 06th August at 09:48hrs: Y-phase Main Bus Tandem isolator Jumper Y phase Jumper of 132kV Amarsagar – Ludarva ckt-2 at Amarsagar end. Which further led to the multiple elements tripping at Amarsagar and nearby stations.

Total loss of wind generation of approx. **1750MW**

ii) 

On 07th August at 05:30hrs: R-phase bus Jumper of 220kV Amarsagar – Phalodi ckt at Amarsagar end. Which further led to the multiple elements tripping at Amarsagar.

Total loss of wind generation of approx. **550MW**



It is evident from the recent trippings due to snapping of conductors that there are issues related to operation and maintenance at 220/132kV Amarsagar S/s.

Rajasthan was requested to take necessary remedial actions to avoid such undesired tripping in future. It was further requested to ensure the proper maintenance of electrical and mechanical components in the switchyard.

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:
◎ CHANDIGARH — Sep-2019
◎ DELHI — Jun-2023
◎ HARYANA — May-2023
◎ HP — Jul-2023
◎ J&K and LADAKH — Not Available
◎ PUNJAB — May-2023
◎ RAJASTHAN — Jul-2023
◎ UP — Jul-2023
◎ UTTARAKHAND — Jul-2023
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:
◎ CHANDIGARH — Not Available
◎ DELHI — Jun-2023
◎ HARYANA — Jun-2023
◎ HP — May-2023
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Jun-2023
◎ RAJASTHAN — Mar-2023
◎ UP — Jun-2023
◎ UTTARAKHAND — Jun-2023
◎ BBMB — Jun-2023
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:
◎ CHANDIGARH — Not Available
◎ DELHI — Increased
◎ HARYANA — Increased
◎ HP — Increased
◎ J&K and LADAKH — Not increased
◎ PUNJAB — Increased
◎ RAJASTHAN — Increased
◎ UP — Increased
◎ UTTARAKHAND — Increased
◎ BBMB — Increased
J&K and LADAKH were requested to update status for increasing settings of UFRs.</td></tr>
</table>

<table>
<tr><td></td><td></td><td></td><td></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>Status of the information submission (month) from states / utilities is as under:
<table><tr><td>◎</td><td>HARYANA</td><td>Sep-2022</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Jul-2023</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Jul-2023</td></tr><tr><td>◎</td><td>UP</td><td>Jul-2023</td></tr><tr><td>◎</td><td>NTPC</td><td>Feb-2023</td></tr></table>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>Submission of breakup of Energy Consumption by the states</td><td>All states/UTs are requested to submit the requisite data as per the billed data information in the format given as under:
<table><tr><td>Category→</td><td>Consumption by Domestic Loads</td><td>Consumption by Commercial Loads</td><td>Consumption by Agricultural Loads</td><td>Consumption by Industrial Loads</td><td>Traction supply load</td><td>Miscellaneous / Others</td></tr><tr><td><Month></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></td><td>Status of the information submission (month) from states / utilities is as under:
<table><tr><td></td><td>State / UT</td><td>Upto</td></tr><tr><td>◎</td><td>CHANDIGARH</td><td>Not Submitted</td></tr><tr><td>◎</td><td>DELHI</td><td>May-23</td></tr><tr><td>◎</td><td>HARYANA</td><td>Jun-23</td></tr><tr><td>◎</td><td>HP</td><td>Jun-23</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>Not Submitted</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Jun-23</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Jun-23</td></tr><tr><td>◎</td><td>UP</td><td>Apr-23</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Mar-23</td></tr></table>J&K and Ladakh and Chandigarh are requested to submit the requisite data w.e.f. April 2018 as per the billed data information in the given format</td></tr>
<tr><td>6</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>All states/UTs are requested to submit daily data on MERIT Order Portal timely.</td></tr>
<tr><td>7</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>Status:
<table><tr><td>◎</td><td>DELHI</td><td>Fully implemented</td></tr><tr><td>◎</td><td>HARYANA</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>HP</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Under implementation. Likely completion schedule is 31.10.2023.</td></tr><tr><td>◎</td><td>UP</td><td>Scheme implemented by NPCIL only</td></tr></table></td></tr>
</table>

8	Reactive compensation at 220 kV/ 400 kV level at 15 substations			
	State / Utility	Substation	Reactor	Status
i	POWERGRID	Kurukshetra	500 MVAr TCR	Anticipated commissioning: Oct'23
ii	DTL	Peeragarhi	1x50 MVAr at 220 kV	Anticipated commissioning: 15.08.2023
iii	DTL	Harsh Vihar	2x50 MVAr at 220 kV	2x50 MVAR Reactor at Harsh Vihar has been commissioned on dated 31th March 2023.
iv	DTL	Mundka	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	Bay work completed on 25.03.2023. Reactor part tender is dropped and at present same is under revision.
v	DTL	Bamnauli	2x25 MVAr at 220 kV	Bay work completed on 25.03.2023. Reactor part tender is dropped and at present same is under revision.
vi	DTL	Indraprastha	2x25 MVAr at 220 kV	Bay work completed on 07.11.2023. 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 - 1x125 MVAR Reactor at Dhuri has been commissioned on dated 30th March 2023. 220kV Reactors - 1x25 MVAR Reactor at Dhuri has been commissioned on dated 27th January 2023.
ix	PUNJAB	Nakodar	1x25 MVAr at 220 kV	1x25 MVAR Reactor at Nakodar has been commissioned on dated 13th February 2023.
x	PTCUL	Kashipur	1x125 MVAR at 400 kV	Price bid has been opened and is under evaluation. Retendered in Jan'23
xi	RAJASTHAN	Akal	1x25 MVAr	1x25 MVAR Reactor at Akal has been commissioned on dated 25th July' 2022.

