सत्यमेव जयते

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

सं: उ.क्षे.वि.स./प्रचालन/106/01/2023/6024-6055 दिनांक: 15.06.2023

विषय: प्रचालन समन्वय उप-समिति की 208वीं बैठक की कार्यसूची।

Subject: Agenda of 208th OCC meeting.

प्रचालन समन्वय उप-समिति की **208वीं** बैठक का आयोजन वीडियो कॉन्फ्रेंसिंग के माध्यम से दिनांक **20.06.2023** को **10:30** बजे से किया जायेगा। उक्त बैठक की कार्यसूची उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट http://164.100.60.165पर उपलब्ध है।

बैठक में सम्मिलित होने के लिए लिंक व पासवर्डसभीसदस्यों को ई-मेल द्वाराप्रदान किया जाएगा।

कृपया बैठक में उपस्थित होने की सुविधा प्रदान करें।

The **208th** meeting of the Operation Co-ordination sub-committee will be conducted through Video Conferencing on **20.06.2023** from **10:30 Hrs**. The agenda of this meeting has been uploaded on the NRPC web-site http://164.100.60.165.

The link and password for joining the meeting will be e-mailed to respective e-mail IDs in due course.

Kindly make it convenient to attend the meeting.

Santosh 15/6/23

(संतोष कुमार)
अधीक्षणअभियंता(प्रचालन)

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

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1. Confirmation of Minutes

The minutes of the 207th OCC meeting were issued vide letter of even number dated 14.06.2023.

Sub-committee may deliberate and kindly confirm the Minutes.

2. Review of Grid operations

2.1 Power Supply Position (Provisional) for May 2023

Anticipated Power Supply Position v/s Actual Power Supply Position (Provisional) of Northern Region during the month of May-2023 is as under:

State / UT	Req. / Avl.	Energy (MU)			Peak (MW)		
		Anticipated	Actual	% Variation	Anticipated	Actual	% Variation
CHANDIGARH	(Avl)	170	154	-9.7%	340	359	5.6%
	(Req)	192	154	-20.0%	400	359	-10.3%
DELHI	(Avl)	5120	3117	-39.1%	7400	6916	-6.5%
	(Req)	3950	3117	-21.1%	7400	6916	-6.5%
HARYANA	(Avl)	6030	5067	-16.0%	9412	10020	6.5%
	(Req)	6030	5082	-15.7%	10541	10020	-4.9%
HIMACHAL PRADESH	(Avl)	1083	879	-18.8%	1782	1702	-4.5%
	(Req)	1085	883	-18.6%	1755	1702	-3.0%
J&K and LADAKH	(Avl)	2110	1709	-19.0%	3530	2893	-18.0%
	(Req)	1610	1720	6.9%	2780	2893	4.1%
PUNJAB	(Avl)	6570	5272	-19.8%	12330	11940	-3.2%
	(Req)	6620	5272	-20.4%	11320	11940	5.5%
RAJASTHAN	(Avl)	10270	8210	-20.1%	18410	16470	-10.5%
	(Req)	9300	8232	-11.5%	14900	16470	10.5%
UTTAR PRADESH	(Avl)	15345	13146	-14.3%	23900	26386	10.4%
	(Req)	15190	13184	-13.2%	27200	26606	-2.2%
UTTARAKHAND	(Avl)	1365	1335	-2.1%	2370	2415	1.9%
	(Req)	1387	1339	-3.4%	2380	2415	1.5%
NORTHERN REGION	(Avl)	48063	38889	-19.1%	77900	72600	-6.8%
	(Req)	45364	38983	-14.1%	73100	72600	-0.7%

As per above, negative / significant variation (≥5%) in Actual Power Supply Position(Provisional) vis-à-vis Anticipated figures is observed for the month of May-2023 in terms of Energy Requirement for Chandigarh, Delhi, Haryana, HP, UTs of J&K and Ladakh, Punjab, Rajasthan, UP, and Uttarakhand and in terms of Peak Demand similar variation is noted for Chandigarh, Delhi, Haryana, HP, Punjab, Rajasthan, UP. These states/UTs are requested to submit reason for such variations so that the same can be deliberated in the meeting.

All SLDCs are requested to furnish provisional and revised power supply position in

prescribed formats on NRPC website portal by 2nd and 15th day of the month respectively for the compliance of Central Electricity Authority (Furnishing of Statistics, Returns and Information) Regulations, 2007.

3. Maintenance Programme of Generating Units and Transmission Lines

3.1. Maintenance Programme for Generating Units

The meeting on proposed maintenance programme for Generating Units for the month of July-2023 is scheduled on 19-June-2023 via Video Conferencing

3.2. Outage Programme for Transmission Elements

The meeting on proposed outage programme of Transmission elements for the month of July-2023 is scheduled on 19-June-2023 via Video conferencing.

4. Planning of Grid Operation

4.1. Anticipated Power Supply Position in Northern Region for July2023

The Anticipated Power Supply Position in Northern Region for July 2023is as under:

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	190	350	No Revision submitted
	Requirement	210	430	
	Surplus / Shortfall	-20	-80	
	% Surplus / Shortfall	-9.5%	-18.6%	
DELHI	Availability	2870	6160	No Revision submitted
	Requirement	4040	7900	
	Surplus / Shortfall	-1170	-1740	
	% Surplus / Shortfall	-29.0%	-22.0%	
HARYANA	Availability	5810	11740	No Revision submitted
	Requirement	6780	12950	
	Surplus / Shortfall	-970	-1210	
	% Surplus / Shortfall	-14.3%	-9.3%	
HIMACHAL PRADESH	Availability	1151	1759	09-Jun-23
	Requirement	1115	1784	
	Surplus / Shortfall	36	-25	
	% Surplus / Shortfall	3.2%	-1.4%	
J&K and LADAKH	Availability	2320	3520	No Revision submitted
	Requirement	1570	2820	
	Surplus / Shortfall	750	700	
	% Surplus / Shortfall	47.8%	24.8%	
PUNJAB	Availability	6520	12360	No Revision submitted
	Requirement	8270	14620	
	Surplus / Shortfall	-1750	-2260	
	% Surplus / Shortfall	-21.2%	-15.5%	
RAJASTHAN	Availability	9340	18330	No Revision

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Requirement	7550	12700	submitted
	Surplus / Shortfall	1790	5630	
	% Surplus / Shortfall	23.7%	44.3%	
UTTAR PRADESH	Availability	15810	26500	13-Jun-23
	Requirement	15655	27700	
	Surplus / Shortfall	155	-1200	
	% Surplus / Shortfall	1.0%	-4.3%	
UTTARAKHAND	Availability	1414	2398	13-Jun-23
	Requirement	1426	2450	
	Surplus / Shortfall	-12	-52	
	% Surplus / Shortfall	-0.8%	-2.1%	
NORTHERN REGION	Availability	45425	74900	
	Requirement	46616	75100	
	Surplus / Shortfall	-1191	-200	
	% Surplus / Shortfall	-2.6%	-0.3%	

SLDCs are requested to update the anticipated power supply position of their respective state / UT for the month of July-2023 and submit the measures proposed to be taken to bridge the gap between demand & availability, as well to dispose-off the surplus, if any, in the prescribed format.

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

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

All utilities are requested to update the status.

6. NR Islanding scheme

Latest status of Islanding Scheme of NR is attached as **Annexure-A.II.**

Members may kindly deliberate.

7. Coal Supply Position of Thermal Plants in Northern Region

7.1 In 186th OCC meeting, it was agreed that coal stock position of generating stations in northern region may be reviewed in the OCC meetings on the monthly basis.

7.2 Accordingly, coal stock position of generating stations in northern region during current month (till 10th June 2023) is as follows:

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd (Days)	Actual Stock (Days)
ANPARA C TPS	1200	87.84	17	6.4
ANPARA TPS	2630	71.03	17	24.0
BARKHERA TPS	90	31.65	26	38.0
DADRI (NCTPP)	1820	60.99	26	14.5

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd (Days)	Actual Stock (Days)
GH TPS (LEH.MOH.)	920	44.27	26	35.3
GOINDWAL SAHIB TPP	540	50.22	26	6.5
HARDUAGANJ TPS	1265	51.34	26	8.3
INDIRA GANDHI STPP	1500	58.48	26	22.7
KAWAI TPS	1320	60.54	26	19.7
KHAMBARKHERA TPS	90	29.39	26	53.1
KOTA TPS	1240	77.54	26	8.2
KUNDARKI TPS	90	32.30	26	55.6
LALITPUR TPS	1980	77.36	26	22.6
MAHATMA GANDHI TPS	1320	60.06	26	24.6
MAQSOODPUR TPS	90	37.02	26	45.9
MEJA STPP	1320	77.30	26	23.0
OBRA TPS	1094	47.97	26	10.8
PANIPAT TPS	710	42.72	26	41.8
PARICHHA TPS	1140	47.23	26	10.0
PRAYAGRAJ TPP	1980	71.13	26	23.2
RAJIV GANDHI TPS	1200	50.95	26	16.9
RAJPURA TPP	1400	90.61	26	22.9
RIHAND STPS	3000	91.25	17	28.2
ROPAR TPS	840	45.78	26	54.0
ROSA TPP Ph-I	1200	72.55	26	15.9
SINGRAULI STPS	2000	88.99	17	16.6
SURATGARH TPS	1500	47.74	26	10.1
TALWANDI SABO TPP	1980	71.90	26	3.4
TANDA TPS	1760	54.95	26	22.4
UNCHAHAR TPS	1550	57.38	26	21.7
UTRAULA TPS	90	31.71	26	59.3
YAMUNA NAGAR TPS	600	72.12	26	21.1
CHHABRA-I PH-1 TPP	500	69.00	26	7.3
KALISINDH TPS	1200	68.53	26	6.9
SURATGARH STPS	1320	58.82	26	6.3
CHHABRA-I PH-2 TPP	500	57.37	26	13.4
CHHABRA-II TPP	1320	64.49	26	5.4

8. Review of Planned Outages for September, 2023 (Agenda by NRPC Sect..)

8.1 OPM, Division CEA vide mail dated 13.06.2023 has intimated that during the review meeting taken by Hon'ble Union Power Minister on 13.06.2023, it was directed that

the planned outages for the month of September has to be reduced from 20.4GW to 11.4GW i.e. (9 GW has to be made available) to meet the anticipated shortages.

8.2 In this regard, it is highlighted that list of outages of NR generating units falling in last week of August 2023and month of September 2023is attached as **Annexure-A.III.**and same needs to be reviewed in compliance of directions from Ministry.

Members may kindly deliberate.

9. Redundant connectivity between Aulsteng (JKPTCL) and Drass (POWERGRID) (Agenda by UT of Ladakh) (Agenda by Powergrid/NR-3)

9.1 UT of Ladakh has submitted that it is connected to rest of the Grid through 220kV SLTS Line between Aulsteng (JKPTCL) and Drass (POWERGRID). During peak winter when temperature is below -40 Degree, only source of power supply to Ladakh area is above Transmission Line and outage of above line results in power crisis in UT of Ladakh as the discharges in the Hydel Power Stations are also very low and not able to meet the load demand which is at annual peak due to heating load. In addition to meeting load requirement of Ladakh area in peak winter, this link also evacuates power generated in Alchi and Chutak Hydro stations of NHPC in Ladakh area to rest of the GRID.

9.2 As per CEA manual of transmission planning criteria Jan '2013, "All the equipment in the transmission system shall remain within their normal thermal and voltage ratings after a disturbance involving loss of any one of the elements (called single contingency or 'N-1' condition), but without load shedding / rescheduling of generation".

9.3 In view of above, providing redundant connectivity at 220kV level, connecting UT of Ladakh with rest of the GRID may please be reviewed in compliance to CEA manual of transmission planning criteria Jan '2013, so as to provide stable/reliable connectivity to UT of Ladakh. Moreover, there will be no generation loss due to outage of one link.

9.4 The cited matter was also deliberated in the 64th NRPC meeting (copy of MoM attached as **Annexure-A.IV.).** MS NRPC acknowledged the criticality of line and stated that it is really challenging to maintain this line in avalanche. He instructed CTU to take up the matter immediately. He stated that agenda may be regularly deliberated in monthly OCC meeting also.

Members may kindly deliberate.

10. Power evacuation problem of Power Stations of RVUNL(Agenda by RVUN)

10.1 RVUN vide mail dated 07.06.2023 has intimated that some of its generators are facing issues related to power evacuation.

10.2 Power evacuation problem of STPS, Suratgarh-

- There are two dedicated 400 kV lines (Bikaner - STPS-SC) for evacuating power from both units of STPS-SC. Additionally, there are two interconnectors

connecting STPS(6x250MW) and STPS-SC(2x660MW). Currently, during the daytime, due to solar generation in Bikaner, these Bikaner lines are exporting power to STPS instead of importing. Consequently, all the power generated by both STPC-SC units and the exported power from Bikaner is transmitted through the two interconnectors and ultimately evacuated through the outgoing feeders of STPS lines. This puts excessive stress on the old existing outgoing feeders of STPS, resulting in jumper/isolator failures in various lines. As a consequence, the units are frequently desynchronized to address these faults, leading to significant losses of DC to RVUN. Details are enclosed at **Annexure-A.V**.

- RVPNL needs to assess the current situation and take appropriate actions. They should consider either preparing the Babai lines or ensuring the readiness of the 400 kV GSS at Hanumangarh, Village-Kenchiya. Additionally, they should explore the possibility of utilizing alternative lines to evacuate power from the solar generation in Bikaner instead of relying solely on the STPS lines. This approach would enable the STPS-SC to export power to Both Bikaner lines, resulting in a more relaxed state for the STPS switchyard.

10.3 Power evacuation problem of KTPS, Kota-

- The 220 kV feeders of PGCIL #1 & #2 are designated for importing generation from Unit # 6 & 7 of KTPS. However, at present, these feeders are predominantly exporting power rather than importing from KTPS. Additionally, other outgoing feeders such as Vatika, Heerapura, and Bewar have low load, causing the majority of KTPS generation to be exported through the Sakatpura feeders. The Sakatpura feeders are short-distance feeders, spanning approximately 500 meters, and the busbar protection at Sakatpura has been non-functional for an extended period. Consequently, all faults occurring at Sakatpura reflect back to KTPS, leading to adverse effects on its generation capacity.

- RVPNL needs to assess the load distribution and ensure the import of power through PGCIL feeders. Furthermore, it is essential to ensure the correct operation of the busbar protection system at Sakatpura.

10.4 Power evacuation problem of CTPP, Chhabra-

- Following 220 kV and 400 kV feeders are available for power evacuation at CTPP(4x250MW):
    i. 400 kV CTPP-Hindaun
    ii. 400 kV CTPP-Bhilwara
    iii. 400 kV CTPP-Anta
    iv. 400 kV CTPP-Adani
    v. 220 kV CTPP-Kawai
    vi. 220 kV CTPP-Aklera
- There are two inter-connectors from CSCTPP (2x660 MW) also. Due to these two interconnectors almost 2/3 load of CSCTPP evacuate through CTPP out going feeders while two dedicated feeders from CSCTPP evacuates only 1/3

of the generated load. Moreover, 400kV CTPP-ADANI Line also injects load to the tune of 300-400 MW to CTPP Switchyard. Allthis extra load creates stress on Jumpers, Connectors, Isolators, formation of Hot Spots etc. at 400 kV Switchyard of CTPP.

During last financial year 4 emergency shutdowns were taken due to Hotspots and issues in Isolator arms of the feeders including two of 400kV Bus.
Continuous loading and unavailability of Shutdowns results in hot spots and snapping of jumpers in each of the Bhilwara and Hindaun feeders.

During agriculture season the load demand from 220kV CTPP-Kawai is high which leads to overloading of 315MVA ICT for almost a quarter of a year. While, ICT is critical for providing Auxiliary load of generating units, therefore continuous demand of ICT, maintenance is difficult.

- The inter-connectors between CTPP(4x250MW) & CSCTPP(2x660MW) should be opened during normal situation and the load from CSCTPP be evacuated from two dedicated feeders i.e 400 kV CSCTPP-Anta. This will lead to relieve the much stressed switchyard of CTPP.

  Also, RVPNL and PGCIL both should review the loading pattern of various transmission lines and make arrangements to reduce the loading due to import and further export to other feeders through CTPP switchyard.

Members may kindly deliberate.

11. Allotment of 500 MVA, 400/220 kV ICT available as regional spare at PGCIL's 400kV GSS Jaipur (South) to RVPN for utilization at RVPN's 400 kV GSS Chittorgarh.(Agenda by RVPN)

11.1. RVPN vide letter dated 23.05.2023 (copy attached as **Annexure-A.VI**) has intimated that there are 2X315 MVA, 400/220 kV ICT's installed at 400kV GSS Chittorgarh. These ICT's are operated in parallel and recorded peak load on these ICTs is 671 MVA against the rated capacity of 630MVA. This peak load is recorded after load curtailment.

11.2. A&FS for procurement of 500 MVA, 400/220 kV ICTs by RVPN has been issued and tendering process has still not started.

11.3. To avoid transmission constraints and meet increased load demand at RVPN's 400kV GSS Chittorgarh, RVPN has requested for approval to use 500 MVA, 400/220 KV ICT available as regional spare at PGCIL's 400 KV GSS Jaipur (South) by RVPN at RVPN's 400 kV GSS Chittorgarh.

Members may kindly deliberate.

12. Full schedule of units, for FGD PG test(Agenda by NTPC)

12.1. NTPC vide mail dated 08.06.2023 has intimated that it is implementing Flue Gas Desulphurization (FGD) systems in its thermal stations to meet SO2 emission norms.

Performance guarantee tests of these systems are required at full load operation of the unit, to ensure efficiency and capacity of the FGD systems. Fixed charges and variable charges for running the FGD systems are paid by the beneficiaries and any variation in efficient operation of FGD will have significant impact throughout life of the unit.

12.2. Full load operation of the units for 5 days is required for PG test of FGD.

12.3. The tentative schedule of PG test requirement requested by NTPC is given below:

SI	Project / Capacity (MW)	Anticipated PG test
1.	**Jhajjar** **(3x500 MW)**	U#1- Jul'23 U#3- Oct'23 U#2 – Dec'23
2.	**Unchahar-IV (1x500 MW)**	June 2023
3.	**Tanda-II (2X660 MW)**	U#5 – Aug'23 U#6: Dec'23
4.	**Meja (2X660 MW)**	U#1: Dec'23 U#2: Jul'23
5.	**Unchahar-I/II/III (5X210 MW)**	U#1,2: Oct'24 U#3,4,5: July'23
6.	**Vindhyachal-III & IV (4X500 MW)**	U#9 & U#10- Jun'24 U#11 – Mar'23 U#12 – Aug'23
7.	**Vindhyachal-I & II (6X210 MW), (2X500MW)**	U#1,2 & 3 – Mar'25 U#4,5,6 – Dec'24 U#7&8 – May'24
8.	**Rihand-II & III (4X500 MW)**	U#5 – Mar'24 U#6 – June'24 Unit#3- Sept'24 U#4 – Dec'24
9.	**Singrauli- I & II (5X200 MW), (2X500MW)**	U#1, 2 & 3 – Oct'24 U#4, 5 – Nov'24 U#6 – Jun'24 U#7 – Mar'24
10.	**Rihand-I (2x500 MW)**	U#1 – Mar'25 U#2- Jun'25

12.4. Further, NTPC has also mentioned that the exact dates and time on which PG test will be carried out will be intimated to SLDC/NRLDC, ten days in advance.

Members may kindly deliberate.

13. Revision of SPS scheme for safe evacuation of power from Anpara Complex

13.1 UPSLDC vide letter dated 14.06.2023 has intimated that following the LILO of 765kV Anpara D-Unnao line at Obra C TPS and in view of synchronization of 1x660 MW Unit at Obra-C TPS, existing system protection scheme for safe evacuation of power from Anpara Complex, needs to be revised.

13.2 In this regard, UPSLDC prepared a revised scheme for the aforementioned SPS scheme. To discuss said scheme, a meeting was also held with all stakeholders on 13.06.2023. Based on the discussion in the aforesaid meeting the revised logic has been finalised by UPSLDC which is attached as **Annexure-A.VII**.

Members may kindly deliberate

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

14. NR Grid Highlights for May2023

Following are major grid highlights of May 2023:

- Maximum energy consumption of Northern Region was **1555 MUs** on 23rd May'23 and it was 0.9 % higher than May' 2022 (1540 MUs 20th May'22)
- Average energy consumption per day of Northern Region was **1258 MUs** and it was 8.9 % lower than May'22 (1381Mus per day)
- Maximum Demand met of Northern Region was **72625 MW** on 23rd May'23 @14:00 hours (*based on data submitted by Constituents)* as compared to 68398 MW on 13th May'22 @23:00 hours.