xii	RAJASTHAN	Bikaner	1x25 MVAr	1x25 MVAR Reactor at Bikaner has been commissioned on dated 24th June 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.	Jun'23	02 No. of bays shall be utilized for LILO-II of 220kV Hiranagar Bishnah Transmission Line, the work of which is under progress and shall be completed by end of Jun'2023. Updated in 207th OCC by JKPTCL.
2	400/220kV, 2x315 MVA New Wanpoh	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• 220 kV New Wanpoh - Alusteng D/c Line	End of 2023	02 No. of bays are to be utilized for connecting 220kV New Wanpoh-Alusteng D/c Line. The work is in progress and expected to be commission by the end of 2023. Updated in 204th OCC by JKPTCL.
				• 220 kV New Wanpoh - Mattan D/c Line	End of 2024	02 No. of bays are to be utilized for connecting 220kV New Wanpoh-Mattan D/c Line. The funding source for the project is being identified and the project is expected to be completed by ending 2024. Updated in 204th OCC by JKPTCL.
3	400/220kV, 2x315 MVA Amargarh	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• 220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri	End of 2024	02 No. of bays are proposed to be utilized for connecting 220/132 kV GSS Loolipora. The funding source for the project is being identified and the project is expected to be completed by ending 2024. Updated in 204th OCC by JKPTCL.
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• 220kV Bhadson (Kurukshetra) – Ramana Ramani D/c line	Jul'24	Updated in 205th OCC by HVPNL
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	31.08.2023	Updated in 210th 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: 2 Unutilized: 4	• 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.	Dec'23	Issue related to ROW as intimated in 208th OCC by HVPNL.
				• 220 kV Bhiwani (PG) - Dadhibana (HVPNL) D/c line.	Apr'24	Issue related to ROW as intimated in 192nd OCC by HVPNL.
10	Jind 400/220kV S/s	Commissioned: 4 Approved:4 Total: 8	Utilized: 4 Unutilized: 0	• 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	Tender is under process Updated in 205th OCC by HVPNL.
11	400/220kV Tughlakabad	Commissioned: 6 Under Implementation: 4	Utilized: 6 Unutilized: 0	• RK Puram – Tughlakabad (UG Cable) 220kV D/c line – March 2023.	-	DTL to update the status.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
	GIS	Total: 10	Under Implementation:4	• 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	Sep'23	Updated in 208th OCC by HPPTCL
				• HPPTCL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Giri S/s	-	HPPTCL to update the status.
				• Network to be planned for 2 bays	-	HPPTCL to update the status.
13	400/220kV Kadarpur Sub-station	Commissioned: 8 Total: 8	Utilized: 0 Unutilized: 8	• 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.	Dec'23	Forest approval is pending for 220 KV Pali - Sector 56 D/C line. Updated in 205th OCC by HVPNL
				• 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	Dec'23	Updated in 205th OCC by HVPNL
14	400/220kV Sohna Road Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• LILO of both circuits of 220kV D/c Sohna-Rangla Rajpur at Roj Ka Meo line at 400kV Sohna Road	Jan'24	Updated in 208th OCC by HVPNL
				• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road	-	The matter is subjudice in Hon'ble Punjab & Haryana High court, Chandigarh Updated in 205th OCC by HVPNL. **Status:-** Earlier 02 nos 220 kV line bays were to be utilized for the 220 kV GIS S/Stn. Sec-77, Gurugram but due to denotification of land of the 220 kV GIS S/Stn. Sec-77 the said substation is now going to be dismantled and a new substation is proposed at Sec-75A, Gurugram. Now, these 02 no. 220 kV line bays may be utilized at 220 kV GIS S/Stn Sec-75A, Gurugram.
15	400/220kV Prithla Sub-station	Commissioned: 8 Aprroved: 2 Total: 10	Utilized: 4 Unutilized: 4 Under Implementation:2	• 220kV D/C line from Prithla to Harfali with LILO of one circuit at 220kV Meerpur Kurali	31.03.2024	Updated in 205th OCC by HVPNL
				• LILO of both ckt of 220kV D/c Ranga Rajpur – Palwal line	Commissioned	Commisioned date: 31.12.2021. Updated in 198th OCC by HVPNL
				• 220kV D/C for Sector78, Faridabad	31.03.2024	Issue related to ROW and Pending crossing approval from Northern Railways and DFCCIL. as intimated in 205th OCC by HVPNL.
				• Prithla - Sector 89 Faridabad 220kV D/c line	31.03.2024	Updated in 205th OCC by HVPNL
16	400/220kV Sonepat Sub-station	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 2 Unutilized: 4 Under	• LILO of both circuits of 220kV Samalkha - Mohana line at Sonepat	05.10.2023	Updated in 205th OCC by HVPNL
				• Sonepat - HSIISC Rai 220kV D/c line	-	Updated in 205th OCC by HVPNL. **Status:** Due to non-performance of work of 220KV GIS Rai S/Stn, the Contract has been terminated & blacklisted by O/o XEN/WB O/o CE/PD&C, HVPNL, Panchkula vide Ch-100/HDP-2418/REC-254/Xen(WB) Dated 24.02.2023. Now pending work will be caried out by HVPNL/ Departmentely

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
		Total: 8	Implementation:2	• Sonepat - Kharkhoda Pocket A 220kV D/c line	31.07.2024	Updated in 205th OCC by HVPNL. **Status:** The Possession of land for construction of 220KV S/Stn. Pocket-A i.e 6.33 Acres and for Pocket-B is 5.55 Acres has been taken over by HVPNL. Work order yet to be issued by O/o CE/PD&C, Panchkula for construction of 2 no. 220KV GIS S/Stn Pocket-A & Pocket-B.
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	25.08.2023	• Lucknow -Kanduni, 220 kV D/C line expected energization date Aug'23 updated by UPPTCL in 209th OCC due to sub-station commissioning delay _____ • 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	22.08.2023	• Gorakhpur(PG)- Maharajganj, 220 kV D/C line expected energization date is 22.08.2023 updated by UPPTCL in 210th 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	Dec'23	SCDA System & PLCC work pending at 220 KV S/stn. Rajokheri Updated in 209th OCC by HVPNL
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	Sep'23	Updated in 205th OCC by HVPNL
				• Panchkula – Sector-32 220kV D/c line	Sep'23	Updated in 205th OCC by HVPNL
				• Panchkula – Raiwali 220kV D/c line	Commissioned	Updated in 194th OCC by HVPNL
				• Panchkula – Sadhaura 220kV D/c line: Sep'23	Jul'24	Updated in 205th OCC by HVPNL
		Commissioned:7	Utilized: 6	• Amritsar – Patti 220kV S/c line	31.07.2023	Route survey/tender under process. Updated in 209th OCC by PSTCL.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
26	400/220kV Amritsar S/s	Approved in 50th NRPC- 1 no. Total: 8	Unutilized: 1 Approved in 50th NRPC- 1 no.	• 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)	15.08.2023	Route survey/tender under process. Work expected to be completed by 15th August 2023. Updated in 208th 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 Approved: 4 Total: 8	Utilized:2 Unutilized: 2	• LILO of 220 kV Nunamajra-Daultabad S/c line at 400 kV Bahadurgarh PGCIL	31.03.2024	Updated in 205th OCC by HVPNL. **Status:** Tentative route stands submitted by TS wing and accordingly BOQ has been submitted by design wing to contracts wing for award of work.
				• Bahadurgarh - METL 220kV D/c line (Deposit work of M/s METL)	31.03.2024	Updated in 205th OCC by HVPNL. **Status:** Tentative route stands submitted by TS wing and accordingly BOQ has been submitted by design wing to contracts wing for award of work.
				• Bahadurgarh - Kharkhoda Pocket B 220kV D/c line	31.07.2024	
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 2 bays	-	Status:- 2nos bays are being utilised for 220 kV D/C Panchgaon (PGCIL)-Panchgaon Ckt-I & 220 kV D/C Panchagon (PGCIL)-Panchgaon Ckt-II, charged on dated 05.09.2022 & 20.10.2022 respectively. The 2nos bays may be utilised by HVPNL in future.
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	Commissioned	Saharanpur(PG)-Devband D/c line (Energization date: 20.04.2023) updated by UPPTCL in 207th 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	Work completed but pending for FTC.	Direct circuit from 220 kV Lalton Kalan to Dhandari Kalan to be diverted to 400 kV PGCIL Ludhiana. Work completed but pending for first time charging.Updated in 209th 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.