No all-time high value recorded in May'23:

Comparison of Average Energy Consumption (MUs/Day) of NR States for the May'22 vs May'23

State/ UT	**May- 2022**	**May- 2023**	**% Diff**
Chandigarh	5.9	5.0	-16.3%
Delhi	120.6	100.7	-16.5%
Himachal Pradesh	32.4	29.2	-9.7%
Haryana	182.0	164.4	-9.6%
Jammu & Kashmir	48.0	55.1	14.9%
Punjab	204.2	170.3	-16.6%
Rajasthan	288.8	264.8	-8.3%
Uttarakhand	44.9	43.3	-3.7%
Uttar Pradesh	454.3	425.4	-6.4%
Northern region	**1381.1**	**1258.2**	**-8.9%**

Frequency Data

Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
May'23	50.03	50.43 on 18.05.23 at 01:19:40 hrs	49.48 on 15.05.23 at 11:52:00 hrs	9.8	68.5	21.7
May'22	50.00	50.35 on 23.05.22 at 09:07:20 hrs	49.50 on 03.05.22 at 14:55:00 hrs	9.9	72.2	17.9

Detailed presentation on grid highlights of May'2023 will be shared by NRLDC in OCC meeting.

15. Grid Operation related issues

a) Tower collapse in six no.s line in RVPN control area

As discussed recently in 66th NRPC meeting, towers of following lines have also collapsed in Western Rajasthan (Renewable Energy area):

I. 400 KV Bhadla(RVPN)-Bikaner(RVPN) Ckt-1 (out since15.05.2023)
II. 400 KV Bhadla(RVPN)-Bikaner(RVPN) Ckt-2 (out since15.05.2023)
III. 400 KV Bhadla(RVPN)-Merta (out since 25.05.2023, revived on 13.06.2023)
IV. 400 KV Bhadla(RVPN)-Jodhpur (out since 25.05.2023)
V. 400 KV Jaisalmer-Barmer Ckt-1 (out since 30.05.2023)
VI. 400 KV Jaisalmer-Barmer Ckt-2 (out since 30.05.2023)

Lines at s.no. I & II were antitheft charged from Bhadla (RVPN) end and provided voltage support during high RE generation. Lines at s.no. III & IV are for evacuating solar generation from Bhadla(RVPN) whereas lines at s.no. V & VI are for evacuating wind generation from Akal/Jaisalmer area.

Forced outage of all these six lines is leading to constraints in renewable generation evacuation in Rajasthan control area during high solar and high wind generation and there is need for RE curtailment in such scenarios (likely curtailment of renewable generation to the tune of 1500-2000MW).

It is extremely important that for safe evacuation of renewable generation, these lines are revived at the earliest. Moreover, as discussed in meeting held on 01.06.2023 between NRPC, NRLDC, CTUIL and RVPN, commissioning of 400kV Bikaner-II S/s is required for allowing further RE generation evacuation from ISTS RE complex. For commissioning works of 400kV Bikaner-II S/s, shutdown of 400kV Bikaner(PG)-Bikaner(RVPN) both ckts. would be required.

Curtailment of both interstate & intrastate RE generation would be required during high solar and high wind generation due to non-availability of these lines. Hence, these lines need to be revived at the earliest.

Given the frequent tripping of lines and outage due to tower collapse in RVPN control area during summer/monsoon season, a thorough study in respect of design of tower & maintenance of lines in this area is also required.

For ensuring reliable evacuation of the renewable generation along with safe and secure operation of the grid, it is desirable that the transmission system is intact and in service. Recently it has been observed that a number of multiple tripping including tower damages are happening during inclement weather condition.

There has been frequent tripping of transmission lines that happened in the month of May & June 2023 in the Rajasthan RE pocket during inclement weather conditions. These transmission lines are important and critical for safe evacuation of power from RE plants and simultaneously frequent tripping of these lines can lead to threat to system security and grid stability.

Therefore, it is requested to take proactive measures to minimize such tripping in future during inclement weather conditions.

Members may like to discuss.

b) Issues due to Double Bus Scheme at 220 kV level of RE Pooling Stations

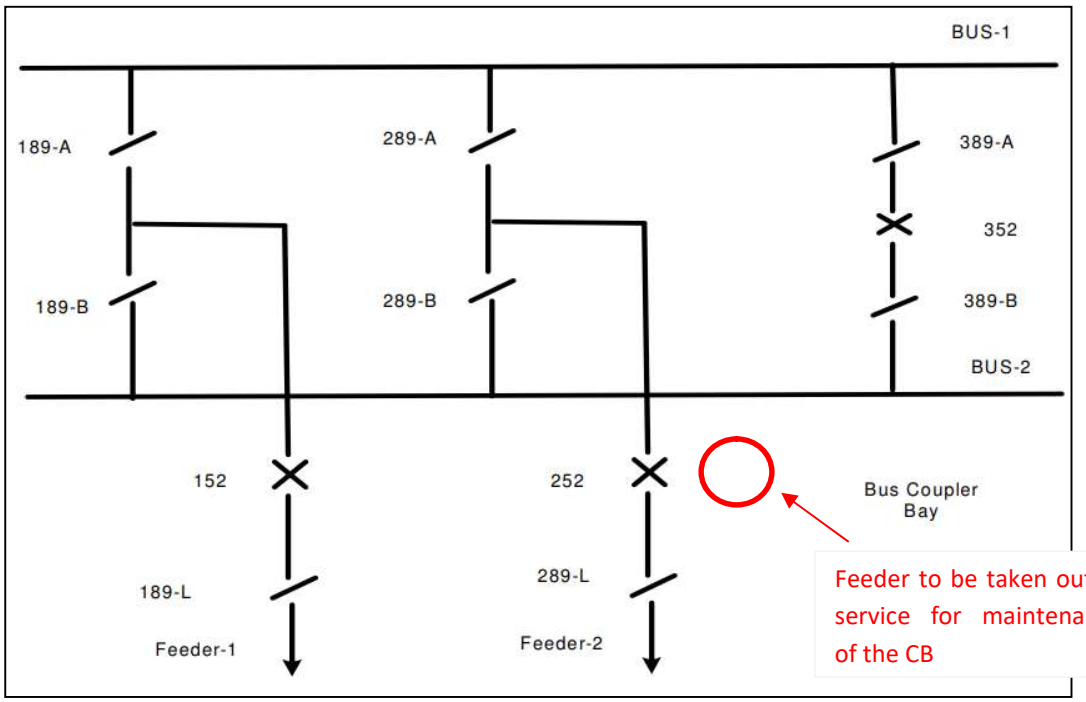
As per Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, the bus switching schemes to be adopted at 220 kV voltage level are:

S. No.	Air Insulated Substation	Gas Insulated Substation
1.	Main and Transfer Bus Scheme	Main and Transfer Bus Scheme
2.	Double Bus Scheme	Double Bus Scheme
3.	Double Main and Transfer Bus Scheme	-

It has been observed that the most of the RE generation stations (developer end) are being developed with double bus scheme at 220 kV level. Further, some of the GIS RE pooling stations (ISTS) are also being developed with double bus scheme at 220 kV level.

It is to highlight here that, in case of Double Bus Scheme, the maintenance of the circuit breaker of any feeder is not possible without taking the feeder out of service.

Double Bus Single Breaker Scheme

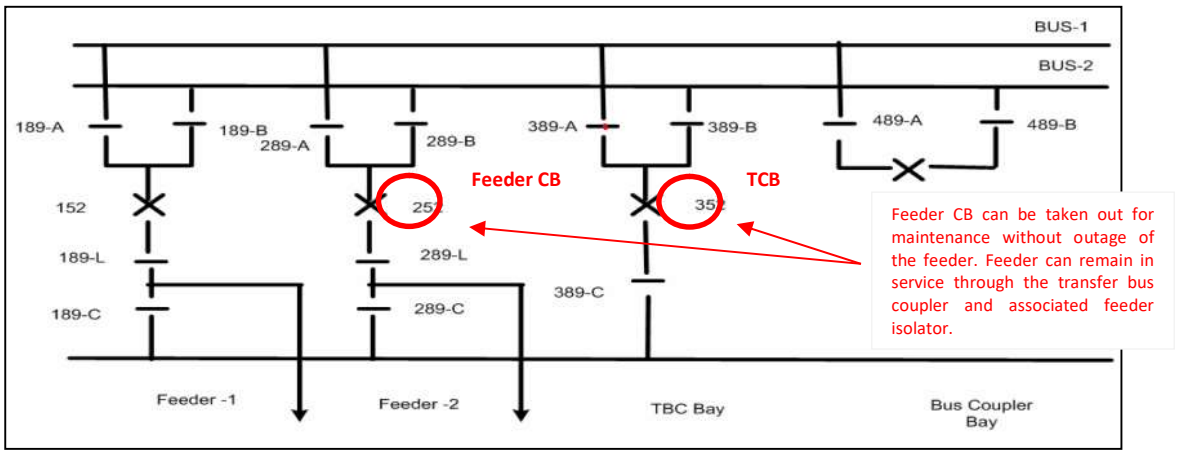


In case of RE plants, the evacuation from RE generation station to ISTS pooling station is generally planned through a 220 kV dedicated transmission line. The 'N-1' reliability criteria is exempted for this dedicated line. The implementation of double bus scheme in such scenario means that any damage to the dedicated line circuit breaker (at either end) and its subsequent maintenance would result in long outage of transmission line, thereby resulting in loss of significant RE generation also during that period.

Recently, on 28th May 2023, multiple elements in Rajasthan RE complex tripped due to inclement weather. The problem in circuit breaker of 220 kV TPREL – Bhadla (PG) line at Bhadla end was also identified in this event. As the GIS portion of 220 kV Bhadla PG has double bus scheme, the 220 kV TPREL – Bhadla (PG) line as well as TPREL generation is out of service since 28th May 2023 for maintenance of the aforementioned breaker.

The implementation of double main and transfer bus scheme would avoid such situations as the faulty circuit breaker can be isolated and taken up for maintenance without outage of the feeder. The feeder will remain in service through transfer bus coupler and associated feeder isolator.

Double Main and Transfer Bus Scheme



The implementation of double main and transfer bus scheme at RE generation stations (developer end) and RE pooling stations (ISTS) is of utmost important to avoid complete generation outage of a RE plant in case of damage to/maintenance of the dedicated line circuit breaker.

In this regard, following is proposed for further deliberation:

a) Double Main and Transfer Bus Scheme may be mandated for all ISTS RE Pooling Stations irrespective of station type (AIS/GIS). This aspect may be explicitly mentioned in RfP also for providing better clarity to prospective bidders in advance.

b) RE developers may also explore the possibility of implementing Double Main and Transfer Bus Scheme in place of Double Bus Scheme at their respective 220 kV switchyards. At present, around 46 nos. of ISTS connected RE plants (out of total 51 nos.) in Rajasthan have Double Bus Scheme at 220 kV level.

Members may like to discuss.

c) Uprating of low rating switchgear at 400kV Nawada, Dhanoda & Mahendragarh

The issues related to low ratings of switchgear at Nawada, Dhanoda & Mahendragarh have been discussed in various NRPC (Northern Region Power Committee), NRPCTP (Northern Region Power Committee on Transmission Planning) & NRSCT (Northern Region Standing Commitee on Transmission) meetings.As per Transmission Planning Criteria, the thermal capacity of Quad Moose line is 2180 MVA at 45˚ ambient temperature. However, as the isolators at 400 kV Nawada, Dhanonda and Mohindergarh stations are rated at only 2 kA, the thermal capacity of respective lines gets limited to only 1385 MVA (1.732*400*2).

These limitations have already caused constraints in real-time operation on many occasions and accordingly the switchgear related issues were raised by NRLDC through written communication and in various meetings (NRPC, OCC, NRSCT, NRPCTP). Due to switchgear related issues, bypass of 400kV Mahendragarh-

Dhanoda D/C and 400kV Dhanoda-Neemrana D/C at 400kV Dhanoda has been done; operating these lines as 400kV Mahendragarh-Neemrana D/C.

The issue has been discussed in number of meetings & HVPNL has agreed for switchgear replacement work in these meetings. However, as per information available with NRLDC, the switchgear replacement work are yet to be completed.

Members may like to discuss.

d) Issues in declaration of AVC by RE Plants

It has been observed that some RE plants such as (300MW Azure Mapple, 300 MW Acme Heergarh, RSRPL connected at Bikaner (PG), 130 MW Azure Power 34 at Bhadla (PG) and 200 MW Azure at Adani Bhadla and 300 MW Thar Surya 1 at Bikaner (PG)) are submitting full AvC (Available capacity) whereas the maximum generation is far less than the AvC/contract capacity/Installed Capacity and also Low CUF are being observed in these plants compared to other RE plants. Matter was already apprised in 204th OCC forum, CEA and Bidding agencies such as SECI, MSEDCL.

On enquiry, plants reported the following reasons over phone/through mail as below:

300MW Azure Mapple:

Approx.6000+ tracker we have projected to install in the plant out of which 30% of the tracker are in operational condition and for remaining tracker we are facing some technical issues to make it live, hence the structures are not inclined properly to harness the max power. We are in the continuous discussion with OEM to close the technical issues and supply of any accessories are required for making it operational of remaining trackers. Also faces the local challenges regarding the incidences of installed cables connected to the solar panels, as the reason not able to account more power especially during the peak hours. We are in the process of procurement of cables to maximize the generation.

300 MW Acme Heergarh

Our project capacity is 300 MW as mentioned in the commissioning certificate. However, our installed DC capacity is 333.19 MWp against originally planned 445 MW due to supply chain disruptions which is acknowledged by MNRE vide OM dated 25.01.2023. Additionally, there are fixed losses like temperature (8-12%), DC cable, conversion, soiling, mismatch, degradation, IAM, irradiance losses to the extent of 20 to 25% of total capacity. You may appreciate that this is completely beyond our reasonable control.

We would like to re-iterate that the cumulative capacity rating of solar inverters installed in our project is 300 MW AC and hence our AVC is 300 MW. We have attached the inverter wise capacity for your reference.

RSRPL connected at Bikaner (PG) (through RSPPL line)

With reference to trailing, we would like to inform you that, we have received the NOC of 300MW (150MW Phase-1 and 150MW Phase-2) on 6th April'23 and accordingly we started the generation of phase-2 (150MW) from 7th April'23. Our phase-2 plant is under stabilization since then and generally it takes 20 to 25 Days.

Further in addition to above we are submitting the forecasting as per the actual generation available from our plant.

So, we request you to kindly consider the stabilization period of the plant.

130 MW Azure Power 34 at Bhadla (PG) and 200 MW Azure at Adani Bhadla

As reported by site they are facing issues in ventilation fans of IGBTs in inverter, due to this inverters can generate only upto 70% only. Accordingly less generation is observed in these plants.

300 MW Thar Surya 1 at Bikaner (PG):

Thar Surya also reported cable theft issue, IGBT issue in inverters etc.

- CERC vide letter dt: 03.03.2017, has issued the approved "Procedure for implementation of the framework on Forecasting, Scheduling and Imbalance Handling for Renewable Energy (RE) Generating Stations including Power Parks based on wind and solar at Inter-State level.
- In the above regulation/procedure the definition of AvC is given which is as follows:

"Available Capacity (AvC)' for wind or solar generators which are regional entities is the cumulative capacity rating of the wind turbines or solar inverters that are capable of generating power in a given time-block."

- In the SOR of the above mentioned procedure commission quoted the following:

"AvC would be equal to the Installed Capacity, ***unless one or more turbines/inverters are under maintenance or shutdown****. Any attempt at misdeclaration, that is declaration of capacity when it is actually not available due to reasons of maintenance or shutdown etc* ***would be treated as gaming and would be liable to action under appropriate provisions of the Act or the Regulations****".*

- In this regard the following clauses related to Gaming may be referred:

IEGC Clause-6.4.18:

It shall be incumbent upon the ISGS to declare the plant capabilities faithfully, i.e. according to their best assessment. In case, it is suspected that they have deliberately over/under declared the plant capability contemplating to deviate from the schedules given on the basis of their capability declarations (and thus make money either as undue capacity charge or as the charge for deviations from schedule), ***the RLDC may ask the ISGS to explain the situation with necessary backup data.***

IEGC Clause-6.4.24:

*RLDC shall periodically review the actual deviation from the despatch and net drawal schedules being issued, to check whether any of the regional entities are indulging in unfair gaming or collusion**. In case any such practice is detected, the matter shall be reported to the Member Secretaiy, RPC for further investigation/ action.***

ACME Heergarh and Thar Surya1 plants reduced AvC after matter was raised with these plants, but Azure plants are yet to revise their AvC.
Member may deliberate and accordingly may advise further actions to be taken.

e) Long outage of transmission elements

It is requested 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.

Some of the key elements that need to be revived at the earliest:

- 400/220 kV 240 MVA ICT 2 at Orai(UP)
- 400/220 kV 315 MVA ICT 2 at Mundka(DV)
- 400/220 KV 240 MVA ICT 3 AT Moradabad (UP)
- 400KV Bus 1 at Vishnuprayag(JP)
- 400KV Bus 2 at Parbati_3(NH)
- 400KV Bus 2 at Noida Sec 148(UP)
- 220 KV Kishenpur (PG)-Mir Bazar (PDD) Ckt-1

Member may like to discuss.

f) Update of Important grid element document in line with IEGC:

In line with section 5.2. (c) of IEGC, list of important grid elements in Northern region would be compiled by NRLDC shortly. Such elements shall be opened/closed only on instructions from NRLDC. NRLDC has requested utilities to submit the list of all elements with details charged under their jurisdiction from 1.4.2022 till date including those expected to be commissioned till May 2023 so that the same could be included in the list vide email dated 23rd March 2022.
In 206 & 207 OCC meeting, it was requested to provide details before 30th April 2023.
Based on feedback received from utilities, the document has been updated and is available *https://nrldc.in/download/important-grid-element-of-northern-region-may-2023/?wpdmdl=12562*.
Any feedback related to inclusion/deletion of elements may also be provided at the earliest.
For king information of members.

g) Update of Operating Procedure document of Northern region:

In compliance with Regulation 5.1 (f) of Indian Electricity Grid Code, Operating Procedure document would be updated by NRLDC in mid-July 2023. Latest available

document is available@ https://nrldc.in/download/final-operating-procedure-for-northern-region-2022-23/?wpdmdl=10826

It was requested in 206 OCC meeting to provide feedback regarding the operating procedure document. Utilities are once again requested to provide their inputs/comments for any suggested changes in the document. It is requested that inputs/comments may be provided by 25th June 2023.

Members may please discuss.

h) Handholding workshop on RE integration for SLDC Rajasthan

In an endeavour to better understand and smoothen the pre-charging activities (Registration & First time charging process) of upcoming RE generation at Intra-state, an online workshop was convened by NRLDC with the FTC coordinators of Rajasthan SLDC and Intra-state RE developers on 25.05.2023. Around 25 participants attended the workshop.

Requisite data for RE plants, simulation models & study reports, validation of simulation models to check compliance w.r.t CEA technical standards for connectivity to the Grid and Requirement (if any) of tunning of Inverters/WTG parameters & Plant controllers were discussed in the workshop. NRLDC also explained the FTC procedure of Grid-India.

For kind information of forum.

16. TTC/ATC of state control areas for monsoon 2023

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: 8500MW

In 207 OCC meeting, Haryana representative stated that following works are expected by Jun'23:

- New 500MVA ICT at Kurukshetra(PG)
- Connection of one circuit of 220 KV Jhajji - Rai D/C line and 220 kV Rai - RGEC D/C line on terminal towers outside 220 KV GIS S/Stn. HSIIDC, Rai (U/C) to give relief at 400 KV S/Stn Deepalpur
- 220kV Sec 32 Panchkula and 220kV lines to Panchkula (PG) (expected by Jun 2023 end)
- 220kV lines from Panchkula(PG) to Pinjore (expected by Jun 2023 end)
- Matter regarding new ICT at Deepalpur is under discussion with Indigrid.

Haryana SLDC is requested to share revised ATC/TTC limits for summer/ monsoon 2023 at the earliest

Punjab:

TTC: 9500MW
ATC: 9000MW

In 207 OCC meeting, Punjab representative stated that following works are expected shortly:

- 315MVA ICT to 500MVA ICT at Nakodar (second week of Jun)
- 400/220kV Dhanansu S/s (mid-July)

Punjab SLDC is requested to share provide update regarding these transmission elements.

Delhi:

TTC: 7100MW
ATC: 6800MW

NRLDC representative asked Delhi SLDC to submit which feeders would be opened, Radial network details & Bus split to be implemented during high demand.
NRLDC representative stated that non-availability of ICT at Mundka would create N-1 related issues at Mundka. Last year, even with three ICTs, N-1 non-compliance was observed and presently, only two ICTs are available. It was also mentioned that given the criticality, mock testing of already implemented SPS may be carried out at 400/220kV Mundka.

Delhi SLDC has shared ATC/TTC limits for summer/ monsoon 2023 on 12.06.2023. NRLDC has shared few queries on 13.06.2023 regarding assessment done by Delhi SLDC.

Rajasthan:

TTC: 7600MW
ATC: 7000MW

In 207 OCC meeting, RVPN representative informed the following:

- Proposal for capacitor bank installation was approved and is presently with PSDF. Few queries have been received from PSDF, reply for which would be submitted shortly.
- PMU data sharing would be completed by 15th June 2023.

Raj SLDC is requested to share ATC/TTC limits for summer/ monsoon 2023 at the earliest

UP:

TTC: 15100MW
ATC: 14500MW

In 207 OCC meeting, UP representative stated that new ICT at 400/220kV Sohawal is expected shortly whereas at Gorakhpur (UP), ICT replacement is not expected in this summer. UP representative stated that mock testing has already been carried out at Nehtaur & Gorakhpur S/s and would also be carried out at other substations shortly.

UP SLDC is requested to share revised ATC/TTC limits for paddy 2023 at the earliest.

HP:

HP SLDC & POWERGRID informed that CT ratio at Nallagarh end has been changed and line can now be loaded to higher power (more than 350MW) provided margin availability in 400/220kV ICTs at Nallagarh.

Uttarakhand:

Uttarakhand SLDC vide email dated 28.04.2023 submitted their ATC/TTC assessment for summer 2023. NRLDC vide email dated 02.05.2023 have shared their comments to the ATC/TTC assessment done by Uttarakhand.

Uttarakhand SLDC agreed to provide update and mock testing report of Kashipur SPS.

Uttarakhand SLDC to provide update.

J&K

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

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

J&K representatives had intimated during 47th TCC and 49th NRPC meeting that they would be sharing ATC/TTC assessment with NRLDC from October 2021, however the same is still awaited.

NRLDC had taken online training sessions for J&K representative (two in Feb 2023, two in March 2023 and two in Apr 2023). J&K and Ladakh U/Ts are once again requested to advise the concerned officers to evaluate their ATC/TTC limits in coordination with NRLDC and share latest assessment with NRLDC and NRPC.
Punjab, Haryana, HP, Uttarakhand, Delhi & UP are communicating with NRLDC regularly regarding ATC/TTC assessment for summer/monsoon 2023. However, other states such as Rajasthan and J&K are yet to provide their ATC/TTC assessments for summer/monsoon 2023.

Punjab, Haryana and UP have shared their ATC/TTC assessment considering number of transmission elements that were anticipated to be commissioned. Based on actually commissioned transmission elements, these states are requested to review and submit their ATC/TTC for summer/monsoon 2023.

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

It is 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**

It is seen that most of the links are old and have old ATC/TTC limits.

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

17. Metering related agenda points

- **Requirement of standby meters on various element in BBMB control area feeders**

NRLDC processes received weekly IEM metering data which is being used for deviation settlement account by NRPC and weekly loss calculation by NLDC. In NR region, in few locations of BBMB, only one IEM meter is installed on some elements/feeders. In such locations the only installed meter is considered as main meter for accounting purpose. The lack of standby meters for these elements poses a problem when it comes to validating and substituting data in case the installed meter becomes faulty. Therefore, ensuring the accuracy of meter data is essential for authentic and reliable accounting. Having standby meter data greatly aids in verifying and validating meter data. Additionally, in the event of one end meter failure, data from the other end's meter is used as a substitute if one end meter data is considered as main meter for accounting purpose.

A comprehensive list of meters in BBMB control area feeder, on which only a single meter is currently installed and utilized for accounting purposes, is submitted in **Annexure-B.II**. Hence, for authentic and reliable accounting stand by meter can be installed on mentioned feeder as per list in Annexure-B.II.

Members may kindly discuss.

- **Unavailability of software/OEM support for L&T (VINCOM software) and ELSTER (Pearl software) IEM meters.**

Currently, in the NR region, there are a total of 2,700 meters installed by Powergrid with make of Secure, L&T, and Elster along with associated software provided by mentioned 3 vendors. Out of these, approximately 590 meters are of ELSTER make using PEARL software, and 58 meters are of L&T make using Vincom software (.dat format). NRLDC (Northern Region Load Dispatch Center) utilizes these software for processing meter data. However, Powergrid has informed NRLDC that maintenance and support for these two types of meters have been discontinued by Vendor Elster and L&T(VINCOM software) since long time. It has also been informed that Elster vendor is no longer available in market for manufacturing meters.

Recently, several issues have arisen regarding the software platforms when converting encrypted meter data files into a readable format i.e. (.npc format). The PEARL and VINCOM software gets stuck or becomes quite slow leading to conversion problem which causes delays in data processing which hampers other activities and may lead to delay in submission of processed data to NRPC for timely issuance of deviation account. Hence, it is needed to ensure software related availability and support services from Vendor by POWERGRID or replace the main meter with secure or L&T NEW type meter without VINCOM software make at one end from the identified meters list which are of same make(Elster or L&T VINCOM make) at both end or priority basis.

A comprehensive list of these elements is provided in **Annexure-B.III**.

Powergrid may ensure software related services by Vendor of Elster and L&T and in case no support service from vendor is available then to replace the identified meters on priority basis

Members may kindly discuss.

- **Time drift intimation for IEM meters and action for correction**

The data recorded by the Interface Energy Meters (IEMs) is time-stamped in 15-minute blocks. Therefore, maintaining accurate time synchronization in the meters is crucial since they are susceptible to time drift caused by variations in parameters such as temperature and humidity.
The time drift in IEMs leads to discrepancies between the recorded meter readings and the actual readings, which in turn affects the calculation of actual drawal/injection of utilities and constituents.
According to Clause 12(e) of the IEGC 2023 (Indian Electricity Grid Code):
Quote
"Entities in whose premises the IEMs are installed shall be responsible for (i) monitoring the healthiness of the CT and PT inputs to the meters, (ii) taking weekly meter readings for the seven-day period ending on the preceding Sunday at 2400 hrs and transmitting them to the RLDC (Regional Load Dispatch Center) by Tuesday noon, if not done through automatic remote meter reading (AMR) facility, **(iii) monitoring and ensuring that the time drift of IEM is within the limits specified in CEA Metering Regulations 2006,** and (iv) promptly informing RLDC about any changes in CT and PT ratio."
Unquote
NRLDC (Northern Region Load Dispatch Center) is intimating all constituents and Utilities to check time drift of their respective IEM meter on weekly basis and send report to NRLDC on weekly basis about meter time drift along with weekly meter data .It has also been informed to take corrective actions at their end to rectify meter time drift as per norms and also inform NRLDC .However, NRLDC is not receiving report regarding Time drift of meters from many Utilities and Constituents even after frequent communication and follow up. A list of meters from report received from Utilities and Constituents with time drift exceeding 1 minute is attached in **Annexure B-IV**.
Hence it is requested to all Utilities and Constituents to send Time drift report on weekly basis and take corrective actions to rectify time drift issue at their respective meters so as to avoid difference in actual meter data due to time drift which may lead to weekly accounting discrepancies and disputes later on if timely it is not being informed and resolved.
All Utilities and Constituents to take measure regarding Time drift correction in meters timely and send weekly report to NRLDC.

Members may kindly discuss.

18. Frequent forced outages of transmission elements in the month of May'23:

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

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	220 KV Nara(UP)-Roorkee(UK) (UP) Ckt-1	4	UP/UK
2	220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1	4	BBMB/Delhi
3	220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1	5	LTUHP/UK
4	220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2	6	LTUHP/UK
5	400 KV Agra-Unnao (UP) Ckt-1	3	UP
6	400 KV Akal-Jodhpur (RS) Ckt-1	6	Rajasthan
7	400 KV Anpara_B(UPUN)-Sarnath(UP) (UP) Ckt-2	3	UP
8	400 KV Bareilly-Unnao (UP) Ckt-2	3	UP
9	400 KV Bikaner(RS)-Deedwana(MTS) (RS) Ckt-1	4	Rajasthan
10	400 KV Kankani-Jaisalmer (RS) Ckt-2	3	Rajasthan
11	400 KV Merta-Kankani (RS) Ckt-1	4	Rajasthan
12	400 KV Suratgarh SCTPS(RVUN)-Bikaner(RS) (RS) Ckt-2	3	Rajasthan
13	400 KV Suratgarh(RVUN)-Ratangarh(RS) (RS) Ckt-2	3	Rajasthan

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

It may be noted that frequent outages of such elements affect the reliability and security of the grid. Hence, utilities are requested to analyze the root cause of the tripping and share the remedial measures taken/being taken in this respect.

Members may kindly discuss.

19. Multiple element tripping events in Northern region in the month of May '23:

A total of 34 grid events occurred in the month of May'23 of which **01** is of GD-2 category, **11** are of GD-1 category, **12** are of GI-2 Category &**10** 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.**

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

Maximum fault duration observed is **3520msec** in the event of multiple element tripping at 220kV Dasuya(PS) at 04:48hrs on 31st May, 2023. During the event, 220 KV Dasuya-Alawalpur (PS) Ckt tripped on R-N phase to earth fault from Alawalpur

end only; fault sensed in zone-1 from Alawalpur end. This fault was not sensed from Dasuya end. Hence distance protection did not operate and line did not trip from Dasuya end on this fault. On this fault, other lines from 200kV Dasuya(PS) tripped on back-up protection (Z-2/Z-3/directional E/F) operation from remote end only.

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **13** events out of **34** grid events occurred in the month. The other events with delayed clearance of faults (>500ms) are as follows:

1. Multiple elements tripping at 400/220kV Jodhpur(RS) at 20:14hrs on 24th May, 2023, fault clearance time: 2080msec
2. Multiple elements tripping at 220/66kV Ballabhgarh(BB) at 01:52hrs on 16th May, 2023, fault clearance time: 1400msec
3. Multiple elements tripping at 220/132kV Barn(J&K) at 12:22hrs on 20th May, 2023, fault clearance time: 840msec
4. Multiple elements tripping at 220kV Bisnah(J&K) at 14:36hrs on 22nd May, 2023, fault clearance time: 840msec
5. Multiple elements tripping at 220/66kV Mohali(PS) at 12:26hrs on 27th May, 2023, fault clearance time: 560msec

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

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

Members may kindly discuss.

20. Details of tripping of Inter-Regional lines from Northern Region for May' 23:

A total of 28 inter-regional lines tripping occurred in the month of May'23. The list is attached at **Annexure-B.VII.** 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.

Members may please note and advise the concerned for taking corrective action to avoid such tripping as well as timely submission of the information.

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

The status of receipt of DR/EL and tripping report of utilities for the month of May'2023 is attached at **Annexure-B.VIII**. 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. Also, it is observed that reporting status has been improved from POWERGRID (NR-2, NR-3), UP, HP, Haryana, Rajasthan & Uttarakhand in May, 2023 compared to the previous month. However, reporting status from POWERGRID (NR-1), Punjab, Delhi, J&K & RE stations need improvement.

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.

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

In last 24 OCC meetings, 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.**

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

Members are requested to update about their future plan for PSS tuning and share the reports of PSS tuning/re-tuning and Step Response Test if conducted in their control area.

Members may like to discuss.

23. Frequency response characteristic:

Two FRC based event occurred in the month of **May-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	01-May-23	13:23hrs	On 01st May,2023 at 13:23 hrs, as reported, 765 KV AJMER(PG)-PHAGI(RS) (PAPTL) CKT-1 ,765 KV FATEHGARH_II(PG)-BHADLA(PG) (FBTL) CKT-1, 765 KV AJMER-BHADLA_2 (PG) CKT-1tripped on over-voltage. This led to the solar generation loss of approx. 1100MW .Hence, generation loss of 1100MW has been considered for FRC calculation.	50.18	50.13	0.05	51
2	15-May-23	11:51hrs	On 15th May, 2023, at 11:51:55 hrs, 765kV Bhadla-Bikaner ckt-1 tripped on Y-B phase to phase fault during inclement weather condition (wind/dust storm), fault distance was ~111.6km from Bikaner end (line length is ~169km). On this fault during voltage dip, significant dip in RE generation observed. Voltage dipped up to 0.65pu (as per PMU at Fatehgarh2). Due to significant dip in RE generation and	49.98	49.76	0.22	24

			de-loading of 765kV EHV lines, over voltage (>1.1pu at 765kV & 400kV level at RE Pooling stations) scenario created immediately after the fault that led to multiple element tripping in the RE complex. As per PMU & SCADA, total drop in RE generation was approx.7120MW (~6410MW ISTS RE generation and ~710MW Rajasthan RE generation). Hence, generation loss of 7120MW has been considered for FRC calculation.				

Status of Data received till date for 01st May 2023 event:

Status of Field Data received of FRC of Grid event occurred at RE complex in Rajasthan in Northern Region at 13:23 Hrs on 01.05.2023			
Data Received from		Data Not Received from	
Koteshwar HEP	TSPL	Uttarakhand	APCPL Jhajjar
UP	Rajasthan	Haryana	Rihand NTPC
BBMB	NHPC	Punjab	Unchhahar NTPC
Delhi		HP	Tehri HEP
			Kawai TPS
			Singrauli NTPC
			Dadri NTPC

Status of Data received till date for 15th May 2023 event:

Status of Field Data received of FRC of Grid event occurred at RE complex in Rajasthan in Northern Region at 11:51 Hrs on 15.05.2023			
Data Received from		Data Not Received from	
Koteshwar HEP	Rajasthan	Uttarakhand	APCPL Jhajjar
UP	NHPC	Haryana	Rihand NTPC
BBMB	Kawai TPS	Punjab	Unchhahar NTPC
Delhi	NJPC	HP	Tehri HEP
Karcham Wangtoo HEP	Singrauli NTPC		TSPL
			Dadri NTPC

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

Members may like to discuss.

24. UFR & df/dt operation on 15th May 2023

On 15th May 2023, at 11:51hrs, grid disturbance of category GD-2 occurred in Rajasthan Renewable Energy (RE) complex. Event triggered by Y-B (L-L) fault in 765kV Bhadla-Bikaner (PG) ckt-1. On this fault, during voltage dip, significant dip in RE generation observed. Due to significant dip in RE generation and de-loading of 765kV EHV lines, over voltage occurred immediately after the fault that led to tripping of multiple 765kV ISTS lines at 765kV pooling stations in Rajasthan RE generation complex. As per PMU & SCADA, total drop in RE generation was approx.7120MW.

During the event, due to significant drop in RE generation, frequency dropped from 49.98Hz to 49.4Hz. On this frequency drop, load relief was observed on operation of UFR stage-1 & df/dt.
State wise summary of UFR & df/dt operation during the event is shown in below table:

Region wise load relief on UFR & df/dt operation at 11:51 hrs on 15th May 2023				
State	UFR stage-1		df/dt stage-1	
	Approved load relief	Actual load relief	Approved load relief	Actual load relief
Uttar Pradesh	1331	1038	592	291

Rajasthan	548	161	286	272
Haryana	308	50	280	Nil
Punjab	400	300 (as per SCADA)	430	
HP	128	Nil	50	
Uttarakhand	77	114	70	
Delhi	291	54	211	
J&K/Ladakh	83	Details not received	90	
Chandigarh	16		0	
Total	**3182**	**1717**	**2009**	**563**

Details of quantum of load relief not received from J&K & Punjab and operation of df/dt reported from UP & Rajasthan only. All states are requested to review the UFR & df/dt operation in their control area.

Members may like to discuss.

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 & Delhi.

Constituent wise status of bus bar protection where bus bar protection is either not installed or installed but not operational is attached as **Annexure-B.X**.

Constituents agreed in last OCC meeting to share the current status of the bus bar protection, however no details received as of now. Constituents are requested to share the present status w.r.t. to the same.

Members may like to discuss.

26. Frequent 800kV HVDC Champa-Kurukshetra inter-regional link:

It has been observed that frequency of tripping of HVDC Champa-Kurukshetra has increased. There are 13 no of trippings has been observed in this link since May 2023. List of all the tripping of HVDC Champa-Kurukshetra is enclosed as **Annexure-B.XI**. The tripping of this high capacity link may cause overloading of other parallel transmission lines and further tripping may cause cascade tripping.

It is also well known that, paddy season is on the verge of start in Haryana & Punjab and on account of summer, the Northern Region load would remain high till September and therefore, high import requirement exists for the Northern Region. Thus, the HVDC Champa-Kurukshetra inter-regional link is a very important link for fulfilling the Northern Region demand requirement.
It has been observed that major fault is either due to DC line fault, filter protection, software issues, protection mal-operation etc. The reason of most of the tripping seems similar indicating the repetitive nature of fault/tripping.
POWERGRID(NR-1) is requested to take necessary corrective actions to avoid frequent tripping of this inter-regional link.

Member may like to discuss.

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 — Mar-2023
◎ HARYANA — Mar-2023
◎ HP — Jan-2023
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Jan-2023
◎ RAJASTHAN — May-2023
◎ UP — Apr-2023
◎ UTTARAKHAND — Apr-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 — Dec-2022
◎ HARYANA — Mar-2023
◎ HP — May-2023
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Mar-2023
◎ RAJASTHAN — Mar-2023
◎ UP — Mar-2023
◎ UTTARAKHAND — Mar-2023
◎ BBMB — Mar-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>May-2023</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>May-2023</td></tr><tr><td>◎</td><td>UP</td><td>May-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>Feb-23</td></tr><tr><td>◎</td><td>HARYANA</td><td>Feb-23</td></tr><tr><td>◎</td><td>HP</td><td>Mar-23</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>Not Submitted</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Feb-23</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Mar-23</td></tr><tr><td>◎</td><td>UP</td><td>Jan-23</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Jan-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 30.06.2023.</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: May'23
ii	DTL	Peeragarhi	1x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under final stage inspection. GIS Bay is already available.
iii	DTL	Harsh Vihar	2x50 MVAr at 220 kV	PO awarded to M/s Kanohar Electricals Ltd. Drawings approved and under final stage inspection. GIS Bay is already available.
iv	DTL	Mundka	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
v	DTL	Bamnauli	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
vi	DTL	Indraprastha	2x25 MVAr at 220 kV	Bay work awarded to M/s. Ethos. Bay work is expected to be completed by Dec.21. Reactor part tender is dropped and at present same is under revision.
vii	DTL	Electric Lane	1x50 MVAr at 220 kV	Under Re-tendering due to Single Bid
viii	PUNJAB	Dhuri	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	400kV Reactors - LOA issued on dated. 17.08.2021 and date of completion of project is 18 months from the date of LOA. 220kV Reactors - LOA issued on dated 19.07.2021 and date of completion of project is 18 months from the date of LOA. Commsioned 27th Jan'23
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	Main bus shutdown is required for commissioning of 1x25 MVAR reactor at Bikaner, same is expected upto March' 2023.
xiii	RAJASTHAN	Suratgarh	1x25 MVAr	1x25 MVAR Reactor at Suratgarh has been commissioned on dated 25th November' 2022.
xiv	RAJASTHAN	Barmer & others	13x25 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Instalment received on dt.19.02.21 &work order placed on dt. 7.04.2022 to M/s Kanohar Electricals Ltd. Schedule time is 18 months.
xv	RAJASTHAN	Jodhpur	1x125 MVAr	Agreement signed on dt. 22.06.2020. Grant of Ist Instalment received on dt.19.02.21 &work order placed on dt. 7.04.2022 to M/s Kanohar Electricals Ltd. Schedule time is 18 months.

Annexure-A-I.I

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

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
1	400/220kV, 3x315 MVA Samba	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• Network to be planned for 2 bays.	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	31.05.2023	Due to ROW issue work was delayd.Updated in 207th 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.	Jun'23	Issue related to ROW as intimated in 202nd OCC by HVPNL.
				• 220 kV Bhiwani (PG) - Dadhibana (HVPNL) D/c line.	Apr'24	Issue related to ROW as intimated in 192nd OCC 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	Jun'23	Updated in 205th OCC by HPPTCL
				• Network to be planned for 4 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: 2 Unutilized: 4	• LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road	Jun'23	Updated in 197th OCC by HVPNL
				• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road	-	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 Total: 8	Utilized: 4 Unutilized: 4 Under Implementation:2	• Prithla - Harfali 220kV D/c line with LILO of one ckt at 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	Jun'23	• Lucknow -Kanduni, 220 kV D/C line expected energization date Jun'23 updated by UPPTCL in 205th 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	31.05.2023	• Gorakhpur(PG)- Maharajganj, 220 kV D/C line expected energization date is 15.04.2023 updated by UPPTCL in 205th 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	Jul'23	SCDA System work pending at 220 KV S/stn. Rajokheri Updated in 205th 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	May'23	Route survey/tender under process. Work expected to be completed by May 2023. Updated in 198th OCC by PSTCL.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
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)	May'23	Route survey/tender under process. Work expected to be completed by May 2023. Updated in 198th OCC by PSTCL.
27	400/220kV Bagpat S/s	Commissioned: 8 Total: 8	Utilized:6 Unutilized: 2	• Bagpat - Modipuram 220kV D/c line	Commissioned	Updated in 201st OCC by UPPTCL
28	400/220kV Bahardurgarh S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• 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 4 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	May'23	Direct circuit from 220 kV Lalton Kalan to Dhandari Kalan to be diverted to 400 kV PGCIL Ludhiana. Work expected to be completed by May 2023.Updated in 205th OCC by PSTCL.