FGD Status

Updated status of FGD related data submission

NTPC (27.02.2023)
MEJA Stage-I
RIHAND STPS
SINGRAULI STPS
TANDA Stage-I
TANDA Stage-II
UNCHAHAR TPS
UPRVUNL (18.07.2023)
ANPARA TPS
HARDUAGANJ TPS
OBRA TPS
PARICHHA TPS

PSPCL (18.07.2023)
GGSSTP, Ropar
GH TPS (LEH.MOH.)
RRVUNL (09.07.2023)
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: 31-01-2022), INDIRA GANDHI STPP U#2 (Target: 30-09-2023), INDIRA GANDHI STPP U#3 (Target: 30-06-2023)
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: 31-12-2022), PANIPAT TPS U#7 (Target: 31-12-2022), PANIPAT TPS U#8 (Target: 31-12-2022), RAJIV GANDHI TPS U#1 (Target: 31-12-2024), RAJIV GANDHI TPS U#2 (Target: 31-12-2024), YAMUNA NAGAR TPS U#1 (Target: 31-12-2024), YAMUNA NAGAR TPS U#2 (Target: 31-12-2024)

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: 31-03-2023), RIHAND STPS U#1 (Target: 31-10-2025), RIHAND STPS U#2 (Target: 30-06-2026), RIHAND STPS U#3 (Target: 31-12-2024), RIHAND STPS U#4 (Target: 31-03-2025), RIHAND STPS U#5 (Target: 30-06-2025), RIHAND STPS U#6 (Target: 31-10-2025), SINGRAULI STPS U#1 (Target: 31-12-2024), SINGRAULI STPS U#2 (Target: 31-12-2024), SINGRAULI STPS U#3 (Target: 31-12-2024), SINGRAULI STPS U#4 (Target: 31-12-2024), SINGRAULI STPS U#5 (Target: 31-03-2025), SINGRAULI STPS U#6 (Target: 31-06-2024), SINGRAULI STPS U#7 (Target: 31-03-2024), UNCHAHAR TPS U#1 (Target: 31-12-2023), UNCHAHAR TPS U#2 (Target: 31-12-2023), UNCHAHAR TPS U#3 (Target: 30-09-2023), UNCHAHAR TPS U#4 (Target: 30-09-2023), UNCHAHAR TPS U#5 (Target: 30-09-2023), UNCHAHAR TPS U#6 (Target: 31-08-2022), MEJA Stage-I U#1 (Target: 31-10-2023), MEJA Stage-I U#2 (Target: 30-06-2023), TANDA Stage-I U#3 (Target:), TANDA Stage-I U#4 (Target:), TANDA Stage-II U#3 (Target: 31-03-2023), TANDA Stage-II U#4 (Target: 30-09-2023)

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: 31-12-2026), GH TPS (LEH.MOH.) U#2 (Target: 31-12-2026), GH TPS (LEH.MOH.) U#3 (Target: 31-12-2026), GH TPS (LEH.MOH.) U#4 (Target: 31-12-2026), GGSSTP, Ropar U#3 (Target: 31-12-2026), GGSSTP, Ropar U#4 (Target: 31-12-2026), GGSSTP, Ropar U#5 (Target: 31-12-2026), GGSSTP, Ropar U#6 (Target: 30-12-2026)

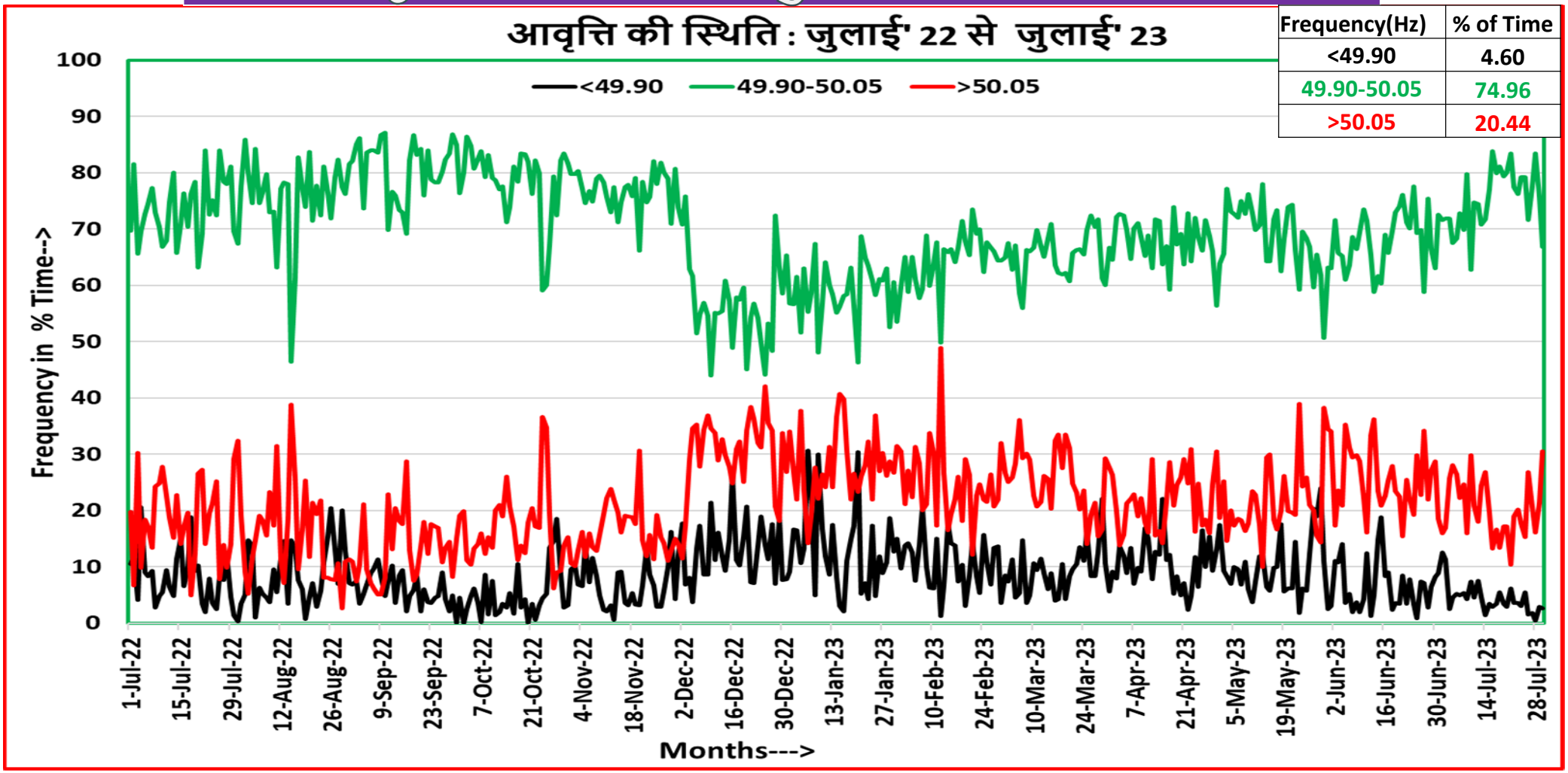
Rosa Power Supply Company	ROSA TPP Ph-I U#1 (Target: 31-12-2026), ROSA TPP Ph-I U#2 (Target: 31-12-2026), ROSA TPP Ph-I U#3 (Target: 31-12-2026), ROSA TPP Ph-I U#4 (Target: 31-12-2026)
RRVUNL	KOTA TPS U#5 (Target: 31-08-2024), KOTA TPS U#6 (Target: 31-08-2024), KOTA TPS U#7 (Target: 31-08-2024), SURATGARH 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)

प्रचालन समन्वय उपसमिति की बैठक
जुलाई- 2023

पिछले एक साल मे आवृत्ति की स्थिति

आवृत्ति बैंड	जुलाई 2022	अगस्त 2022	सितम्बर 2022	अक्टूबर 2022	नवम्बर 2022	दिसंबर 2022	जनवरी 2023	फ़रवरी 2023	मार्च 2023	अप्रैल 2023	मई 2023	जून 2023	जुलाई 2023
< 49.7 Hz(%)	0.42	0.49	0.17	0.04	0.13	1.11	1.25	0.32	0.16	0.24	0.24	0.22	0.09
<49.8 Hz(%)	1.78	2.02	0.91	0.46	0.76	3.96	3.60	1.95	1.26	1.68	1.48	0.86	0.66
<49.9 Hz(%)	7.82	8.77	5.94	4.88	6.70	12.78	13.30	10.75	9.03	10.54	9.83	8.42	4.60
49.90-50.05 Hz(%)	**73.45**	**75.77**	**80.77**	**78.27**	**77.00**	**57.39**	**58.70**	**64.68**	**63.84**	**67.90**	**68.48**	**67.83**	**74.96**
50.05-50.10 Hz(%)	14.84	11.99	11.55	14.04	13.88	11.99	15.26	14.59	17.86	12.54	13.25	15.59	15.64
>50.10 Hz(%)	3.58	3.00	1.65	2.63	2.30	17.84	12.34	8.49	7.99	6.46	8.44	8.15	4.79
>50.20 Hz(%)	0.31	0.47	0.08	0.18	0.12	4.07	1.83	1.49	1.28	0.88	0.77	1.09	0.80
औसत आवृत्ति	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	49.99	49.99	50.01	50.01

आवृत्ति की स्थिति: जुलाई -2022 से 2023



Frequency(Hz)	% of Time
<49.90	4.60
49.90-50.05	74.96
>50.05	20.44

जुलाई-2023 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

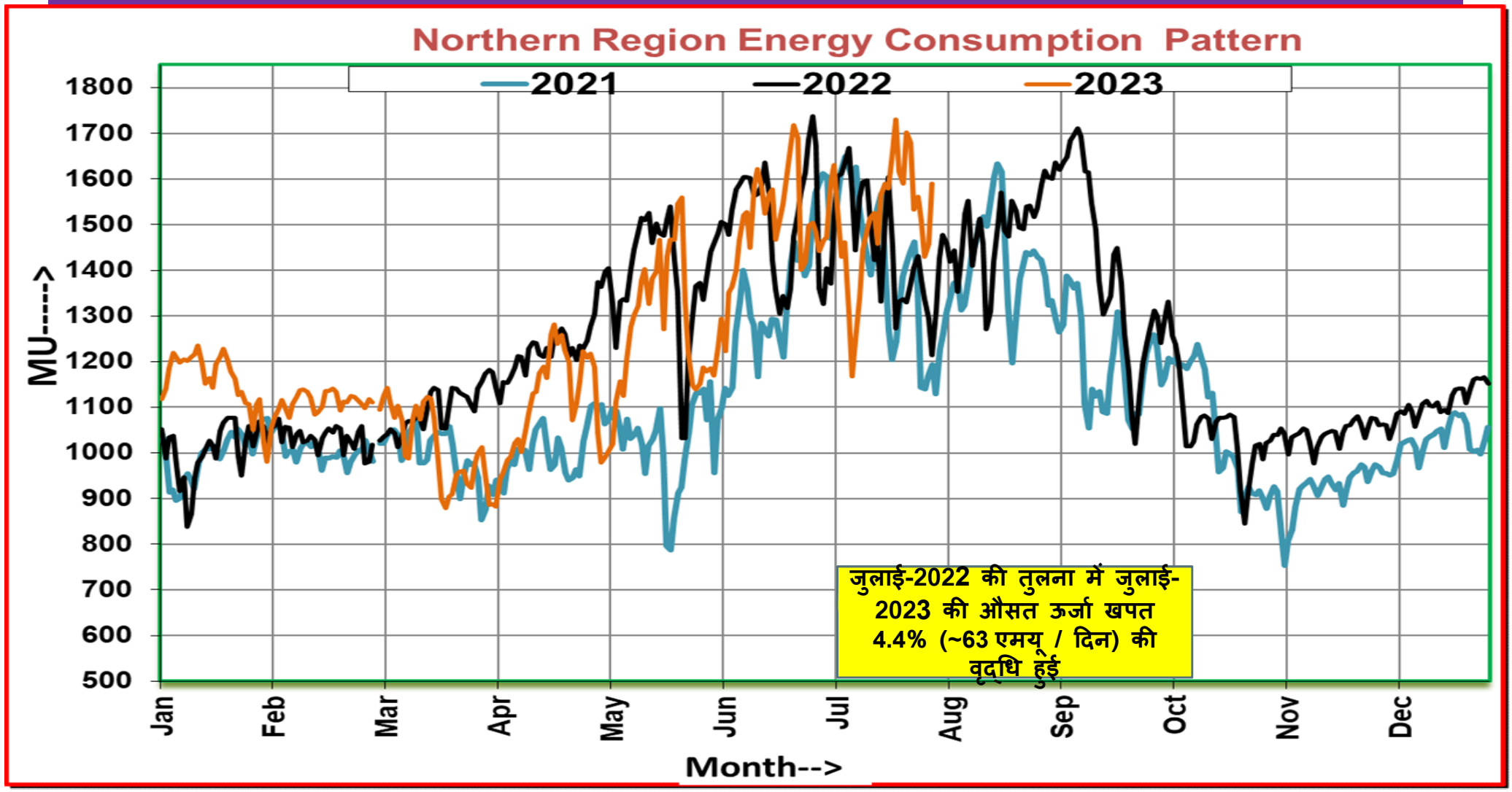
राज्य	अधिकतम मांग (MW) (in Jul'23)	दिनांक / समय	रिकॉर्ड अधिकतम मांग (in MW) (upto Jun'23)	दिनांक / समय	अधिकतम ऊर्जा खपत (MU) (in Jul'23)	दिनांक	रिकॉर्ड अधिकतम ऊर्जा खपत (MU) (Upto Jun'23)	दिनांक
पंजाब	14831	21.07.23 at 10:45	15293	24.06.23 को 11:45 बजे	319	21.07.23	344.1	24.06.2023
हरियाणा	12227	03.07.23 at 14.45	12768	28.06.22 को 11:56 बजे	254	24.07.23	266.2	07.07.21
राजस्थान	14204	05.07.23 at 15:00	17206	18.01.23 को 14:30 बजे	301	05.07.23	332	13.06.2023
दिल्ली	7398	21.07.23 at 15:10	7695	29.06.22 को 15:10 बजे	149	21.07.23	153.5	28.06.22
उत्तर प्रदेश	28284	24.07.23 at 21:43	27611	13.06.23 को 23:33 बजे	577	24.07.23	568	17.06.2023
उत्तराखंड	2223	21.07.23 at 21:00	2594	14.06.22 को 21:00 बजे	50	21.07.23	56.2	17.06.2023
हिमाचल प्रदेश	1775	21.07.23 at 10.00	2071	06.01.23 को 09:45 बजे	36	28.07.23	37.0	06.01.23
जम्मू और कश्मीर (UT) तथा लद्दाख़ (UT)	2590	12.07.23 at 12.00	3044	02.02.23 को 20:00 बजे	59	13.07.23	64.6	20.01.23
चंडीगढ़	371	25.07.23 at 15:00	426	08.07.21 को 15:00 बजे	8	21.07.23	8.4	08.07.21
उत्तरी क्षेत्र #	77145	21.07.23 at 13:00	77898	23.06.23 को 22:00 बजे	1728	23.06.23	1737.1	28.06.22