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

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

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

FGD Status

Updated status of FGD related data submission

NTPC (27.02.2023)
MEJA Stage-I
RIHAND STPS
SINGRAULI STPS
TANDA Stage-I
TANDA Stage-II
UNCHAHAR TPS
UPRVUNL (17.05.2023)
ANPARA TPS
HARDUAGANJ TPS
OBRA TPS
PARICHHA TPS

PSPCL (16.02.2023)
GGSSTP, Ropar
GH TPS (LEH.MOH.)
RRVUNL (09.06.2023)
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)

MIS Report for Status of Islanding Schemes

Implemented Schemes

Sl. No.	Islanding Scheme	SLDC	Status	Submission of Self Certification of Healitheness	SOP	SCADA Display Page	Remarks
1	Delhi IS	Delhi	Implemented	Yes (Sept - 2021)	No	Yes	List of officials in-charge and relays in Delhi IS submitted by DTL on 16.08.2021. Revision of island is under discussion.
2	NAPS IS	UP	Implemented	Yes (08-10-2021)	Yes	Yes	-
3	RAPS IS	Rajasthan	Implemented	16-Aug-21	Yes	Yes	List of officials in-charge, format for generation, islanding scheme sld and relays in RAPP IS submitted by RVPN on 04.12.2021.

Under Implementation/ Newly Proposed/Under Discussion

Sl. No.	Islanding Scheme	SLDC	Status	Details of progress	DPR for PSDF funding (Required /	Timelines Status - Proposed/Actual									
						Study		Design		Approval		Procurement		Commissioning	
						Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual	Proposed	Actual
1	Lucknow-Unchahar IS	UP	Under Implementation	Scheme has been approved in 59th NRPC meeting held on 31.10.2022.		-		-	-	-	-	-	-	-	-
2	Agra IS	UP	Under Study	UP has placed offer to CPRI for dynamic study in July, 2022. The estimated time of study is 5 months from date of acceptance.		-		-	-	-	-	-	-	-	-
3	Jodhpur-Barmer-Rajwest IS	Rajasthan	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. Scheme implementation timeline: July,2023	-	-		-	-	-	-	-	-	-	-
4	Suratgarh IS	Rajasthan	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. SCADA display implementation timeline: Dec, 2022; Scheme implementation timeline: July,2023	-	-		-	-	-	-	-	-	-	-
5	Patiala-Nabha Power Rajpura IS	Punjab	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. SCADA display implementation timeline: Dec, 2022; Scheme implementation timeline: July,2023		-		-	-	-	-	-	-	-	-
6	Pathankot-RSD IS	Punjab	Implemented	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. Scheme has been implemented in April 2023 as informed by Punjab in 206th OCC.		-		-	-	-	-	-	-	-	-
7	Kullu-Manali-Mandi IS	HP	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. Timeline to be intimated by HPSLDC											
8	Shimla-Solan IS	HP	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. Timeline to be intimated by HPSLDC											

STATION NAME	UNIT NO.	Station Type	Capacity (MW)	ORGANIZATION/UTILITY	Outage from	Outage To	Duration (days)	Outage_Reason
SSTPS SURATGARH	5	THERMAL	250	RVUNL	1-Aug-23	21-Aug-23	21	Annual Boiler Overhaul
KOTA TPS (KSTPS)	3	THERMAL	210	RVUNL	1-Aug-23	21-Aug-23	21	Annual Boiler Overhaul
CTPP CHHABRA	4	THERMAL	250	RVUNL	1-Aug-23	9-Sep-23	40	Capital Overhaul
CSCTPP CHHABRA	5	THERMAL	660	RVUNL	15-Aug-23	8-Sep-23	25	Annual Boiler Overhaul
SSTPS SURATGARH	3	THERMAL	250	RVUNL	16-Aug-23	29-Sep-23	45	Capital Overhaul
TANDA TPS	1	THERMAL	110	NTPC	18-Aug-23	24-Sep-23	38	Boiler+Turbine COH
SSTPS SURATGARH	6	THERMAL	250	RVUNL	22-Aug-23	11-Sep-23	21	Annual Boiler Overhaul
CTPP CHHABRA	2	THERMAL	250	RVUNL	1-Sep-23	23-Sep-23	23	Annual Boiler Overhaul
RAJIV GANDHI TPS HISAR	2	THERMAL	600	HPGCL	1-Sep-23	13-Nov-23	74	Replacement of HIP rotor with new one and other activities works related to turbine and boiler.
SSCTPP SURATGARH	7	THERMAL	660	RVUNL	1-Sep-23	30-Sep-23	30	Annual Boiler Overhaul
KOTA TPS (KSTPS)	4	THERMAL	210	RVUNL	10-Sep-23	24-Oct-23	45	Capital Overhaul
SINGRAULI STPS	6	THERMAL	500	NTPC	16-Sep-23	10-Oct-23	25	Boiler overhaul
NAPS Narora	2	NUCLEAR	220	NPCIL	1-Jul-23	31-Aug-23	62	NAPS-2 BSD FOR 60 DAYS
RAMGANGA POWER HOUSE	3	HYDRO	66	UJVN	23-Jul-23	22-Aug-23	31	Annual Maintenance
RAMGARH CCPP	GT-3	GAS	110	RVUNL	1-Aug-23	14-Sep-23	45	Major Inspection
ANTA CCPP	ST	GAS	153.2	NTPC	28-Aug-23	30-Aug-23	3	WHRB-2 Boiler license renewal , ST will be available partially
AURAIYA CCPP	ST-2	GAS	109.3	NTPC	1-Sep-23	30-Sep-23	30	Major o/h of ST-2, (with ST-2 S/D WHRB-3,4 wiill be under s/d for LP Evaporator tube bend replacement
KASHIPUR CCPP (SRAVANTHI ENERGY)	GT-2	GAS	71.5	Sravanthi Energy Private Limited (IPP)	2-Sep-23	3-Sep-23	2	Oflline water wash

सत्यमेव जयते

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

सं. उक्षेविस/ वाणिज्यिक/ 209/ आर पी सी (64वीं)/2023/3933-3980 दिनाँक: 12, April, 2023

सेवा में / To,

उ.क्षे.वि.स. के सभी सदस्य (संलग्न सूचीनुसार)
Members of NRPC (As per List)

विषय: उत्तर क्षेत्रीय विद्युत समिति की 64वीं बैठक का कार्यवृत ।
Subject: 64th meeting of Northern Regional Power Committee – MoM

महोदय / Sir,

उत्तर क्षेत्रीय विद्युत समिति की 64वीं बैठक दिनांक 24.03.2023 को धर्मशाला, हिमाचल प्रदेश में आयोजित की गयी थी । बैठक का कार्यवृत संलग्न है। यह उ.क्षे.वि.स. की वेबसाइट (http://164.100.60.165/) पर भी उपलब्ध है।

The 64th meeting of Northern Regional Power Committee (NRPC) was held on 24.03.2023 at Dharamshala, Himanchal Pradesh. MoM of the same is attached herewith. The same is also available on NRPC Sectt. website (http://164.100.60.165/).

भवदीय
Yours faithfully,

Naresh

(नरेश भंडारी) 12/4/23
(Naresh Bhandari)
सदस्य सचिव
Member Secretary

18-ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली- 110016 फोन:011-26513265 ई-मेल: ms -nrpc@nic.in वेबसाईट: www.nrpc.gov.in
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owner of the asset in RTM mode with completion schedule of 18 months from the date of allocation.

A.8.7 MS, NRPC stated that agenda may be first discussed in TeST meeting of NRPC for having details scrutiny of the proposal and then it may be put up for approval of NRPC forum.

A.8.8 Forum agreed for the same.

A.9 Redundant communication for Narora (NAPP) (NPCIL) (Agenda by CTUIL)

A.9.1 CTU apprised the forum that redundant communication for Narora (NAPP) (NPCIL) was deliberated in the 2nd ISTS planning meeting of NR also in 20th TesT meeting of NRPC.

A.9.2 The agenda was also discussed in the 3rd Meeting of CTUIL for Planning of Communication System for Inter-State Transmission system (ISTS) in Northern Region held on 17.02.2023, wherein UPPTCL informed that they have included NAPP – Atrauli link (38 kms.) in their proposed OPGW package awarded to TCIL. Using NAPP – Atrauli link data of NAPP may be routed through following links upto ISTS node:

"*Narrora (NAPP) – Atrauli – Aligarh (400) – Sikandara Rao – Kasganj- Etah – Mainpuri (UP) – Mainpuri (PG) - NRLDC*"

A.9.3 It is proposed that alternate path may be explored with lesser hops e.g. Narrora – Sibhauli UPPTCL link, where OPGW needs to be installed on Narrora – Sibhauli (UPPTCL) line which is around 88 kms. Sibhauli is already connected with ISTS communication network.

A.9.4 CTU requested UPPTCL to inform status of amendment feasibility in the awarded tender.

A.9.5 UPPTCL informed that shifting of Narora-Atrauli OPGW laying to Narora-Simbhauli may not be possible, however they are trying to include OPGW laying on Narora-Simbhauli as an additional works.

A.9.6 Forum decided that OPGW laying path may be finalized first in TeST sub-committee and then may be put up for approval of NRPC.

A.10 Redundant connectivity between Aulsteng (JKPTCL) and Drass (POWERGRID) (Agenda by UT of Ladakh)

A.10.1 Ladakh representative stated that Ladakh is connected to rest of the Grid through 220kV SLTS Line between Aulsteng (JKPTCL) and Drass (POWERGRID). During peak winter when temperature is below -40 Degree, only source of power supply to Ladakh area is above Transmission Line and outage of above line results in power crisis in UT of Ladakh as the discharges in the Hydel Power Stations are also very low and not able to

meet the load demand which is at annual peak due to heating load. In addition to meeting load requirement of Ladakh area in peak winter, this link also evacuates power generated in Alchi and Chutak Hydro stations of NHPC in Ladakh area to rest of the GRID.

A.10.2 He highlighted that as per CEA manual of transmission planning criteria Jan '2013, "All the equipment in the transmission system shall remain within their normal thermal and voltage ratings after a disturbance involving loss of any one of the elements (called single contingency or 'N-1' condition), but without load shedding / rescheduling of generation".

A.10.3 In view of above, he emphasized that providing redundant connectivity at 220kV level, connecting UT of Ladakh with rest of the GRID may please be reviewed in compliance to CEA manual of transmission planning criteria Jan '2013, so as to provide stable/reliable connectivity to UT of Ladakh. Moreover, there will be no generation loss due to outage of one link.

A.10.4 He also apprised that peak demand in winter is 70 MW, however NHPC generation at times is only 15 MW. Hence, redundant connectivity with ISTS grid is very essential for UT of Ladakh.

A.10.5 A video clip was also shown to forum by Ladakh regarding snow avalanche that covered towers of the above line.

A.10.6 CTU informed that for carbon neutrality, a Solar Park with 2.5 GW capacity was envisaged in the Zangla/Zanskar area of Kargil along with 400kV corridor (400 kV Zangla-Drass - New Alusteng - New Wanpoh & 400 kV New Alusteng - Amargarh D/c line and anchoring at 220 kV Drass and Alusteng). Subsequently, in the meeting held between Hon'ble Minister of Power and NRE and Hon'ble LG of J &K on 15.12.2022, UT of J&K proposed for setting up about 400 MW solar power station along with battery storage in Kargil for addressing power supply position of J&K and suggested for utilization of existing Alusteng - Leh 220 kV S/c line for wheeling the power from proposed solar project to the valley. Hence, considering the land constraints in Kargil and margin available in the existing Alusteng - Leh 220 kV S/c line, NTPC and SECI were directed to survey and identify location(s) of RE projects along with storage.

A.10.7 Further, a meeting was convened by CEA in Feb'23 wherein it was decided that as directed by MoP vide letter dated 23.12.2022, SECI, NTPC with assistance from PDD, Ladakh, would perform the survey and identify suitable location(s) for setting up of RE projects in Ladakh. In case, contiguous land parcel is not available for 400 MW RE project at one location, small parcels of land may be explored for setting up small scale RE projects (say 50-60 MW) at discrete locations with feasibility of connecting to the local distribution sub-stations.

A.10.8 CTU stated that implementation of Transmission System Strengthening for 'Srinagar – Leh Transmission System is being implemented by POWERGRID. In above scheme, to mitigate the problem of avalanche prone zone, additional 15km of 220 kV cable in the section between Minamarg & Zojilla Top is being laid which would increase reliability of power to UT Ladakh.

A.10.9 CTU also stated that there is limitation of ROW in Ladakh, therefore corridor must be planned judiciously considering above aspects, Further JKPTCL has recently done a survey in Zojila pass wherein possibility of additional corridor (400kV) from Kashmir to Kargil through the Zojila pass for evacuation of RE power from Ladakh to J&K side is identified. Earlier POWERGRID had also done preliminary survey and identified one corridor. Hence, he stated that comprehensive plan considering all above approaches of distributed generation (Solar) along with BESS is also being explored and MoM of CEA will be shared with NRPC. Further 20 MW Solar project along with 50 MWh BESS is already under implementation by SECI in Leh.

A.10.10 UT of Ladakh requested that for immediate relief, an additional ISTS corridor from Kashmir to Drass may be planned. CTU stated that in view of above developments (Planning of distributed Solar generation along with BESS), they will deliberate the requirement with CEA and UT of Ladakh in a separate meeting.

A.10.11 MS, NRPC acknowledged the criticality of line and stated that it is really challenging to maintain this line in avalanche. He instructed CTU to take up the matter immediately. He stated that agenda may be regularly deliberated in monthly OCC meeting also.

A.10.12 MD, RVPN also emphasized on finding solution of the concern raised by UT of Ladakh.

A.11 Replacement of two 132 kV transmission lines of PTCUL (Agenda by PTCUL)

A.11.1 PTCUL apprised that there are mainly two sources of power in Kumaon region one is from 400 kV PGCIL Lines connected to 400 kV S/s Kashipur and the other is 220 kV Pantnagar –Bareilly Line which is connected to 220 kV Pantnagar S/s. PGCIL lines cater approximately 60 % load of Kumaon and partial load of Garhwal region also. Due to exponential growth in power demand of Kichha and ELDECO Sitarganj region, the existing Line is unable to cater power demand of above region. It is also to be noted that there is no possibility of erecting new line due to non-availability of ROW (Right of Way).

A.11.2 Therefore, replacement of ACSR Panther conductor in 132KV Sitarganj (PGCIL)-ELDECO Sitarganj single circuit line (22.0 Kms) and 132 KV Sitarganj –Kichha line (31.5Kms) with HTLS conductor is the only possible option to reduce the over loading of existing line and also to improve the reliability of the evacuation of power to cater the increased load demand in Kichha, ELDECO and nearby area through 132 KV Substation,

Annexure - A

Regarding inadequate power evacuation system of SSCTPP(2X660MW) and its impact on STPS (6x250MW) plant

Impact on Switchyard of STPS

1. Overloading on 2X315MVA, 400KV/220KV ILTS led to the cascade tripping of both ILTs whenever either one tripped. This led to instability in the local grid and a loss of generation. The failure of the local grid occurred on 05.06.2022, during which all running units of STPS (O&M) tripped.

2. Frequent failures of isolators/jumpers/joints of 2x400KV Ratangarh feeders (list enclosed) have been observed. To address these failures, emergency shutdowns are always required. However, due to the complete procedure and the time taken to issue a shutdown, it often takes 3-4 hours, resulting in further damage to the system.

3. While attending these faults by taking emergency shutdowns, the Load Dispatcher (LD) is not effectively managing the load to other lines. As a result, the load of STPS Units needs to be reduced, and sometimes units are also required to be desynchronized.

4. Due to continuous overloading of the system, planned shutdowns of power elements in both the 220KV and 400KV switchyards are also required to be deferred. This leads to further deterioration of the system and reduces the flexibility of the system.

Financial impact on STPS

1. The failure of the local grid results in the tripping of running units of STPS, leading to a significant financial loss for RVUN in terms of DC and expenditures on LDO (Light Diesel Oil) and HFO (Heavy Fuel Oil) for the light-up and resynchronization activities of all units. Additionally, there is a substantial loss in auxiliary power consumption during the process of light-up and resynchronization activities.

2. To attend emergency shutdowns, either generation has to be curtailed or units sometimes need to be desynchronized. However, the Load Dispatcher (LD) does not provide written messages for these actions, and have to be managed locally, resulting in either paying DSM charges or revising the availability of machines (causing a loss of DC to RVUN). This leads to a significant financial loss for RVUN, despite the machines being ready to take on the load.

3. Due to the time consumed in allowing shutdowns, further damage to associated equipment occurs, resulting in a significant financial loss. The frequent start and stop of the equipment also causes additional stress, which may lead to the breakdown of auxiliaries and consequently, increased consumption of spares and equipment outage. Spares consumption has considerably increased, which also causes an extra financial burden.

Annexure - B

List of Emergency shut-downs in STPS due to Overloading

S. No.	Date	Name of Power Element	Damages or effects
1.	21.12.2021	400KV Bus-2	Jumper of Y-phase near CVT broken. For attending the same U#4 & 6 are also desynchronized.
2.	02.02.2022	400KV STPS-RTG-Ckt-2	Arm of Bus Isolator (B-Phase) burnt
3.	30.03.2022	400KV STPS-RTG-Ckt-1	Jumper of Y-Phase (Gantry to Gantry) burnt on Bus-2. Took approx 40 Hrs to normalize.
4.	16.05.2022	400KV STPS-RTG-Ckt-2	Dropper from main bus-1 to bus Isolator is heated & broken.
5.	05.06.2022	Both ILTs and running units tripped.	Unit#2 tripped on Over Current causing cascade tripping of both ILTs and other running units. 220KV Switchyard Isolated from Grid.
6.	20.06.2022	400KV STPS-RTG-Ckt-1	Contacts of Bus Isolator B-Phase burnt causing current zero and double current in B-phase of STPS-RTG-Ckt-2.
7.	05.09.2022	400KV STPS-RTG-Ckt-2	Line Isolator B-phase burnt. Took 10 Hrs to normalize.
8.	18.09.2022	220KV STPS-Suratgarh-2	Jumper on wave trap B-Ph burnt.
9.	19.09.2022	400KV STPS-RTG-Ckt-2	Contacts of Bus Isolator (R-phase) burnt causing double current in R-phase of STPS-RTG-Ckt-1. Took 8 Hrs to normalize.
10.	23.09.22	400KV Bus-I and 400KV STPS-RTG-Ckt-2	Gantry to Gantry wire was damaged so repaired. Y-connectors are installed in all the six droppers of Bus isolator A. Arm (Bus side) of Bus isolator-A along with dropper conductors (R-phase) changed. Repaired arm of B isolator. Took 12 Hrs to normalize.
11	27.09.22	400KV STPS-RTG-Ckt-2	Replacement of damaged isolator arm (Bkr side) of Bus isolator-A (R-phase).Took 5 Hrs to normalized.
12	07.10.22	400KV STPS-RTG-Ckt-2	Jumper at wave trap-R ph broken. Y-connector installed in R & B Phase.
13	31.10.22	400KV STPS-RTG-Ckt-2	Overheating of jaws. Both the arms of Isolator B (B ph) changed. Y-jumper was also installed in R-ph. Took 6 Hrs to normalize.
14	28.11.22	400KV STPS-RTG-Ckt-1 400KV STPS-RTG-Ckt-2, 400KV Bus-II Main CB of ILT-2	Y phase of Bus isolators-A of both the circuits got melted after fire. Generation back down in Units of STPS and SSCTPP. Also U#4 desynchronized. Took 15 Hrs to normalize.
15	09.12.22	400KV STPS-RTG-Ckt-1 400KV Bus-II Main CB of ILT-2	Contacts of Isolator B (R-phase) burnt causing double current in R-phase of STPS-RTG-Ckt-2. Also U#4 desynchronized. Took 10 Hrs to normalize.
16	26.12.22	400KV Bus-I Main CB of ILT-1 and	Replacement of damaged isolator arm (Bus side) of Bus isolator-A (R & Y-phase). Tightness of

		400KV STPS-RTG-Ckt-2	Isolator C. Maintenance of CB of ILT-1
17	04.01.23	ILT-2	Isolator arms of Y and B phase of B Isolator (400KV side) were replaced. Jumper of B-ph of isolator B (220KV) also replaced.
18	05.05.23	400KV Bus-II	B phase of Bus isolator (Near CVT) got melted. One Arm replaced. Also U4 and U6 were desynchronized. U4 was already tripped so remain dysync for 20Hrs and U6 for 9 Hrs. Incident happened at 12 o clock in noon but got shutdown at 9pm

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RVPN An ISO 9001:2000 Certified Company

No. RVPN/SE(P&P)/XEN-2(P&P)/AE-2/ F. /D 96 Jaipur, Dt. 23/05/2023

The Member Secretary,
Northern Regional Power Committe,
18-A, QutabInstituitional Area, ShaheedJeet Singh Marg,
KatwariaSarai, New Delhi-110 016

Diary No. 595 29/5/23

Sub: RVPN's agenda for allotment of 500MVA, 400/220 kV ICT Available as Regional Spare at PGCIL's 400 kV GSS Jaipur (South) to RVPN for utilization at RVPN's 400 kV GSS Chittorgarh.

Dear Sir,

Kindly find enclosed herewith an Agenda to accord approval for Allotment of 500MVA, 400/220 kV ICT Available as Regional Spare at PGCIL's 400 kV GSS Jaipur (South) (along with all designs/specification documents) to RVPN for utilization at RVPN's 400 kV GSS Chittorgarh.