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

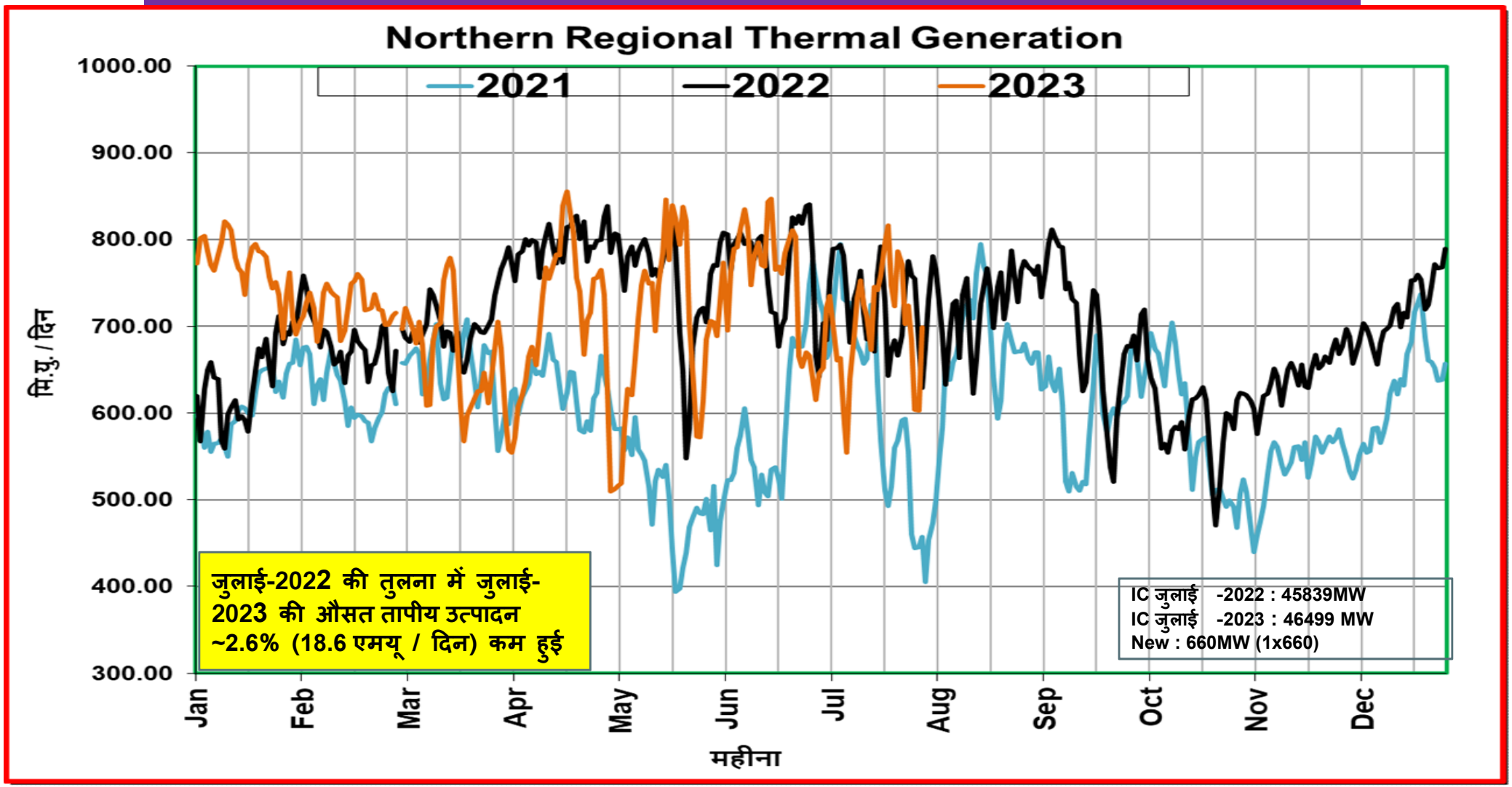
उत्तरी क्षेत्र की औसत ऊर्जा खपत में वृद्धि(% में) जुलाई-2023/ जुलाई-2022 / जुलाई-2021

राज्य	जुलाई -2021	जुलाई -2022	जुलाई -2023	% वृद्धि (जुलाई -2022 vs जुलाई -2021)	% वृद्धि (जुलाई -2023 vs जुलाई -2022)
पंजाब	265.0	264.3	268.8	-0.3%	1.7%
हरियाणा	209.7	209.4	216.9	-0.1%	3.6%
राजस्थान	262.6	233.7	269.4	-11.0%	15.3%
दिल्ली	119.6	125.0	126.2	4.6%	0.9%
उत्तर प्रदेश	450.1	480.9	494.0	6.8%	2.7%
उत्तराखंड	43.9	46.6	43.9	6.2%	-5.8%
चंडीगढ़	6.5	6.6	6.3	1.0%	-3.8%
हिमाचल प्रदेश	29.0	32.2	32.4	11.1%	0.7%
जम्मू और कश्मीर (UT) तथा लद्दाख़ (UT)	46.6	49.5	50.8	6.1%	2.6%
उत्तरी क्षेत्र	1432.9	1448.1	1512.0	1.1%	4.4%