Encl: as above

Your's faithfully,

(S. C. Meena)
CHIEF ENGINEER (PP&D)

Copy to the following for information and necessary action please:-

1. Sh. Ishan Sharan, Power System Planning & Project Appraisal-I, Central Electricity Authoriy, New Delhi-
2. Sh. P. C. Garg, COO(CTU), PGCIL, Saudamini, Plot No. 2, Sector 29, Near IFFCO Chowk, Gurgaon (Haryana)-122001.
3. The C.S. Gupta, CGM, PGCIL, Saudamini, Plot No. 2, Sector 29, Near IFFCO Chowk, Gurgaon (Haryana)-122001.

Encl: As above

CHIEF ENGINEER (PP&D)

Signature valid
Digitally signed by Suresh Chand Meena
Designation : Additional Chief Engineer
Date: 2023.05.18 19:31:17 IST
Reason: Approved

SE(O) 29/5/23

Ref No. : 3826072

Pls. discuss. May be brought first in OCC meeting.
SE 31/5

EE(O)

Agenda: Agenda for Allotment of 500MVA, 400/220 kV ICT available as Regional Spare at PGCIL's 400 kV GSS Jaipur (South) (along with all designs/specification documents) to RVPN for utilization at RVPN's 400 kV GSS Chittorgarh

I. OBJECTIVE

To avoid Transmission Constraints and meet increased load demand at RVPN's 400 kV GSS Chittorgarh

II. BACKGROUND

There are 2x315MVA, 400/220 kV ICTs installed at 400 kV GSS Chittorgarh.These ICTs are operated in parallel and recorded peak load on these ICTs is 671 MVA against the rated capacity of 630 MVA. This peak load is recorded after load curtailment. These ICTs are used to cater load demand in Chittorgarh, Sawa, Hamirgarh, Pratapgarh, Banswara and Udaipur regions. Total 6 nos. 220 kV lines are emanating from 400 kV GSS Chittorgarh. A snapshot of power map of region is included in Fig. 1. Details of peak loads recorded on the transformers and transmission lines associated with 400 kV GSSChittorgarhis tabulated below in Table 1.

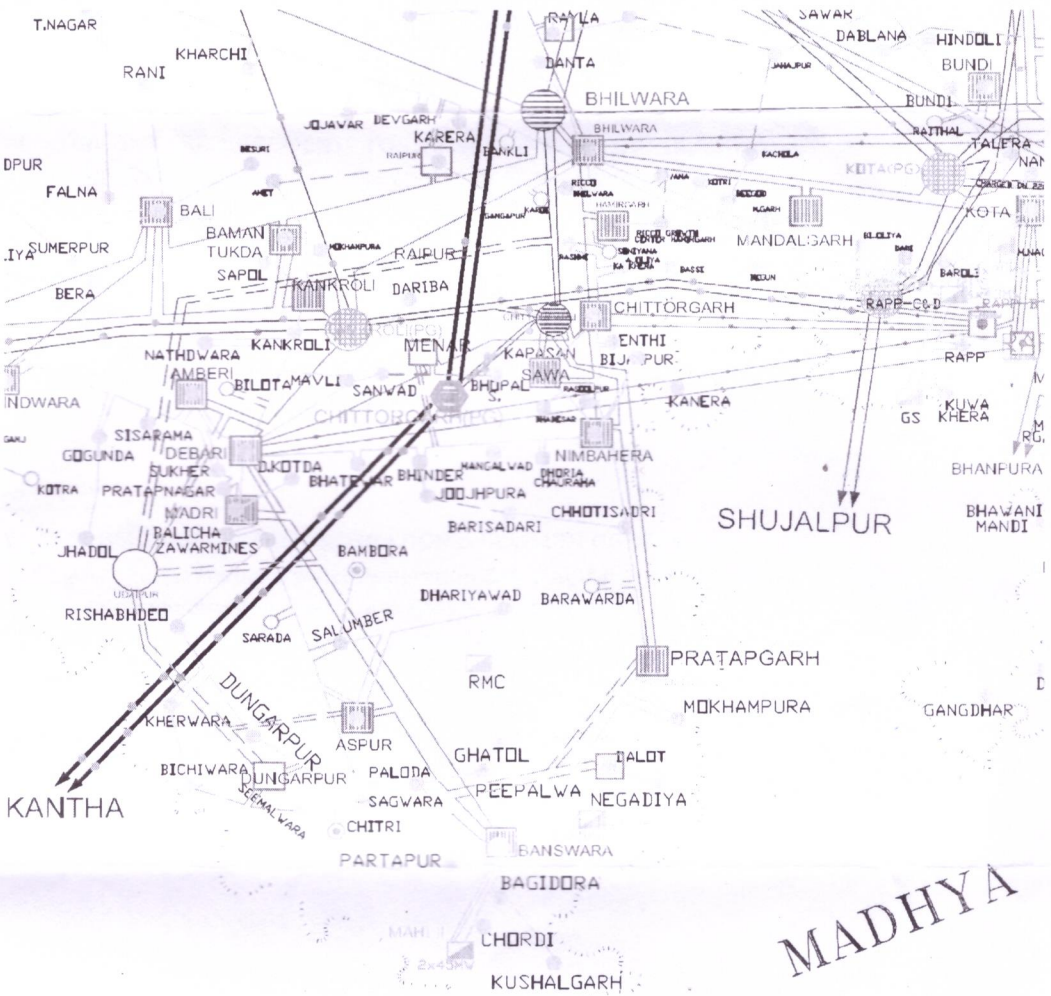

Fig. 1 A snapshot of power map

Signature valid
Digitally signed by Suresh Chand Meena
Designation : Additional Chief Engineer
Date: 2023.05.18 19:29:03 IST
Reason: Approved

Table 1 Details of Peak Loads on Transformers and Transmission Lines

S. No.	Name of Transmission Element	Peak Load
1	315 MVA, 400/220 kV ICT-1	333 MVA
2	315 MVA, 400/220 kV ICT-1	338 MVA
3	400 kV Chittorgarh (400 kV GSS)- Chittorgarh (765 kV GSS) line CKT-I	373 MW
4	400 kV Chittorgarh (400 kV GSS)- Chittorgarh (765 kV GSS) line CKT-II	368 MW
5	400 kV Chittorgarh (400 kV GSS)- Bhilwara line CKT-I	448 MW
6	400 kV Chittorgarh (400 kV GSS)- Bhilwara line CKT-II	341 MW
7	400 kV Chittorgarh (400 kV GSS)- RAPP-C&D line	426 MW
8	400 kV Chittorgarh (400 kV GSS)- Kankroli line	587 MW
9	220 kV Chittorgarh (400 kV GSS)-Sawa line CKT-I	202 MW
10	220 kV Chittorgarh (400 kV GSS)-Sawa line CKT-II	196 MW
11	220 kV Chittorgarh (400 kV GSS)-Nimbahera line	232 MW
12	220 kV Chittorgarh (400 kV GSS)-Pratapgarh line	106 MW
13	220 kV Chittorgarh (400 kV GSS)-Debari line	210 MW
14	220 kV Chittorgarh (400 kV GSS)-Chittorgarh (220 kV GSS)line	173 MW

III. URGENT REQUIREMENT FOR INSTALLATION OF HEALTHY ICT AT 400 KV GSS CHITTORGARH AND REASON TO USE REGIONAL SPARE

Recorded peak load on 2x315MVA, 400/220 kV ICTs at 400 kV GSS Chittorgarhis 671 MVA against the rated capacity of 630 MVA after curtailment of load. A&FS for procurement of 500 MVA, 400/220 kV ICTs by RVPN has been issued and tendering process has still not started. Looking to heavy load conditions, it is required to install additional 400/220 kV ICT at RVPN's 400 kV GSS Chittorgarh. This requirement can be met using the 500MVA, 400/220 kV ICT Available as Regional Spare at PGCIL's 400 kV GSS Jaipur (South).

IV. READYNESS OF TRANSFORMER BAY AT 400KV GSS CHITTORGARH

Transformer bay for 3rd, 400/220 kV ICT at 400 kV GSS Chittorgarh will be ready by the end of August-2023.

V. SUBMISSION FOR CONSIDERATION & DECISION OF NRPC

The agenda herein is for consideration & decision of NRPC on the following:-

- In-principal approval to use 500MVA, 400/220 kV ICT available as regional spare at PGCIL's 400 kV GSS Jaipur (South) by RVPN at RVPN's 400 kV GSS Chittorgarh.
- To provide all designs/specification documents of ICT by PGCIL's to RVPN.

Signature valid

Digitally signed by Suresh Chand Meena
Designation : Additional Chief Engineer
Date: 2023.05.18 16:29:03 IST
Reason: Approved

Annexure-A.VII

उत्तर प्रदेश राज्य भार प्रेषण केन्द्र
उ0प्र0पॉवर ट्रांसमिशन कारपोरेशन लि0
(उत्तर प्रदेश सरकार का उपक्रम)
यू0पी0एस0एल0डी0सी0 परिसर, विभूति खण्ड– II
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ई–मेल : cepso@upsldc.org
sera@upsldc.org

U.P. State Load Despatch Centre
U.P. Power Transmission Corporation Ltd.
(A U.P. Govt. Undertaking)
UPSLDC Complex, Vibhuti Khand – II
Gomti Nagar, Lucknow- 226010
E-mail: cepso@upsldc.org
sera@upsldc.org

No: - 2412 /SE(R&A)/EE-II/Anpara SPS Dated: - 14/06/ 2023

Member Secretary, NRPC,

18 – A, SJSS Marg, Katwaria Sarai,

New Delhi, 110016.

Subject - Regarding the revision of SPS scheme for safe evacuation of power from Anpara Complex.

Following the LILO of 765kV Anpara D-Unnao line at Obra C TPS and in view of synchronization of 1x660 MW Unit at Obra-C TPS, existing system protection scheme for safe evacuation of power from Anpara Complex, needs to be revised. In this regard UPSLDC prepared a revised scheme for the aforementioned SPS scheme .To discuss said scheme, a meeting was also held with all stakeholders on 13.06.2023. Based on the discussion in the aforesaid meeting the revised logic has been finalised by UPSLDC which is enclosed herewith.

It is requested to kindly include revised SPS scheme as an agenda in 208th OCC meeting of NRPC so that the same may be discussed and approved.

Encl: - As above

(Amit Narain)
Superintending Engineer (R&A)

No: - 2412 /SE(R&A)/EE-II/Anpara SPS Dated: - 14/06/ 2023

Copy forwarded to following for kind information and necessary action:-

1. Director, UPSLDC, Vibhuti Khand – II, Gomti Nagar, Lucknow.
2. Director (Operation), UPPTCL, 11th Floor, Shakti Bhawan Extn., Lucknow.
3. Chief Engineer (PSO), UPSLDC Vibhuti Khand – II, Gomti Nagar, Lucknow.
4. General Manager, NRLDC18-A, SJSS Marg, Katwaria Sarai, New Delhi – 110016.
5. Chief General Manager, (Obra-C) Thermal Power Station, Obra, Sonbhadra Pin code-231219.
6. M/s LANCO – Anpara Power Ltd, 411/09 River Side Apartment, New Hyderabad Lucknow-226007(arun.tholia@lancogroup.com).
7. Chief Engineer (Trans. Central), UPPTCL, Pareshan Bhawan, Vibhuti Khand, Gomti Nagar Lucknow (cetc@upptcl.org).

8. Chief Engineer (Trans. South - East), U.P. Power Transmission Corporation Ltd., 57, George Town, Prayagraj - 211003.
9. Chief General Manager, Anpara-D, Thermal Power Station, Anpara.
10. Chief General Manager, Anpara-A&B, Thermal Power Station, Anpara.

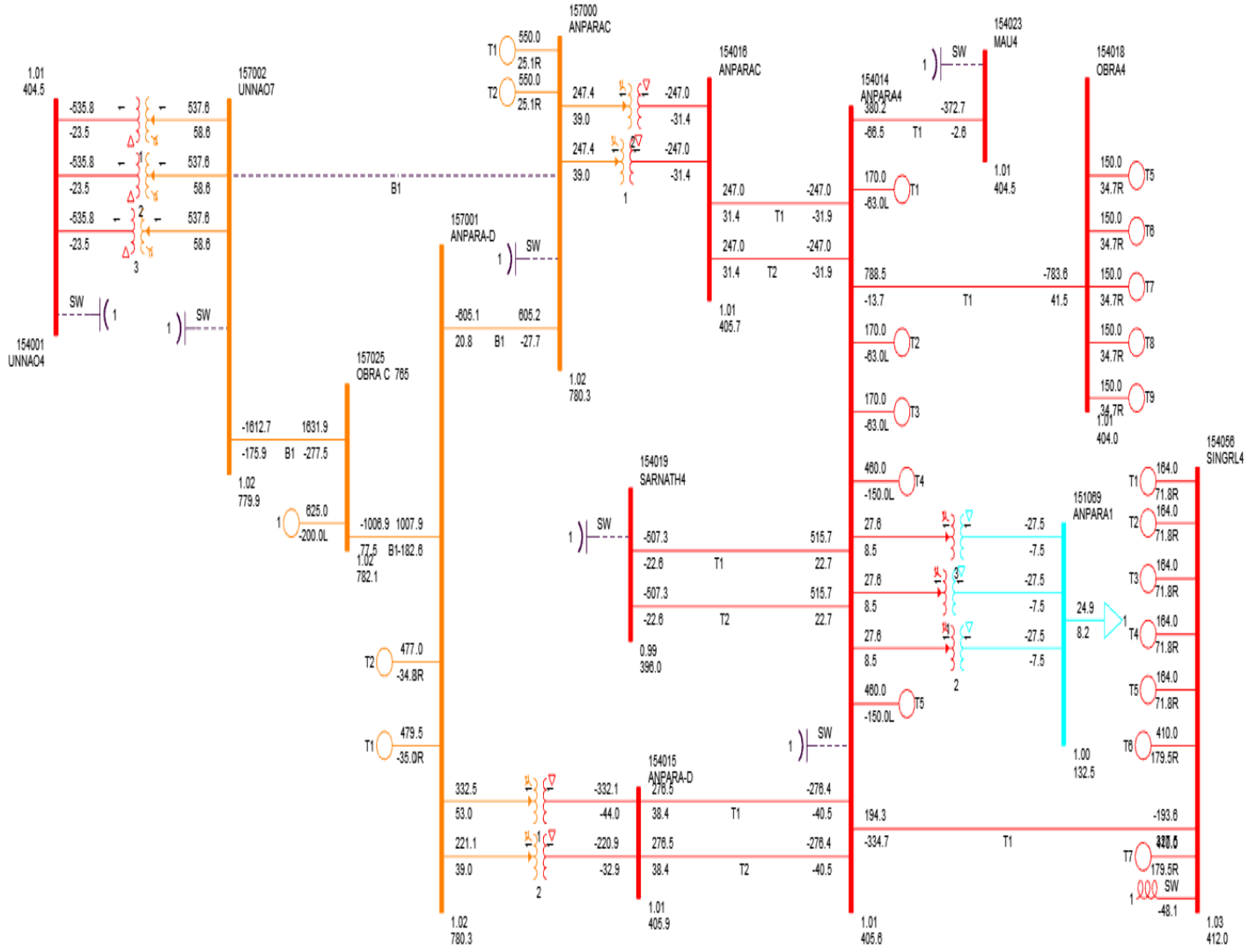
(Amit Narain)
Superintending Engineer (R&A)

Revision of SPS scheme for Anpara Complex

Single Contingency

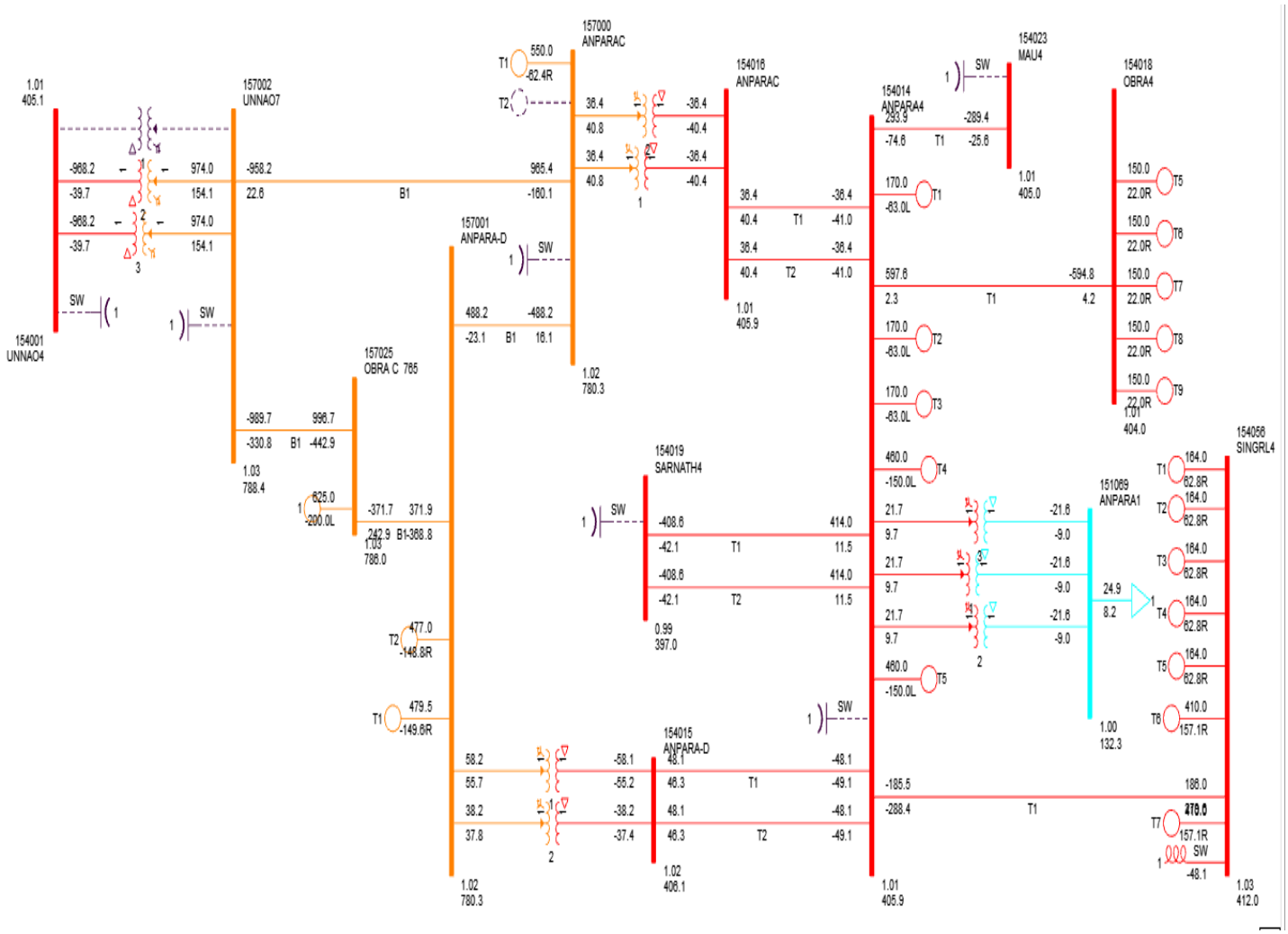
1. **Tripping of 765kV Anpara C-Unnao line OR 765 kV Obra C- Unnao line OR 765 kV Anpara D-Obra C line**

   Action: - No automatic back down or tripping of unit is required. However, as a standard operating procedure control room operator shall take immediate action to keep the loading of remaining 765 KV lines at Unnao end below 1280 MW so that system remains N-1 Compliant.



2. **Tripping of one ICT of 1000 MVA at 765 kV substation Unnao**

Action: - Tripping of one unit either from Obra CTPS or Anpara CTPS or Anpara DTPS on rotation basis if antecedent loading on 765kV Anpara C-Unnao line is more than 1050 MW. After tripping of one ICT at 765 kV Substation Unnao, backing down is required at Obra CTPS, Anpara C TPS, Anpara DTPS till loading of each ICT is below 950 MW.



Multiple contingencies

1. **Tripping of 2x 1000 MVA ICT at 765 kV substation Unnao.**
   Action: - Tripping of one unit each at Obra CTPS, Anpara CTPS and Anpara DTPS and tripping of 765 kV Obra C –Unnao line. In case any of the unit is under shutdown at aforementioned plants, tripping command shall not be issued to that plant.

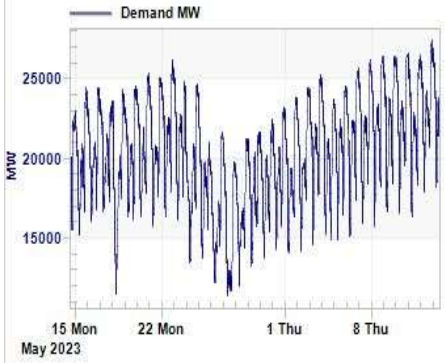
2. **Tripping of 765kV Anpara C-Unnao AND 765 kV Anpara D-Obra C line simultaneously.**

   Action 1- Tripping of one unit each at Anpara CTPS and Anpara DTPS if antecedent loading on 765kV Anpara C-Unnao line is more than 1100 MW.
   Action 2- Tripping of one unit either from Anpara CTPS OR Anpara DTPS on rotation basis if antecedent loading on 765kV Anpara C-Unnao line is more than 950 MW.

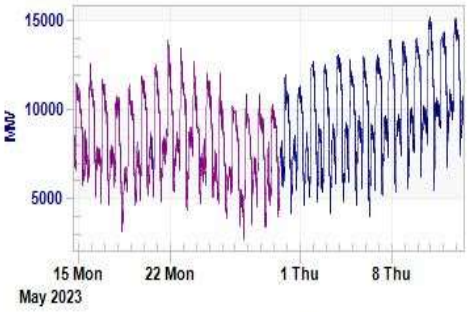
3. **Tripping of 765kV Anpara C-Unnao AND 765 KV Obra C-Unnao line simultaneously OR Tripping of 3 x 1000 MVA ICT at 765 KV substation Unnao**.

   Action 1- Tripping of one unit each at Obra CTPS, Anpara CTPS and Anpara DTPS if antecedent loading on 765kV Anpara C-Unnao line is more than 1100 MW.
   Action 2- Tripping of total 2 units to be selected from two of three plants namely Obra CTPS, Anpara CTPS and Anpara DTPS on rotation basis if antecedent loading on 765kV Anpara C-Unnao line is more than 1000 MW.
   Action 3- Tripping of 1 unit to be selected from one of three plants namely Obra CTPS, Anpara CTPS and Anpara DTPS on rotation basis if antecedent loading on 765kV Anpara C-Unnao line is more than 900 MW.

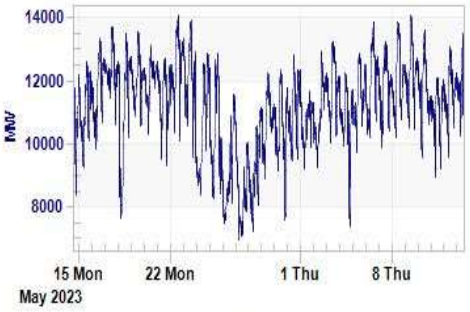
UP Demand



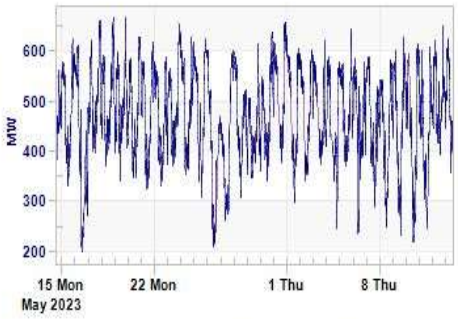
UP Import



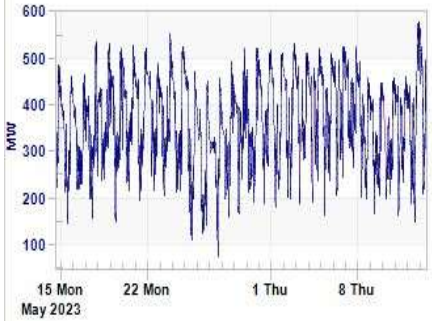
UP own generation



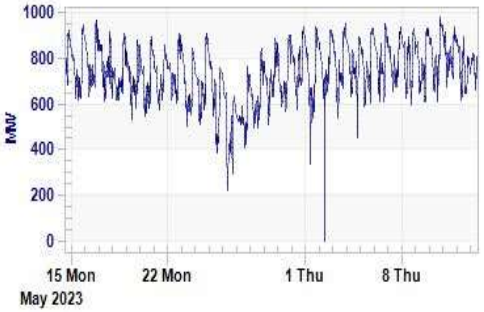
Obra ICT loading



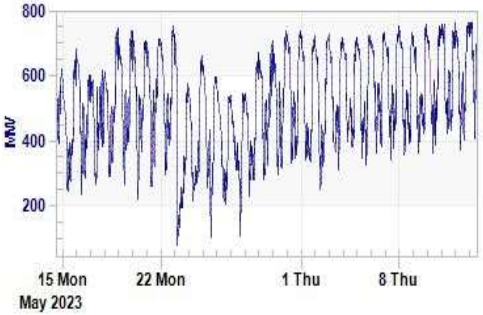
Azamgarh ICT loading



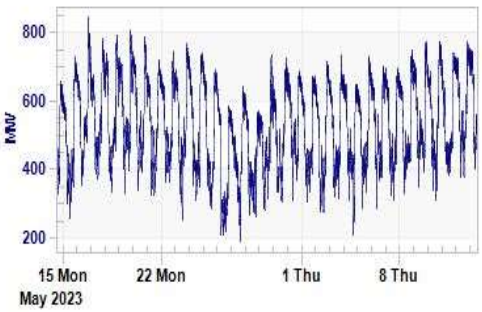
Sarnath ICT loading



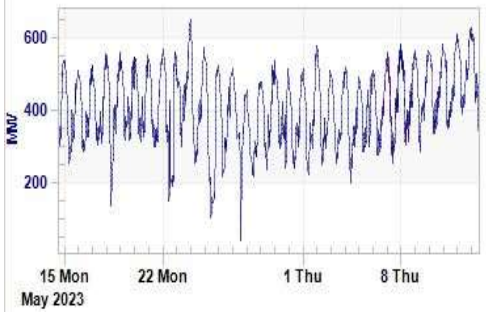
Gorakhpur UP ICT loading



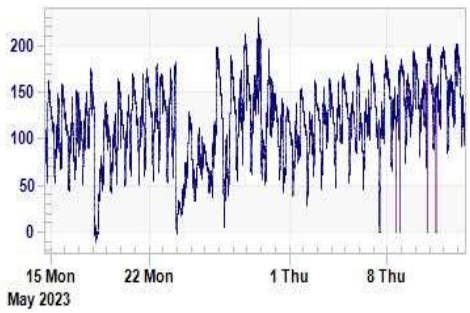
Allahabad ICT loading



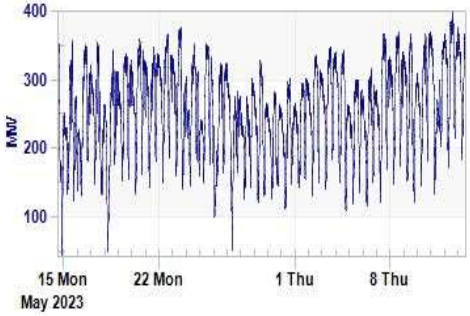
Lucknow(PG) ICT loading



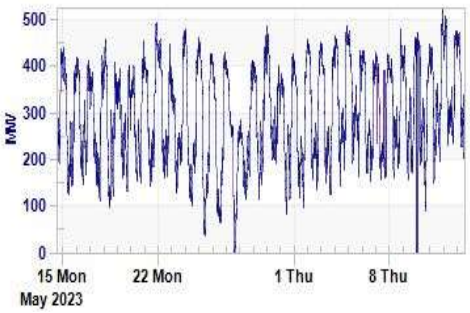
Nehtaur ICT loading



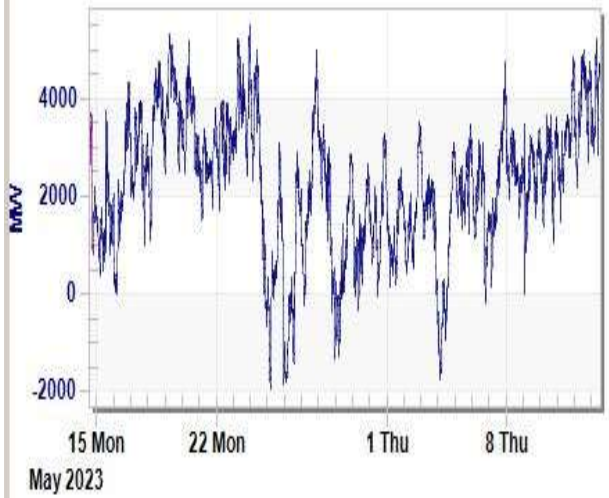
Agra(PG) ICT loading



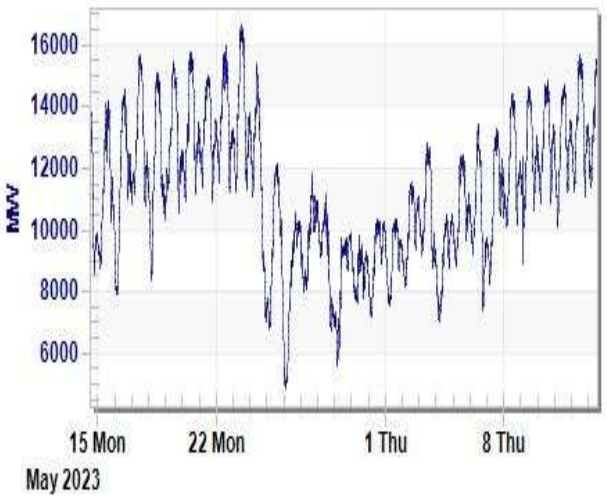
Sohawal ICT loading



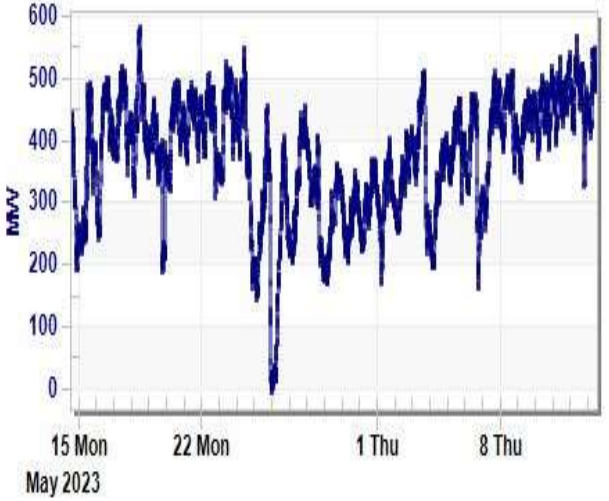
Rajasthan import



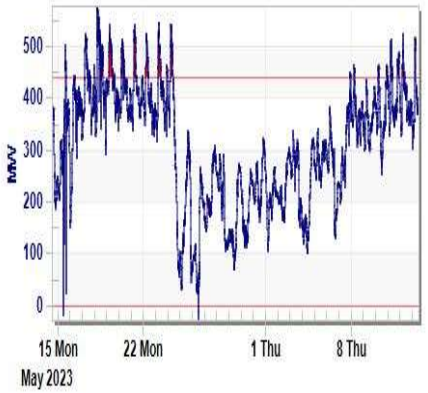
Rajasthan Load



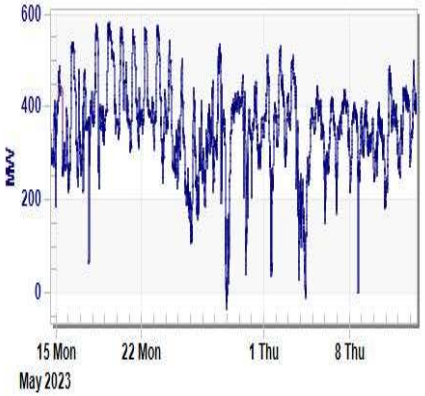
Ajmer ICT loading



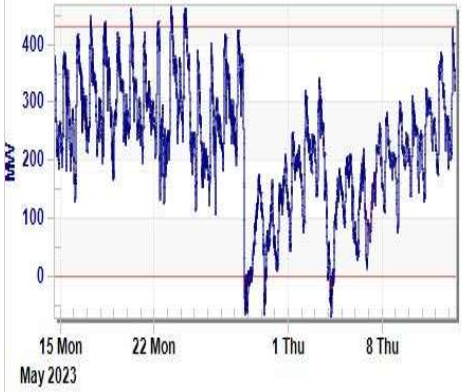
Merta ICT loading



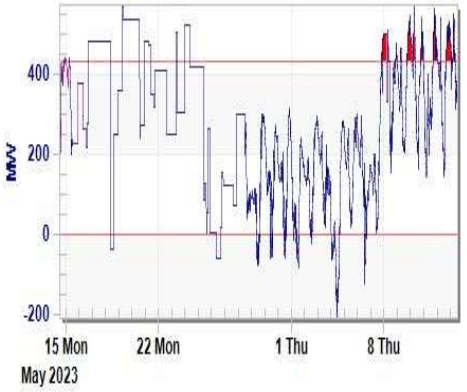
Chittorgarh ICT loading

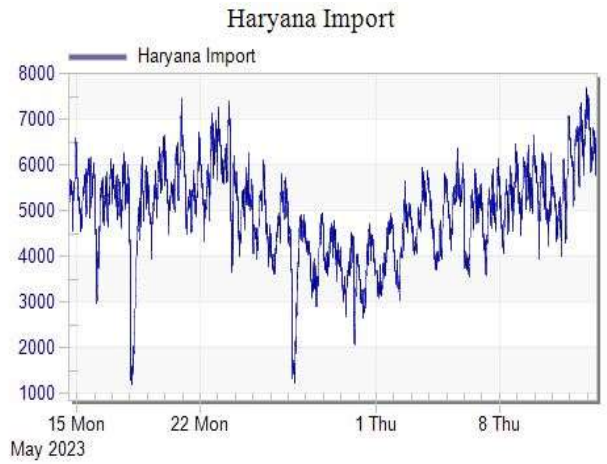


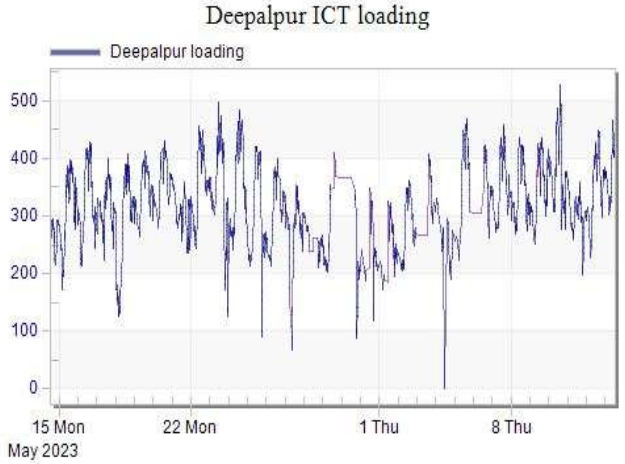
Bhinmal ICT loading



Bikaner ICT loading




Haryana Import
Haryana Import
8000
7000
6000
5000
4000
3000
2000
1000
15 Mon
22 Mon
1 Thu
8 Thu
May 2023


Deepalpur ICT loading
Deepalpur loading
500
400
300
200
100
0
15 Mon
22 Mon
1 Thu
8 Thu
May 2023

BBMB TO HARYANA		
SL NO	**Feeder Name**	**End1**
1	220kV Panipat(T)-1 at Panipat-BBMB	NS-1504-A
2	220kV Panipat(T)-3 at Panipat-BBMB	NR-3226-A
3	220kV Panipat(T)-2 at Panipat-BBMB	NP-7076-A
4	220kV Panipat(T)-4 at Panipat-BBMB	NP-7079-A
5	220/132kV T/F-1(220 kV) at Panipat-BBMB	NR-3294-A
6	220/132kV T/F-2(220 kV) at Panipat-BBMB	NP-6583-A
7	220/33kV T/F-1 (220 kV) at Panipat-BBMB	NR-3271-A
8	220/33kV T/F-2 (220 kV) at Panipat-BBMB	NP-1416-A
9	220kV Mahendargarh-1 at Charkhi Dadri-BBMB	NP-5466-A
10	220kV Mahendargarh-2 at Charkhi Dadri-BBMB	NP-3130-A
11	220kV Rewari at Charkhi Dadri-BBMB	NP-1145-A
12	220/132kV ICT-1(220kV) at Charkhi Dadri	NP-1156-A
13	220/132kV ICT-2(220kV) at Charkhi Dadri	NP-1155-A
14	220kV Palwal-1 at Samaypur-BBMB	NS-1056-A
15	220kV Palwal-2 at Samaypur-BBMB	NP-6606-A
16	220kV Badshapur-1 at Samaypur-BBMB	NP-8153-A
17	220kV Badshapur-2 at Samaypur-BBMB	NP-6683-A
18	220kV Faridabad GPS-1 at Samaypur-BBMB	NP-8199-A
19	220kV Faridabad GPS-2 at Samaypur-BBMB	NP-5051-A
20	220kV Palla-1 at Samaypur-BBMB	NP-6695-A
21	220kV Palla-2 at Samaypur-BBMB	NP-6824-A
BBMB TO PUNJAB		
1	220/132kV ICT-1 at JALANDHAR (BBMB)	NP-1651-A
2	220/132kV ICT-2 at JALANDHAR (BBMB)	WR-2151-A
3	220/132kV ICT-3 at JALANDHAR (BBMB)	NR-3231-A
4	220/132kV ICT-4 at JALANDHAR (BBMB)	NP-5462-A
5	220/66kV ICT-1 at JALANDHAR (BBMB)	NP-1815-A
6	220/66kV ICT-2 at JALANDHAR (BBMB)	NR-3305-A
7	220kV Mahilpur 1 at Bhakra Right Bank	NR-3384-A
8	220kV Mahilpur 2 at Bhakra Right Bank	NP-3088-A
9	220Kv Butari -Jalandhar	NP-6977-A
10	220/66 kV ICT1 at Jamalpur BBMB	NP-7151-A
11	220/66 kV IC21 at Jamalpur BBMB	NP-7520-A
12	220/66 kV ICT3 at Jamalpur BBMB	NP-7153-A
13	220/132kV ICT1 at Jamalpur BBMB	NP-6572-A
14	220/132kV ICT2 at Jamalpur BBMB	NS-1552-A
15	220/132kV ICT3 at Jamalpur BBMB	NP-8591-A
16	220 kV Sangrur at Hissar 1	NS-1011-A
17	221 kV Sangrur at Hissar 2	NP-1331-A

ELSTER MAIN METER LIST			
Sr. No	METER.NO	CATEGORY	PLACE OF INSTALLATION OF SEM
1	NR-4679-B	M	11kV HVDC-1(aux) at HVDC Rihand POWERGRID_#HVDC Rihand POWERGRID
2	NR-4680-B	M	11kV HVDC-2(aux) at HVDC Rihand POWERGRID_#HVDC Rihand POWERGRID
3	NR-4681-B	M	11kV HVDC-3(aux) at HVDC Rihand III(from CPS Board)-POWERGRID_#HVDC Rihand POWERGRID
4	NR-4684-B	M	6.6kV HVDC-1(aux) at Dadri-HVDC(from thermal)
5	NR-4694-B	M	6.6kV HVDC-2(aux) at Dadri-HVDC(from Gas)
6	NR-4372-A	M	400 kV Basti-2 at Tanda Stage-2
7	NR-3465-A	M	400kV Banala (PG) at Parbati-II HPS
8	NR-3464-A	M	400kV Sainj HEP at Parbati-II HPS
9	NR-3292-A	M	220 kV Amargarh-1 at Kishenganga HEP
10	NR-3758-A	M	220kV RAPS-B at RAPS-C Tie Line-2
11	NR-3761-A	M	220kV side of 220/33 kV SUT-5(35 MVA) at RAPS-C
12	NR-3939-A	M	400 kV Jaipur(PG) at RAPP-7&8
13	NR-3384-A	M	220 kV Mahilpur-1 at Bhakra Right Bank
14	NR-3232-A	M	GT-2(220 kV) at Pong HPS
15	NR-3226-A	M	220kV Panipat(T)-3 at Panipat-BBMB
16	NR-3294-A	M	220/132kV T/F-1(220 kV) at Panipat-BBMB
17	NR-3271-A	M	220/33kV T/F-1 (220 kV) at Panipat-BBMB
18	NR-3305-A	M	220/66kV ICT-2 (220kV) at Jalandhar-BBMB
19	NR-4310-A	M	400/220 kV ICT-3(400 kV) at Fatehpur-PG
20	NR-3386-A	M	220kV UT Chandigarh-1 at Nalagarh-PG
21	NR-3210-A	M	220kV Chhaur at Nalagarh-PGCIL
22	NR-3484-A	M	ICT-2 315MVA (400 kV) at Panchkula-PG
23	NR-3433-A	M	ICT-3 500MVA (400 kV) at Panchkula-PG
24	NR-4570-A	M	ICT-1 (400 kV) at Sikar-PG
25	NR-3587-A	M	ICT-I (400 kV) at Tughlakabad-GIS-PG
26	NR-3652-A	M	ICT-II (400 kV) at Tughlakabad-GIS-PG
27	NR-3969-A	M	ICT-IV (400 kV) at Tughlakabad-GIS-PG
28	NR-3218-A	M	220 kV Kanjal-1 at Jallandhar-PG
29	NR-3216-A	M	220 kV Kanjal-2 at Jallandhar-PG
30	NR-3726-A	M	ICT-3 (400 kV) at Allahabad-PG
31	NR-4355-A	M	220 kV Railways(Naini)-I at Allahabad-PG
32	NR-4361-A	M	220 kV Railways(Naini)-II at Allahabad-PG
33	NR-4611-A	M	ICT-3(400 kV) 500MVA at Sohawal-PG
34	NR-4488-A	M	ICT-2 (400 kV) at Mainpuri-PG
35	NR-4492-A	M	ICT-1 (220 kV) at Mainpuri-PG
36	NR-4489-A	M	ICT-3 (400 kV) at Mainpuri-PG
37	NR-3278-A	M	ICT-4 (400 kV) at Amritsar-PG
38	NR-3274-A	M	ICT-1 (400 kV) at Kaithal-PG
39	NR-3272-A	M	ICT-2 (400 kV) at Kaithal-PG
40	NR-3301-A	M	ICT-3 (400 kV) at Kaithal-PG
41	NR-3383-A	M	ICT-1 (400 kV) at Banala PG
42	NR-3546-A	M	400/220 kV ICT-2 (400KV) at Kurukshetra PG(NR-3518-A replaced in Aug 2022)
43	NR-3507-A	M	Auxiliary Consumption(33 kV side) at Kurukshetra-HVDC
44	NR-3520-A	M	Auxiliary Consumption(33 kV side) at Kurukshetra-HVDC
45	NR-3488-A	M	ICT-1 (400 kV) at Samba-PG
46	NR-3490-A	M	ICT-3 (400 kV) at Samba-PG
47	NR-4519-A	M	ICT-2 (400 kV) at Dehradun-PG
48	NR-4582-A	M	400 KV Bikaner(RJ) ckt 2 at Bikaner-PG(Before tapping this was 400kV Bhadla(RJ) at Bikaner-PG)
49	NR-4578-A	M	220 kV AREPRL-1 at Bhadla-PG
50	NR-4517-A	M	220 kV AREPRL-2 at Bhadla-PG
51	NR-3979-A	M	220 kV Saurya Urja-1 at Bhadla-PG
52	NR-4455-A	M	220 kV Saurya Urja-2 at Bhadla-PG
53	NR-3586-A	M	220 kV Azure Thirty Four at 765/400/200 kV Bhadla-PG
54	NR-3696-A	M	220 kV ACME-Chittorgarh at 765/400/200 kV Bhadla-PG
55	NR-4496-A	M	400 kV ICT-1 at Prithala-Sterlite
56	NR-4600-A	M	400 kV ICT-2 at Prithala-Sterlite
57	NR-4601-A	M	400 kV ICT-1 at Sohna-Sterlite
58	NR-3764-A	M	400 kV ICT-2 at Sohna-Sterlite
59	NR-3503-A	M	220 kV side of ICT(220/33 kV) at Phojal-HEP
60	NR-3342-A	M	ICT-1 (400 kV) at Hamirpur-PG
61	NR-3514-A	M	400 KV Parbati-III at Sainj HEP
62	NR-3515-A	M	400 KV Parbati-II at Sainj HEP