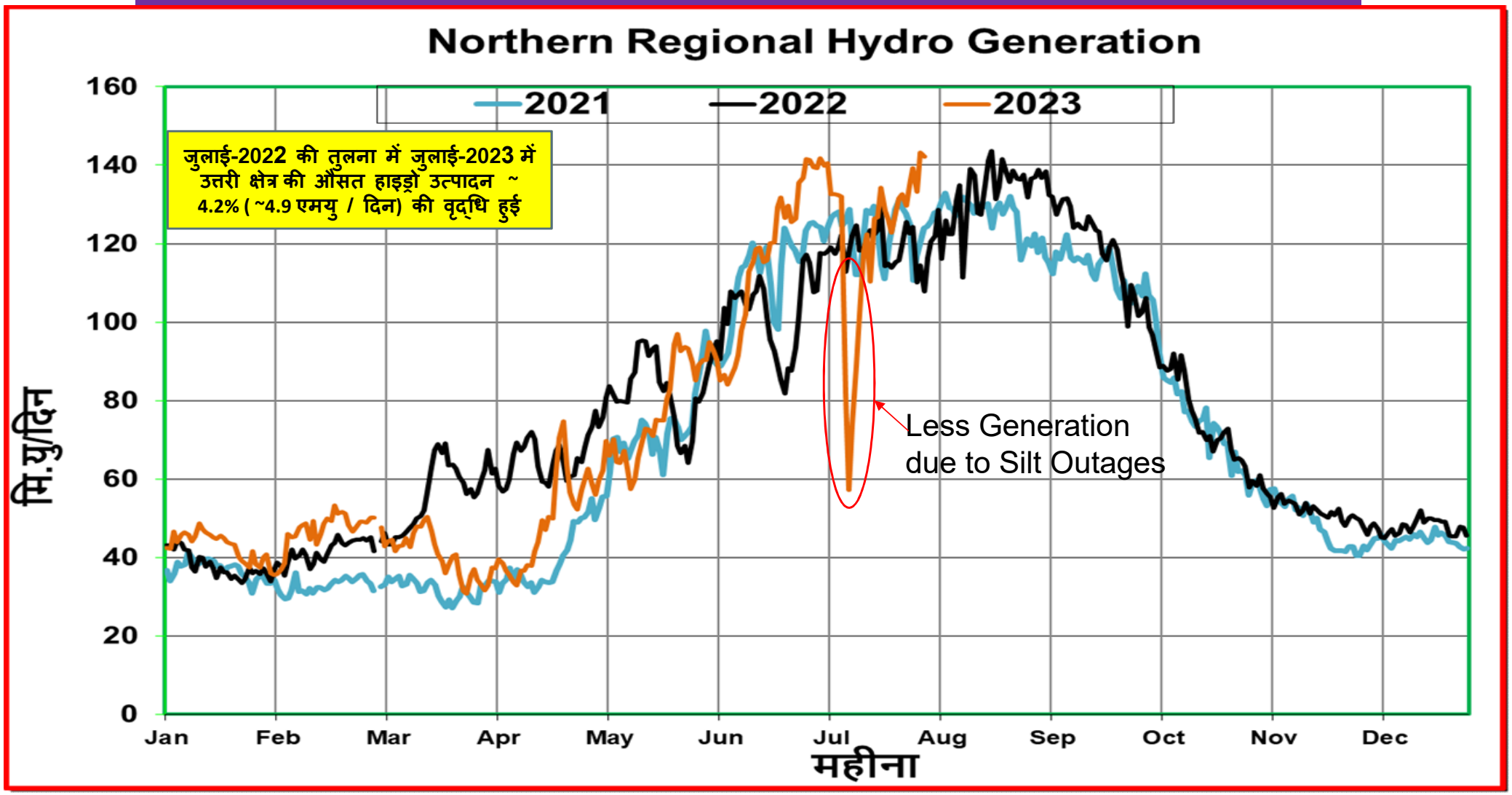
उत्तरी क्षेत्र की ऊर्जा खपत(MUs)



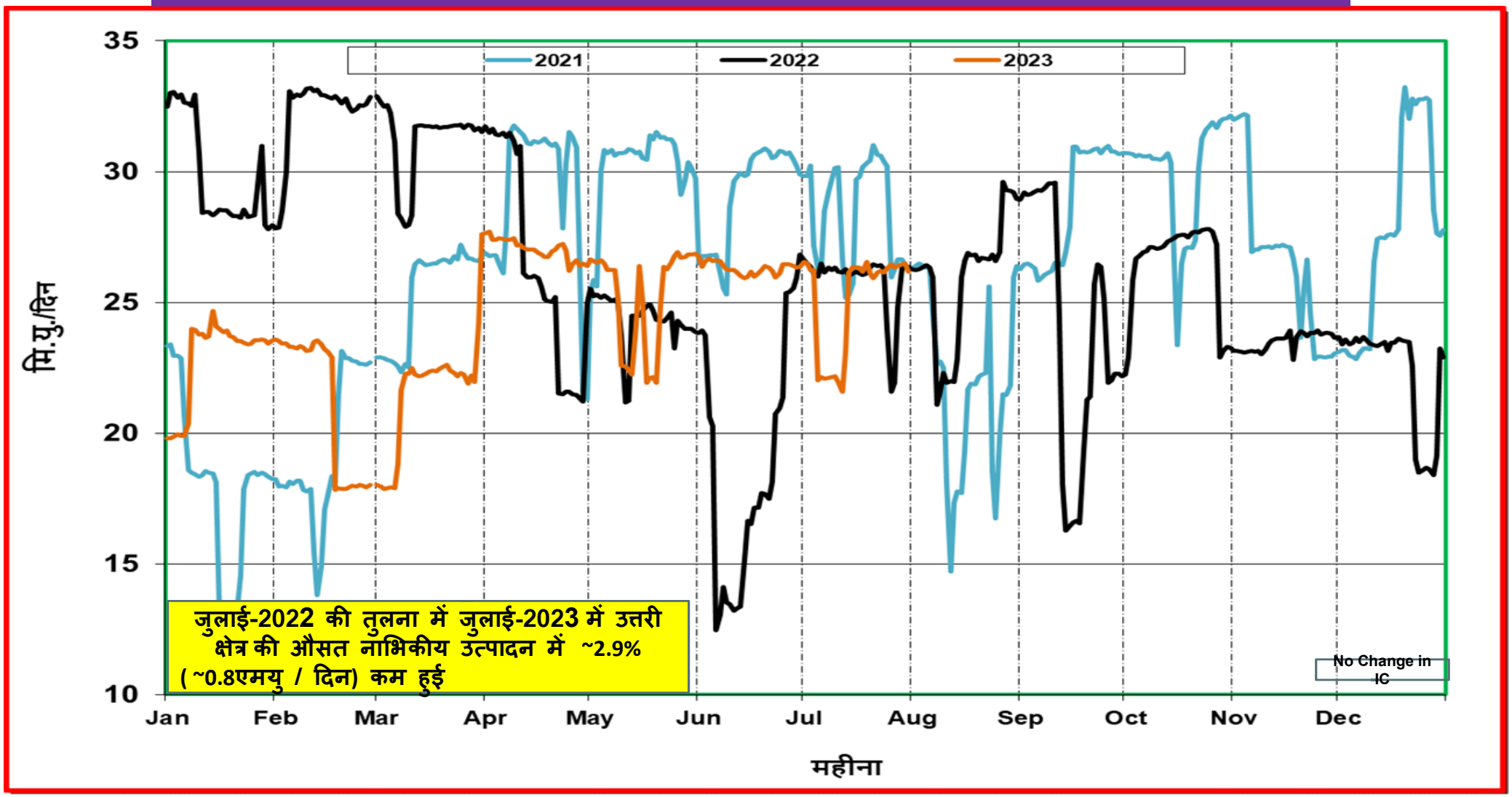
उत्तरी क्षेत्र की तापीय (Thermal) उत्पादन की स्थिति(Mus/Day)