63	NR-3530-A	M	220 kV Kishenganga-2 at Amargarh-PDD
64	NR-3320-A	M	400 kV Kishenpur-PG-3 at Baglihar
65	NR-3291-A	M	220 kV Drass at Alusteng
66	NR-3438-A	M	400 kV ICT-I at Patran-PTCL
67	NR-4702-B	M	Genr-1(11kV) at Chibro HPS-UPCL
68	NR-4704-B	M	Genr-2(11kV) at Chibro HPS-UPCL
69	NR-3924-A	M	765 kV Varanasi-2 at Vindhyachal-PG
70	NR-4415-A	M	400kV Allahabad-2 at Rihand-2 STPS_#Rihand STPS
71	NR-4616-A	M	400kV Fatehpur-I at Unchahar TPS
72	NR-3774-A	M	400kV Fatehpur-II at Unchahar TPS
73	NR-4363-A	M	ICT-1 (220 kV) at Tanda Stage-2
74	NR-4364-A	M	ICT-2 (220 kV) at Tanda Stage-2
75	NR-3797-A	M	400 kV Azamgarh at Tanda Stage-2
76	NR-4367-A	M	400 kV Sultanpur at Tanda Stage-2
77	NR-4362-A	M	400 kV Basti-1 at Tanda Stage-2
78	NR-3419-A	M	220kV Jammu-2 at Salal HPS
79	NR-3369-A	M	220kV Kishenpur-2 at Salal HPS
80	NR-3370-A	M	220kV Kishenpur-3 at Salal HPS
81	NR-3372-A	M	220kV Kishenpur-4 at Salal HPS
82	NR-3504-A	M	220 kV Amargarh-2 at Kishenganga HEP
83	NR-3938-A	M	ST-7A&B (220kV) at RAPPC
84	NR-3752-A	M	400 kV Bhadla-II at Bhadla-RRVPNL
85	NR-3777-A	M	400/220 kV ICT-2(400 kV) at Fatehpur-PG
86	NR-3416-A	M	220kV HPSEB NANGAL-2 at Nalagarh-PG
87	NR-3204-A	M	220kV Ad-Hydro-1 at Nalagarh-PGCIL
88	NR-3909-A	M	ICT-2 (400 kV) at Mandola-PG
89	NR-4499-A	M	ICT-4 (400 kV) at Mandola-PG
90	NR-3482-A	M	ICT-1 315MVA (400 kV) at Panchkula-PG
91	NR-3759-A	M	ICT-3 (400 kV) at Sikar-PG
92	NR-3976-A	M	400 kV Ratangarh(RVPNL)-I at Sikar-PG
93	NR-3977-A	M	400 kV Ratangarh(RVPNL)-II at Sikar-PG
94	NR-3756-A	M	400 kV Bikaner(RVPNL)-I at Sikar-PG
95	NR-3340-A	M	400 kV Baglihar-2 at Kishenpur-PG
96	NR-4609-A	M	ICT-1(400 kV)315MVA at Sohawal-PG
97	NR-3846-A	M	ICT-2 (400 kV)500MVA at Bahadurgarh-PG
98	NR-3528-A	M	400/220 kV ICT-1 (400KV) at Kurukshetra PG
99	NR-3539-A	M	400kV AC SIDE OF Conv. Trf.of HVDC-Pole-III at Kurukshetra-HVDC
100	NR-3290-A	M	400kV AC SIDE OF Conv. Trf.of HVDC-Pole-IV at Kurukshetra-HVDC
101	NR-3704-A	M	33 kV ICT-1 at Aligarh-PG
102	NR-3809-A	M	220 kV TPREL Chhayan at 765/400/200 kV Bhadla-PG
103	NR-3212-A	M	400 kV ICT-1 at Amargarh-Sterlite
104	NR-3214-A	M	400 kV ICT-2 at Amargarh-Sterlite
105	NR-3765-A	M	400 kV ICT-1 at Kadarpur-Sterlite
106	NR-3770-A	M	400 kV ICT-2 at Kadarpur-Sterlite
107	NR-3931-A	M	400 kV Neemrana(PG)-1 at Dhanonda(HVPN)
108	NR-3826-A	M	400 kV Neemrana(PG)-2 at Dhanonda(HVPN)
109	NR-3491-A	M	400 kV Jhakri-I at Gumma-HPPTCL
110	NR-3268-A	M	400 kV Jhakri-II at Gumma-HPPTCL
111	NR-3341-A	M	ICT-2 (400 kV) at Hamirpur-PG
112	NR-3237-A	M	ICT-3 (400 kV) at Hamirpur-PG
113	NR-3396-A	M	400 KV Abdullapur-I at Kala Amb
114	NR-3399-A	M	400 KV Abdullapur-II at Kala Amb
115	NR-3531-A	M	220 kV Kishenganga-1 at Amargarh-PDD
116	NR-4703-B	M	Genr-3(11kV) at Chibro HPS-UPCL
117	NR-4700-B	M	Genr-4(11kV) at Chibro HPS-UPCL
118	NR-4705-B	M	Genr-1(11kV) at Khodri HPS-UPCL

VINCOM METER LIST		
1	NP-6797-A	400kV GT-1 at Jhajaar
2	NP-6798-A	400kV GT-2 at Jhajaar
3	NP-6799-A	400kV GT-3 at Jhajaar
4	NP-6800-A	400/132kV ICT-I(400kV) at Jhajaar
5	NP-6801-A	400/132kV ICT-2(400kV) at Jhajaar
6	NP-6813-A	400kV Mundka-II at Jhajaar - HVPNL
7	NP-6593-A	400kV Mundka-II at Jhajaar - HVPNL
8	NP-6814-A	400kV Mundka-I at Jhajaar - HVPNL
9	NP-6592-A	400kV Mundka-I at Jhajaar - HVPNL
10	NP-6645-A	400kV Daultabad-I at Jhajaar - HVPNL
11	NP-6643-A	400kV Daultabad-II at Jhajaar - HVPNL
12	NP-6646-A	400kV Daultabad-I at Jhajaar - HVPNL
13	NP-6644-A	400kV Daultabad-II at Jhajaar - HVPNL
14	NP-5029-A	220kV Hissar(BBMB) at Chirawa-RVPNL
15	NP-1953-B	Genr-2 (11kV) at Salal HPS
16	NP-1956-B	Genr-6 (11kV) at Salal HPS
17	NP-6693-A	400 kV Kankroli-PG at Jodhpur-RVPNL
18	NP-1790-A	220kV Phaphund (Railways)-2 at Auraiya CCPP
19	NP-1780-A	220kV Phaphund (Railways)-1 at Auraiya CCPP
20	NP-1769-A	220kV Phaphund (Railways)-1 at Auraiya CCPP
21	NP-1512-A	220kV UPPC-1 at Auraiya CCPP
22	NP-1510-A	220kV UPPC-2 at Auraiya CCPP
23	NP-6791-A	220kV Mehgaon at Auraiya CCPP
24	NP-1516-A	220kV Mehgaon at Auraiya CCPP
25	NP-1513-A	220kV Malanpur at Auraiya CCPP
26	NP-1514-A	220kV Malanpur at Auraiya CCPP
27	NP-5038-A	400kV Kanpur-2 at Auraiya CCPP
28	NP-5037-A	400kV Kanpur-1 at Auraiya CCPP
29	NP-1515-A	GT-5 (Steam Turb-220kV) at Auraiya CCPP
30	NP-1520-A	ST-1 (Stn. Tfr-220kV) at Auraiya CCPP
31	NP-6781-A	ST-2 (Stn. Tfr-220kV) at Auraiya CCPP
32	NP-1507-A	220kV Agra - 2 at Auraiya CCPP
33	NP-1508-A	220kV Agra-2 at Auraiya CCPP
34	NP-1501-A	ICT-2 (220kV) at Auraiya CCPP
35	NP-1502-A	ICT-2 (220kV) at Auraiya CCPP
36	NP-5019-A	ICT-1 (220kV) at Auraiya CCPP
37	NP-1504-A	ICT-1 (220kV) at Auraiya CCPP
38	NP-1525-A	GT-6 (Steam Turb-220kV) at Auraiya CCPP
39	NP-1528-A	GT-4 (Gas Turb-220kV) at Auraiya CCPP
40	NP-1527-A	GT-3 (Gas Turb-220kV) at Auraiya CCPP
41	NP-1524-A	GT-2 (Gas Turb-220kV) at Auraiya CCPP
42	NP-1523-A	GT-1 (Gas Turb-220kV) at Auraiya CCPP
43	NP-1428-A	66kV Dhulkote-1 at Sec-28 Chandigarh-BBMB
44	NP-1368-A	66kV Dhulkote-2 at Sec-28 Chandigarh-BBMB
45	NP-6702-A	GT#1(HV SIDE) AT SHREE CEMENT LTD
46	NP-6568-A	GT#2(HV SIDE) AT SHREE CEMENT LTD

47	NP-6128-A	400 kV Merta AT SHREE CEMENT LTD
48	NP-6129-A	400 kV Merta AT SHREE CEMENT LTD
49	NP-6130-A	400 kV Kota AT SHREE CEMENT LTD
50	NP-6131-A	400 kV Kota AT SHREE CEMENT LTD
51	NP-9963-A	400kV KOTESHWAR POOLING(PG)-1 at Tehri-THDC
52	NP-9967-A	400kV KOTESHWAR POOLING(PG)-2 at Tehri-THDC
53	NS-1282-A	400kV KOTESHWAR POOLING(PG)-1 at Tehri-THDC
54	NS-1270-A	400kV KOTESHWAR POOLING(PG)-2 at Tehri-THDC
55	NP-9969-A	GT-1 (400kV) at Tehri-THDC
56	NP-9958-A	GT-2 (400kV) at Tehri-THDC
57	NP-9962-A	GT-3 (400kV) at Tehri-THDC
58	NP-9905-A	GT-4 (400kV) at Tehri-THDC

Sr.N	Station	Meter No.	Received	Time drift (Sec)
1	Uri-2		Yes	
2	Uri-1		Yes	
3	Unchahar-4		Yes	
4	Unchahar-3			
5	Unchahar-2			
6	Unchahar-1			
7	Unchahar Solar			
8	TPREL_Chhayan (150MW)			
9	TPGEL		Yes	
10	THAR-SURYA		Yes	
11	Tanda Stage-2			
12	Tanakpur			
13	Singrauli Solar		Yes	
14	Singrauli Hydro		Yes	
15	Singrauli	NP-1549-A	Yes	8715
16	Sewa-2			
17	SBSR_bikaner			
18	SB_Energy_Six_Pokaran(600MW)		Yes	
19	SB_Energy_Bhadla (200MW)			
20	Salal	WR-2159-A	Yes	62
		NP-1956-B		61
21	RSUPL			
22	Rihand-3			
23	Rihand-2			
24	Rihand-1			
25	RENEWSURYARAVI			
26	Renew_sunwaves			
27	Renew_Bikaner (250MW)			
28	Renew sunbright			
29	ReNew Power_Bhadla (50MW)			
30	RAPS-C			
31	RAPS-B	NP-3031-A	Yes	180
		NP-3022-A		120
		NP-1321-A		600
		NP-3021-A		240
32	Rampur	No	Yes	

33	Pong	No	Yes	
34	Parbati3			
35	Parbati2	No	Yes	
36	NTPC_296			
37	NTPC KOLAYAT			
38	NOKHRA			
39	Net Injection Singoli			
40	Net Injection of Tehri			
41	Net Injection of Sorang HEP			
42	Net Injection of Shree Cement Ltd			
43	Net Injection of SAINJ HEP	No	Yes	
44	Net Injection of MALANA HEP-2			
45	Net Injection of LANCO BUDHIL HEP			
46	Net Injection of Koteshwar			
47	Net Injection of KARCHAM WANGTOO HYDRO			
48	Net Injection of Jhajjar(APCPL)	No	Yes	
49	Net Injection of Ad Hydro			
50	NAPS	NP-5163-A	Yes	60
		NP-3064-A		60
		WR-2145-A		300
		NP-3056-A		60
		NP-3072-A		60
		NP-3070-A		60
51	MRPL_Mahindra-Jodhpur(250MW)			
52	Mega-Surya			
53	KSMPL_Mahoba (50MW)			
54	Koldam HEP	No	Yes	
55	Kishenganga NHPC			
56	JHAR_3PL			
57	Jhakri	No	Yes	
58	Eden			
59	Dulasti			
60	Dhuliganga			
61	Devikot			
62	Dehar			
63	Dadri-Stage-2			

64	Dadri-Stage-1			
65	Dadri Solar		Yes	
66	Dadr- Gas		Yes	
67	CSJODHPUR			
68	Clean Solar (300MW)_SuryaUrja			
69	Chamera-3			
70	Chamera-2	No	Yes	
71	Chamera-1	No	Yes	
72	Bhakra-Complex		Yes	
73	Bairasul	No	Yes	
74	Azure Power_Bhadla (200MW)			
75	Azure Maple			
76	AVADA_SUSTAIN			
77	Avada			
78	Avaada_Sunrays			
79	AVAADA_RJHN		Yes	
80	Auraya			
81	ASEJTL_Mahoba (50MW)			
82	ASEJOL			
83	ARP1PL			
84	ARERJL_Mahoba (200MW)			
85	APTFPL_Jodhpur (130MW)			
86	APFTPL_Bikaner (2*150MW)			
87	APFOPL			
88	Anta	NP-1314-A	Yes	160
		NP-1304-A		82
		NP-1303-A		64
		NP-1302-A		86
		NP-8139-A		76
89	AHEJ4L	All	Yes	
90	AHEJ3L	All	Yes	
91	AHEJ2L	All	Yes	
92	Adani_Hybrid			
93	ACME-Heeragarh			
94	ACME_Chittorgarh (250MW)			
95	Auraiya		Yes	
		NP-7025-A		60

96	Dhulkote	NP-3107-A	Yes	60
		NP-8541-A		60
97	Bhakra Left Bank	NP-3094-A	Yes	292
		NP-3089-A		112
		NP-3097-A		222
		NP-1384-A		416
		NP-1386-A		538
		NP-1849-A		231434
98	Lahal		Yes	
99	ABC Renew		Yes	
100	Kotla	WR-2156-A	Yes	62
101	Jamalpur	NP-7151-A	Yes	206100
102		NP-7520-A		480
103		NP-7153-A		600
104		NP-6572-A		420
105		NP-8591-A		360
106	Kotputli	No	Yes	
107	Dasuya	NP-1871-A	Yes	85
108		NP-1687-A		105
109		NP-8556-A		96
110		NP-1688-A		233
111		NP-1563-A		64
112		NP-1838-A		141
113		NP-8823-A		
114		NP-8822-A		69
115		NP-7085-A		72
116		NR-3469-A		105
117		NP-1848-A		73
118	Bareilly	No	Yes	
119	Bhadrekhi	No	Yes	
120	Hisar	No	Yes	
121	Abdullapur	All	Yes	
122	Jalandhar	No	Yes	

Sr No	Element Name	Outage Date	Outage Time	Reason
1	220 KV Nara(UP)-Roorkee(UK) (UP) Ckt-1	12-May-23	13:03	Phase to earth fault Y-N
		16-May-23	04:10	R-N fault, Zone-1, Dist. 39.3km from Nara(UP).
		27-May-23	06:54	Tripped from Nara end
		31-May-23	09:45	Phase to earth fault B-N
2	220 KV Panipat(BB)-Narela(DV) (BBMB) Ckt-1	01-May-23	03:55	B-N fault, Zone-1, Dist. 11.15km from Narela.
		04-May-23	21:37	Phase to earth fault Y-N
		26-May-23	04:03	Phase to earth fault Y-N
		27-May-23	22:02	Phase to earth fault Y-N
3	220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1	04-May-23	15:22	Phase to earth fault R-N
		15-May-23	07:43	Phase to phase fault R-Y
		20-May-23	16:19	Phase to phase fault Y-B
		23-May-23	18:07	Phase to earth fault B-N
		23-May-23	21:40	Three phase to earth fault
4	220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2	15-May-23	07:49	Phase to earth fault Y-N
		20-May-23	16:19	Phase to phase fault Y-B
		23-May-23	18:07	Three phase to earth fault
		23-May-23	20:02	Snaping of jumper
		24-May-23	18:04	B-N fault, Fault current 1.520kA, Dist. 77km from Srinagar(UK).
		31-May-23	18:35	Phase to earth fault B-N
5	400 KV Agra-Unnao (UP) Ckt-1	09-May-23	08:44	tripped at Unnao end only due to CB trip on pole discrepancy. Line charged at Agra end.
		14-May-23	02:47	B phase, Z1 ,Dist. 88.5KM,F/L 31% ,F/C 3.38KA, SOTF, A/R Unsuccess
		14-May-23	18:40	R-N fault, Zone-1, Dist. 184.2km, Fault current 2.09kA from Unnao & Dist. 97.002km from Agra.
6	400 KV Akal-Jodhpur (RS) Ckt-1	07-May-23	14:11	B-N fault, Dist. 119.4km, Zone-1, Fault current 2.424kA from Jodhpur(RS).
		11-May-23	12:35	B-N fault, Zone-1, Dist. 92.60km, Fault current 3.403kA from Jodhpur (RS).
		14-May-23	19:05	R-N fault, Zone-1, Dist. 170.60km, Fault current 1.658kA from Jodhpur (RS).
		20-May-23	16:17	Y-B fault, Dist. 66.26km, Zone-1, Fault current 2.885kA from Jodhpur & Dist. 171.2km, Zone-1, Fault current Iy 2.801kA, Ib 2.938kA from Akal end.
		24-May-23	20:10	Direct trip received, 86A & 86B relay operated at Akal end.
		25-May-23	20:09	Manually hand-tripped due to heavy sparking observed on main isolator of line at Akal end (very bad weather in the area).
7	400 KV Anpara_B(UPUN)-Sarnath(UP) (UP) Ckt-2	18-May-23	18:12	R-Y fault, Zone-1, Fault current Ir 4.23kA, Iy 3.69kA, Dist. 123.77km from Anpara.
		25-May-23	14:30	Phase to earth fault B-N
		26-May-23	15:45	Phase to earth fault B-N
		10-May-23	19:17	Y-B fault, Dist. 235.3km, Fault current Iy 2.39kA, Ib 2.02kA from Unnao & Dist. 30.8km, Fault current Iy 11.32kA, Ib 11.4kA from Bareilly.