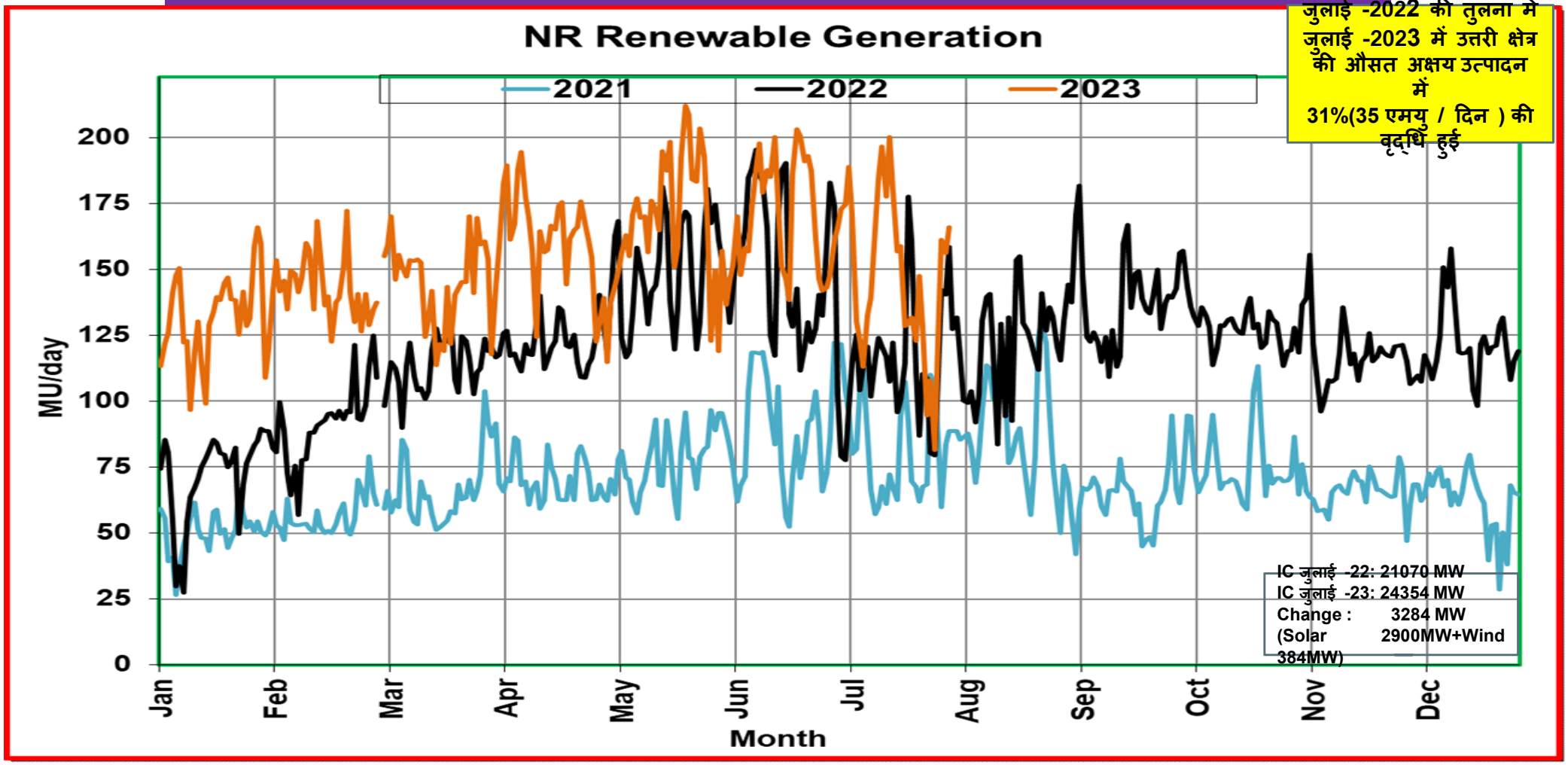
उत्तरी क्षेत्र की जलीय (हाइड्रो) उत्पादन की स्थिति(Mus/Day)



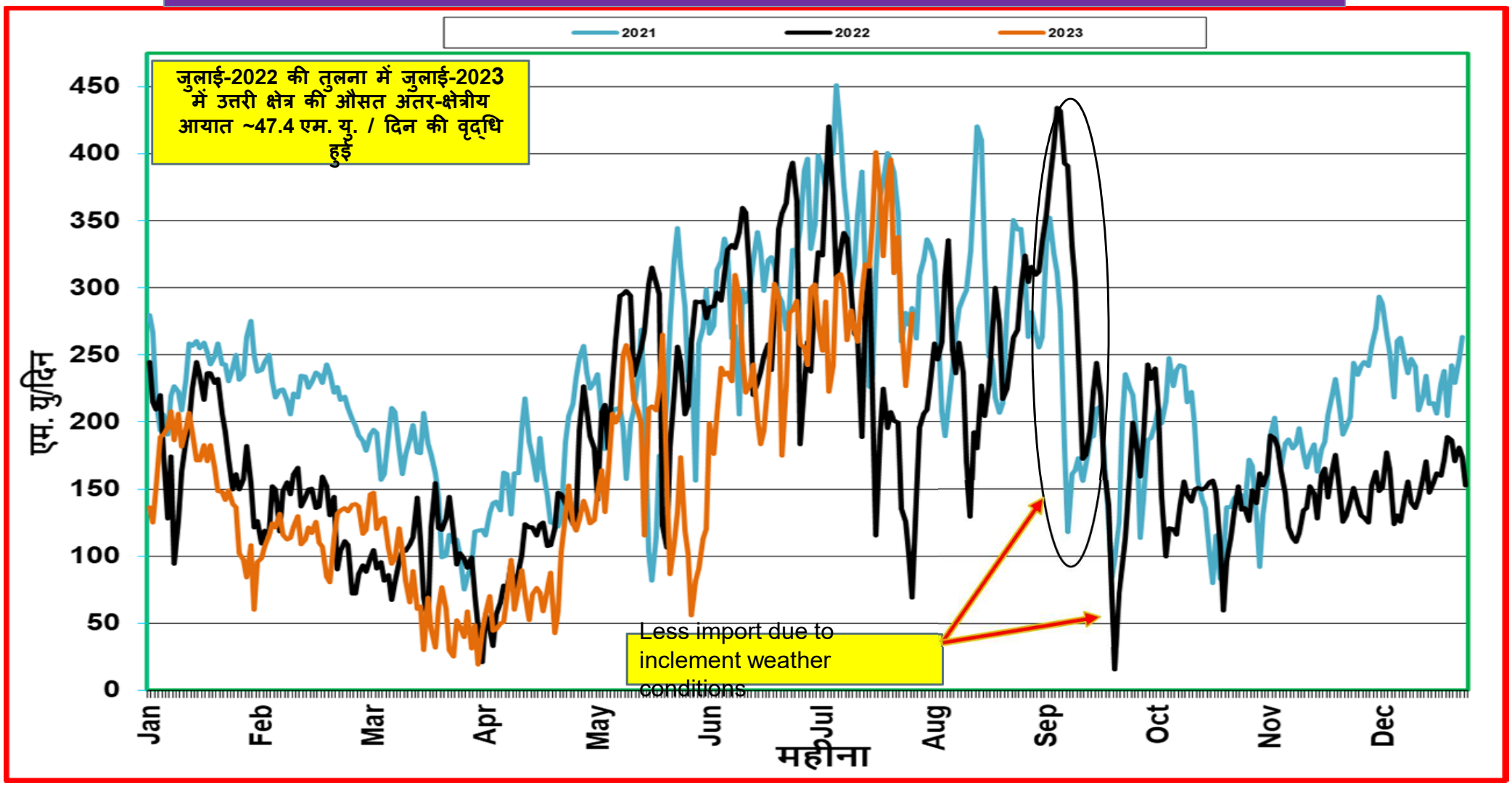
उत्तरी क्षेत्र की नाभिकीय उत्पादन की स्थिति (Mus/Day)



(Mus/Day)


NR Renewable Generation
2021
2022
2023
MU/day
200
175
150
125
100
75
50
25
0
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month
जुलाई -2022 की तुलना में जुलाई -2023 में उत्तरी क्षेत्र की औसत अक्षय उत्पादन में 31%(35 एमयु / दिन) की वृद्धि हुई
IC जुलाई -22: 21070 MW
IC जुलाई -23: 24354 MW
Change : 3284 MW
(Solar 2900MW+Wind 384MW)

अंतर-क्षेत्रीय आयात(Mus/Day) की स्थिति



वास्तविक सारांश -
जुलाई-2021 बनाम जुलाई-2022

	जुलाई-2022 (मि.यु. /दिन)	जुलाई-2023 (मि.यु. /दिन)	जुलाईमाह में वृद्धि (मि.यु./दिन)
तापीय (Thermal) उत्पादन	720.59	702.04	-18.56
जलीय (Hydro) उत्पादन	118.44	123.36	4.93
नाभिकीय (Nuclear) उत्पादन	25.85	25.09	-0.76
अंतर-क्षेत्रीय (Inter-Regional) कुल आयात	249.66	297.04	47.37
अक्षय (Renewable) उत्पादन	113.579	148.812	35.23
कुल	**1228.1**	**1296.3**	**68.2**

Outage Summary For July 2023									
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	228	276	177	99	56.3%	43.7%	64.1%	35.9%	504
UPPTCL	99	175	54	121	64.7%	35.3%	30.9%	69.1%	274
RRVPNL	58	95	19	76	75.3%	24.7%	20.0%	80.0%	153
HVPNL	48	52	29	23	62.3%	37.7%	55.8%	44.2%	100
BBMB	14	64	30	34	31.8%	68.2%	46.9%	53.1%	78
PSTCL	9	33	19	14	32.1%	67.9%	57.6%	42.4%	42
DTL	3	28	9	19	25.0%	75.0%	32.1%	67.9%	31
PTCUL	0	21	3	18	0.0%	100.0%	14.3%	85.7%	21
NTPC	3	17	10	7	23.1%	76.9%	58.8%	41.2%	20
PDD JK	2	13	2	11	50.0%	50.0%	15.4%	84.6%	15
ATIL	0	14	10	4	0.0%	100.0%	71.4%	28.6%	14
FBTL	11	1	1	0	91.7%	8.3%	100.0%	0.0%	12
Avaada solar	0	6	4	2	0.0%	100.0%	66.7%	33.3%	6
THDC	2	3	0	3	100.0%	0.0%	0.0%	100.0%	5
Adani	2	2	0	2	100.0%	0.0%	0.0%	100.0%	4
Chandigarh SEB	0	4	0	4	NA	NA	0.0%	100.0%	4
PFTL	3	1	0	1	100.0%	0.0%	0.0%	100.0%	4
ACME	1	2	1	1	50.0%	50.0%	50.0%	50.0%	3
ADHPL	0	3	0	3	NA	NA	0.0%	100.0%	3
AREPRL	0	3	2	1	0.0%	100.0%	66.7%	33.3%	3
Cleansolar_Jodhpur	1	2	1	1	50.0%	50.0%	50.0%	50.0%	3
MPSEB	1	2	0	2	100.0%	0.0%	0.0%	100.0%	3
PKTSL	3	0	0	0	100.0%	0.0%	0.0%	0.0%	3
RENEW SURYARAVI (R	0	3	2	1	0.0%	100.0%	66.7%	33.3%	3
Saurya Urja	1	2	0	2	100.0%	0.0%	0.0%	0.0%	3
AHEJ3L	1	1	0	1	100.0%	0.0%	0.0%	100.0%	2
Azure	0	2	1	1	0.0%	100.0%	50.0%	50.0%	2
ESUCRL	2	0	0	0	100.0%	0.0%	NA	NA	2
MAHINDRA	1	1	0	1	100.0%	0.0%	0.0%	100.0%	2
Sekura	0	2	1	1	0.0%	100.0%	50.0%	50.0%	2
Tata Power	1	1	1	0	0.0%	0.0%	100.0%	0.0%	2
EDEN (ERCPL)	1	0	0	0	100.0%	0.0%	NA	NA	1
GPTL	0	1	0	1	NA	NA	0.0%	100.0%	1
JSW	1	0	0	0	100.0%	0.0%	NA	NA	1
NHPC	0	1	1	0	0.0%	100.0%	100.0%	0.0%	1
NPCIL	0	1	1	0	0.0%	100.0%	100.0%	0.0%	1
NRSS XXIX	0	1	1	0	0.0%	100.0%	100.0%	0.0%	1
PKATL	1	0	0	0	100.0%	0.0%	NA	NA	1
Renew Solar Urja (RSUP	0	1	0	1	NA	NA	0.0%	100.0%	1
Total	497	834	379	455	56.7%	43.3%	45.4%	54.6%	1331

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))	
April-23	777	629	267	362	74.4%	25.6%	1406
May-23	543	1007	359	648	60.2%	39.8%	1550
June-23	537	840	393	447	57.7%	42.3%	1377
July-23	**497**	**834**	**379**	455	**56.7%**	**43.3%**	**1331**

New Elements First Time Charged During June 2023

S. No.	Type of transmission element	Total No
1	Transmission Lines	02
2	RE Generating Units	01
3	ICTs/GTs/Transformers	01
4	STATCOM DEVICES	01
5	Bays	07
Total New Elements charged		12

Transmission Lines

S.NO.	LINE NAME	Owner	Length (KM)	Conductor Type	DATE	REMARKS
1	400kV Bikaner_2 (PBTSL)-Bikaner(PG)-1	POWERGRID	43	Quad Moose	01-Jul-2023	Total=43 KM {9 KM LILO of one circuit of Bhadla-Bikaner (RVPN) 400kV D/c(Quad) line at Bikaner (PG),which is already under charged condition + 34 KM new line section upto Bikaner (PG) from the tapping point}
2	400kV Bikaner_2 (PBTSL)-Bikaner(PG)-2	POWERGRID	43	Quad Moose	08-Jul-2023	Total=43 KM {9 KM LILO of one circuit of Bhadla-Bikaner (RVPN) 400kV D/c(Quad) line at Bikaner (PG),which is already under charged condition + 34 KM new line section upto Bikaner (PG) from the tapping point}

RE Generating Units

SL. NO.	Station name	Owner	Capacity (MW)	DATE
1	SBSR Power Cleantech Eleven Private Limited (SBSRPC-11)	SBSRPC-11	25	11-Jul-2023

ICTs/GTs/Transformers

S.NO.	SUB-STATION	Voltage Level (kV)	CAPACITY (MVA)	DATE
1	400/220/33kV, 500 MVA, 3-Phase, ABB, ICT - 4 at Patiala(PG)	400/220/33kV	500	09-Jul-2023

STATCOM DEVICES

S.NO.	SUB-STATION	Voltage Level (kV)	CAPACITY (MVAR)	DATE
1	STATCOM : 1, 34.5kV, 2* +/-Mvar each | Coupling Transformer : 400KV/34.5KV, 550 MVA | MSR : 1, 34.5kV, 125 Mvar each | MSC : 1, 34.5kV, 2*125 Mvar each | Auxillary Transformer : 630KVA at Bikaner_2 (PBTSL)	34.5kV	SCV 2 x +/- 150MVAr, MSC 2x+125MVAr, MSR 1x-125 MVAr	12-Jul-2023


धन्यवाद