8	400 KV Bareilly-Unnao (UP) Ckt-2	14-May-23	05:28	Gen trip, Y Phase,Earth,Z1,Dist-57.7 km.,FL-20.6% FC- 6.09 kA y phase (unnao end A/R sucsessful)
		28-May-23	23:46	tripped from Bareilly end only with flowing flag: Gen trip Zone-1 earth fault f/c -1.9kA distance- 181.62 km f/l 67.02%
9	400 KV Bikaner(RS)-Deedwana(MTS) (RS) Ckt-1	02-May-23	12:34	Line tripped from Bikaner(RS) only. Line remain charged from Deedwana.
		04-May-23	11:10	400kV Bikaner-Deedwana Line tripped, which is on the same DIA of 400kV Bikaner-SCTPS-II line. Bikaner-Deedwana line was charged through TIE breaker (552T)
		13-May-23	23:20	Distance protection Zone main-1,C Phase operated.distance 9.967 km. IC-14.39 KA.AT BIKANER END/Distance protection Zone main-1,YPhase operated.distance 112 km. IC-2334A.Distance protection Zone main-2,BPhase operated.distance 116.1 km. IB-2131 A AT DEEDWANA END
		25-May-23	23:26	B-N fault, Zone-1, Fault current 1.2kA, Dist. 66.20km from Deedwana.
10	400 KV Kankani-Jaisalmer (RS) Ckt-2	02-May-23	20:03	Phase to Earth fault (Y-N)
		28-May-23	18:48	M1= Zone-Ist, B-Phase, Dis DT Received - 108.7 km, M2= Dist 95.9 km , Zone-Ist
		30-May-23	04:32	KANKANI - Z-I, B-PH., 107.2 KM, 3.132 KA JAISALMER - Z-I, B-PH., 41.07 KM 2.785 KA
11	400 KV Merta-Kankani (RS) Ckt-1	01-May-23	15:59	Y-N fault, Zone-1, Dist. 110.6km, Fault current 3.238kA from Merta & Zone-1, Dist. 18.78km from Kankani.
		15-May-23	12:35	At Kankani : Distance protection optd., Zone-1, Y-phase, Fault current Iy 4.9kA, Dist. 37.53km & At Merta : Dist. 93 km, Zone-1.
		16-May-23	01:14	Y-N fault, Fault current 5.247kA, Dist. 37.81km from Kankani & Dist. 90.37km from Merta.
		24-May-23	20:19	B-N Fault, Dist. 118.70km, Fault current 2.81kA from Merta & Dist. 29.610km, Fault current 4.8kA from Kankani end.
12	400 KV Suratgarh SCTPS(RVUN)-Bikaner(RS) (RS) Ckt-2	02-May-23	12:34	Direct Trip received at Bikaner(RS). 86A, 86B Master trip relay operated.
		03-May-23	11:27	DT Received at Bikaner(RS) end. 86A 86B trip at Suratgarh end.
		04-May-23	11:10	DT received at Bikaner(RS). 86A, 86B Master relay operated.
13	400 KV Suratgarh(RVUN)-Ratangarh(RS) (RS) Ckt-2	14-May-23	15:27	Relay-186A, 186B (Tripped due to 400KV Main BusBar B Trip)
		24-May-23	18:14	At Ratangarh :- Direct trip command received from STPS end. At STPS end :- Tripped on High voltage (259kV Phase to neutral voltage detected in Y phase).
		28-May-23	13:04	RATANGARH END:-Direct trip command received from STPS end STPS END(SURATGARH) END:-Tripped on over voltage

Grid Event summary for May 2023

S.No.	Category of Grid Disturbance (GD-I to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserved due to Generation loss (MU)	Energy Unserved due to Load loss (MU)	Loss of generation / loss of load during the Grid Disturbance		% Loss of generation / loss of load w.r.t Antecedent Generation/Load in the Regional Grid during the Grid Disturbance		Antecedent Generation/Load in the Regional Grid		Fault Clearance time (in ms)
					Date	Time	Date	Time					Generation Loss(MW)	Load Loss (MW)	% Generation Loss(MW)	% Load Loss (MW)	Antecedent Generation (MW)	Antecedent Load (MW)	
1	GI-2	1) 400 KV Bara(UP)-Meja TPS(MUN) (UP) Ckt-1 2) 400 KV Bara(UP)-Meja TPS(MUN) (UP) Ckt-2	Uttar Pradesh	UPPTCL	1-May-23	16:59	1-May-23	17:51	00:52	i) As reported, at 16:59 hrs, 400 KV Bara(UP)-Meja TPS(MUN) (UP) Ckt-1 tripped on B-N phase to earth fault, fault was in Z-1 from Bara(UP) end, distance was 0.598km from Bara(UP) end. As per DR, line tripped after unsuccessful A/R operation and fault current was approx. 17.9kA. ii) At the same time, 400 KV Bara(UP)-Meja TPS(MUN) (UP) Ckt-2 also tripped from Bara(UP) end only on B-N phase to earth fault, distance was 56.7km from Bara(UP) end. As per DR, fault was in Z-3 from Bara(UP) end, fault current was approx. 3.67kA. iii) As per PMU at Mainpuri(PG), B-N phase to earth fault with unsuccessful A/R operation is observed. Fault clearance time was 80 ms. iv) As per SCADA, no load loss/generation loss is observed in UP control area.	0	0.00	0	0	0.000	0.000	34436	37824	80
2	GD-1	1) 765 KV Ajmer(PG)-Phagi(RS) (PAPTL) Ckt-1 2) 765 KV Fatehgarh_II (PG)-Bhadla(PG) (FBTL) Ckt-1 3) 765 KV Ajmer-Bhadla_2 (PG) Ckt-1	Rajasthan	PGCIL, RVPNL	1-May-23	13:23	1-May-23	13:41	00:18	i) As per PMU at Ajmer(PG), at 13:23 hrs, B-N fault phase to ground is observed with fault clearance time of 80 msec. ii) As per SOE, no triggering incident (exact location of fault) identified. iii) After clearance of fault, a sudden rise in voltage from 796kV to 831kV was observed at 765kV Ajmer(PG). iv) As reported, during the same time, 765 KV Ajmer(PG)-Phagi(RS) (PAPTL) Ckt-1, 765 KV Fatehgarh_II (PG)-Bhadla(PG) (FBTL) Ckt-1 and 765 KV Ajmer-Bhadla_2 (PG) Ckt-1 tripped due to over-voltage. v) As per DR, 765 KV Ajmer(PG)-Phagi(RS) (PAPTL) Ckt-1 and 765 KV Fatehgarh_II (PG)-Bhadla(PG) (FBTL) Ckt-1 tripped on over-voltage stage-1 operation. 765 KV Ajmer-Bhadla_2 (PG) Ckt-1 tripped on DT received from Bhadla2(PG) end. vi) During the fault, drop in generation of almost all the RE plants pooled at 765kV Fatehgarh2(PG), Bhadla(PG), Bhadla2(PG) & Bikaner(PG) is observed. Generation at few of the RE station revived back with the clearance of fault but at some stations partial or no recovery is observed. PMU plots of the MW/MVAr and phase voltages of RE plants are attached for the reference. vii) As per SCADA, total NR solar generation drop of approx. 1100MW in Rajasthan RE complex is observed. Solar generation was restored within 2 minutes. viii) As per SCADA, change of approx. 890MW is observed in NR demand.	0.33	0.00	1100	0	2.829	0.000	38877	40743	80
3	GI-2	1) 400/220 kV 315 MVA ICT 2 at Ratangarh(RS) 2) 220 KV Ratangarh(RS)-Sikar(PG) (PG) Ckt-1 3) 220 KV Ratangarh(RS)-Sikar(PG) (PG) Ckt-2 4) 220 KV Ratangarh-Badnu (Raj) Ckt 5) 220 KV Ratangarh-Ratangarh220 (Raj) Ckt-1 6) 220 KV Ratangarh-Khetri (Raj) Ckt-1 7) 220 KV Ratangarh-Sridungargarh (Raj) Ckt-1	Rajasthan	PGCIL, RVPNL	4-May-23	09:41	4-May-23	12:31	02:50	i) 400/220kV Ratangarh(Raj) has double main & transfer bus scheme at 220kV side. ii) As reported at 09:41 hrs, R-ph bus jumper of isolator of 220 KV Ratangarh-Badnu (Raj) Ckt broke and created B-N phase to earth bus fault. iii) On this fault, bus bar protection of 220KV Bus-B operated which led to the tripping of all the elements connected at 220kV Bus-B at Ratanagrh(Raj). 400/220 kV 315 MVA ICT 2 at Ratangarh(RS) and 220kV feeders to Sikar(PG)-I & II, Ratangarh-I, Khetri-I and Badnu tripped on the bus bar protection operation. iv) As per DR of tripped elements at Ratangarh end, R-N phase to earth fault with delayed clearance in ~240msec is observed, elements tripped on LBB protection operation. v) As per PMU at Sikar(PG), B-N phase to earth fault with delayed clearance in 240msec is observed. vi) As per SCADA, change in load of approx. 185MW is observed in Rajasthan control area.	0	0.186	0	185	0.000	0.421	41778	43943	240
4	GI-2	1) 765/400kV 1500MVA ICT-3 at Bhadla2(PG) 2) 400/220kV 500MVA ICT-6 at Bhadla2(PG) 3) 400/220kV 500MVA ICT-7 at Bhadla2(PG) 4) 400kV Bus 1 at Bhadla2(PG) 5) 220 kV Bhadla2(PG) – ASEPL(IP) ckt 6) 220/33kV 150MVA ICT-1 at ASEPL(IP) 7) 220/33kV 150MVA ICT-2 at ASEPL(IP) 8) 220/33kV 150MVA ICT-3 at ASEPL(IP)	Rajasthan	PGCIL, ASEPL	5-May-23	12:26	5-May-23	14:20	01:54	i) During antecedent condition, emergency shutdown of 404 main Bay of 400/220kV 500MVA ICT-7 at Bhadla2(PG) was taken for attending CT emergency alarm. During this work, bus bar protection mal-operated at 400kV Bus 1 at Bhadla2(PG) and Bus-1 became dead. ii) As per SCADA data and CB status, tie CB at 400kV side of 765/400kV 1500MVA ICT-3 and tie CB at 400kV side of 400/220kV 500MVA ICT-6 at Bhadla2(PG) were already in open condition. Hence due to bus bar protection operation as main CB connected to bus-1 opened, 765/400kV 1500MVA ICT-3 and 400/220kV 500MVA ICT-6 at Bhadla2(PG) tripped. Along with this, 400/220kV 500MVA ICT-7 at Bhadla2(PG) also tripped during the same time due to opening of Tie CB (Main CB was already open). iii) Total generation of 220kV Avaada Sunrays (ASEPL) was feeding through 400/200kV 500MVA ICT-6 and 7 at Bhadla2(PG) only. Hence tripping of ICT-6 and 7 led to tripping of 220 kV Bhadla2(PG)-ASEPL(IP) ckt which eventually resulted in generation loss of 220kV Avaada Sunrays (ASEPL). iv) As per PMU at 400kV Bhadla2(PG), no fault is observed in the system. v) As per SCADA, generation loss of approx. 305MW is observed observed in NR Solar generation.	0.58	0.00	305	0	0.641	0.000	47560	49783	NA
5	GI-2	1) 400KV Bus 1 at Heerapura(RS) 2) 400 KV Bassi(PG)-Heerapura(RS) (PG) Ckt-1 3) 400 KV Bassi(PG)-Heerapura(RS) (PG) Ckt-2 4) 400/220 kV 250 MVA ICT 2 at Heerapura(RS) 5) 400/220 kV 250 MVA ICT 3 at Heerapura(RS) 6) 400/220 kV 315 MVA ICT 4 at Heerapura(RS)	Rajasthan	PGCIL, RVPNL	5-May-23	18:13	5-May-23	21:05	02:52	i) 400/220kV Heerapura(Raj) has one and half breaker bus scheme. ii) As reported at 18:13 hrs, R-ph CT at 400kV side of 400/220kV 315MVA ICT-4 at Heerapura(Raj) burst followed by damage of R-ph pole of its CB. iii) On this fault, bus bar protection of 400kV Bus-1 at Heerapura(Raj) operated led to the tripping of 400KV Bus 1 at Heerapura(RS). At the same time, 400 KV Bassi(PG)-Heerapura(RS) (PG) Ckt-1 & 2, 400/220 kV 250 MVA ICT 2 & 3 and 315MAV ICT 4 at Heerapura(RS) also tripped. iv) As per communication with Heerapura S/s, 400 KV Bassi(PG)-Heerapura(RS) (PG) Ckt-1 remained charged from Heerapura end via Tie CB, however, it tripped from Bassi end. In case of 400 KV Bassi(PG)-Heerapura(RS) (PG) Ckt-2, 400/220kV 250MVA ICT 2&3 at Heerapura, Tie CB at Heerapura end also opened. v) As per PMU at Bassi(PG), multiple R-N fault, first at 18:12:58hrs which cleared within 100msec followed by another R-N fault with delayed clearance of 280msec is observed. vi) As per SCADA, change in load of approx. 65MW is observed in Rajasthan control area. vii) As informed by SLDC-Rajasthan, relays at Heerapura(Raj) are of electromagnetic nature. Hence, disturbance recorder files are not available.	0	0.186	0	65	0.000	0.146	36369	44548	280
6	GI-1	1) 220 KV Mir Bazar(PDD)-NewWanpoh(PG) (PDD JK) Ckt-1 2) 220 KV Mir Bazar(PDD)-NewWanpoh(PG) (PDD JK) Ckt-2	Jammu & Kashmir	PGCIL, PDD-JK	5-May-23	14:58	5-May-23	15:57	00:59	i) During antecedent condition, active power loading of 220 KV MirBazar(PDD)-NewWanpoh(PG) (PDD JK) Ckt-1 & 2 were 178MW and 177MW respectively. ii) As reported, at 14:58hrs, 220 KV MirBazar(PDD)-NewWanpoh(PG) (PDD JK) Ckt-1 tripped on Y-B phase to phase fault with distance of 1.2 km (22.9%) from NewWanpoh(PG) end. As per telephonic conversation with Mirbazar S/S, 220 KV MirBazar(PDD)-NewWanpoh(PG) (PDD JK) Ckt-1 tripped as a tree was leaning on the circuit. iii) As per DR at NewWanpoh(PG) end of 220 KV MirBazar(PDD)-NewWanpoh(PG) (PDD JK) Ckt-1, zone-1 distance protection operated with fault current of 6.7kA and 6.3kA in Y and B-phase respectively. iv) Due to tripping of 220 KV MirBazar(PDD)-NewWanpoh(PG) (PDD JK) Ckt-1, loading on 220 KV MirBazar(PDD)-NewWanpoh(PG) (PDD JK) Ckt-2 increased and line CB at 220kV MirBazar(PDD) end of 220 KV MirBazar(PDD)-NewWanpoh(PG) (PDD JK) Ckt-2 opened due to over-loading, but line remain charged from NewWanpoh(PG) end. v) As per PMU at Kishenpur(PG), Y-B phase to phase fault is observed in system with fault clearance time of 80 ms. vi) As per SCADA, load loss of approx. 360MW occurred in J&K control area.	0	0.354	0	360	0.000	0.743	46362	48474	80
7	GI-1	1) 220kV Sakatpura-Mandalgarh ckt 2) 220 KV Kota(PG)-KTPS(RVUN) (RS) Ckt-1 3) 220 KV Anta(NT)-Sakatpura(RS) (RS) Ckt-1 4) 220 KV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-2 5) 220KV KTPS-Sakatpura ckt-1 6) 220KV KTPS-Sakatpura ckt-2 7) 220KV KTPS-Sakatpura ckt-3 8) 220KV KTPS-Sakatpura ckt-4 9) 210MW Unit-3 at KTPS 10) 210MW Unit-4 at KTPS 11) 210MW Unit-5 at KTPS	Rajasthan	PGCIL, RVPNL, NTPC, NPCIL	8-May-23	19:11	8-May-23	22:32	03:21	i) 220/132kV Sakatpura(Raj) S/s have double main & transfer bus scheme. Station is connected with 220kV Kota TPS via 220kV KTPS-Sakatpura ckt-1, 2, 3 & 4. ii) As reported at 19:11 hrs, R & Y ph CT at Sakatpura end of 220kV Sakatpura-Mandalgarh ckt burst and bus fault occurred. iii) As per information received, bus bar protection is not healthy at 220kV Sakatpura S/s and Z-4(reverse) distance protection time delay setting is kept as 160msec. iv) On this bus fault, 220kV line from RAPP_A & Anta(NTPC) tripped in Z-4 distance protection operation at Sakatpura end and 220kV KTPS-Sakatpura ckt-1,2,3&4 tripped on distance protection in Z-2 from KTPS end. 220kV KTPS-Kota(PG) ckt-1 also tripped from KTPS end. v) At the same time, 210MW Unit-4 at Kota TPS tripped followed by tripping of 210MW Unit-3 & 5 at 19:15 hrs & 19:21 hrs respectively due to tripping of auxiliary components (boiler, pulveriser etc.) vi) As per PMU at Kota(PG), R-N fault converted into R-Y-N fault with delayed clearance of 240msec is observed. vii) As per SCADA, change in load of approx. 220MW in Rajasthan control area and loss in generation of approx. 230MW at 19:11hrs due to tripping of 210MW unit-4 at KTPS. Further at 19:15hrs, 210MW unit-3 at KTPS tripped followed by tripping of 210MW unit-5 at KTPS 19:21hrs is observed.	0	0.737	230	220	0.519	0.409	44284	53815	240
8	GD-1	1) 765 KV Ajmer-Bhadla_2 (PG) Ckt-1 2) 765 KV Bhadla_2 (PG)-Fatehgarh_II(PG) (PFTL) Ckt-1 3) 765 KV Fatehgarh_II(PG)-Bhadla(PG) (FBTL) Ckt-1 4) 220 KV Bhadla(PG)-ACME Solar(ACM) (ACME) Ckt-1 5) 220/33 kV 150 MVA ICT 1 at AzureMaplePSS SL_BHD_PG (APMPL) 6) 220/33 kV 150 MVA ICT 2 at AzureMaplePSS SL_BHD_PG (APMPL) 7) 220/33 kV 150 MVA ICT 1 at AzurePSS41 SL_BHD_PG (APFOL) 8) 220/33 kV 150 MVA ICT 2 at AzurePSS41 SL_BHD_PG (APFOL)	Rajasthan	PGCIL, ACME, Azure Maple, Azure 41	9-May-23	12:57	9-May-23	13:22	00:25	i) As reported, at 12:57 hrs, 220 KV Bhadla(PG)-ACME Solar(ACM) (ACME) Ckt-1 tripped on R-N phase to ground fault. Fault distance was 3.3 km from Bhadla(PG) end. During patrolling, it was observed that a tree bush was touching R-phase of the line. ii) After clearance of fault, a sudden rise in voltage from 767kV to 823kV was observed at 765kV Fatehgarh2(PG). iii) Due to this, 765 KV Ajmer-Bhadla_2 (PG) Ckt-1, 765 KV Bhadla_2 (PG)-Fatehgarh_II(PG) (PFTL) Ckt-1 and 765 KV Fatehgarh_II(PG)-Bhadla(PG) (FBTL) Ckt-1 tripped on over-voltage protection operation. iv) As reported, during the same time, 220/33 kV 150 MVA ICT 1 & 2 at AzureMaplePSS SL_BHD_PG (APMPL) and 220/33 kV 150 MVA ICT 1 & 2 at AzurePSS41 SL_BHD_PG (APFOL) also tripped due to over-voltage protection operation. v) As per DR at Bhadla(PG) end of 220 KV Bhadla(PG)-ACME Solar(ACM) (ACME) Ckt-1 tripped on zone-1 distance protection operation on R-N phase to ground fault with fault current of 18kA from Bhadla(PG) end. Unsucessful A/R operation is observed. vi) As per DR, 765 KV Ajmer-Bhadla_2 (PG) Ckt-1, 765 KV Bhadla_2 (PG)-Fatehgarh_II(PG) (PFTL) Ckt-1 and 765 KV Fatehgarh_II(PG)-Bhadla(PG) (FBTL) Ckt-1 tripped on over-voltage stage-1 operation. vii) As per PMU at 765kV Fatehgarh2(PG), Y-N phase to ground fault with unsuccessful A/R operation is observed with fault clearing time of 80 ms. viii) During the fault, drop in generation of almost all the RE plants pooled at 765kV Fatehgarh2(PG), Bhadla(PG), Bhadla2(PG) & Bikaner(PG) is observed. Generation at few of the RE station revived back with the clearance of fault but at some stations partial or no recovery is observed. PMU plots of the MW/MVAr and phase voltages of RE plants are attached for the reference. ix) As per SCADA, total NR solar generation drop of approx. 1390MW in Rajasthan RE complex is observed.	0.737	0.00	1390	0	2.687	0.000	51736	56171	80
9	GI-1	1) 220 KV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-1 2) 220 KV RAPS_B(NP)-RAPS_A(NP) (RS) Ckt-1 3) 200 MW RAPS-A - UNIT 2 4) 220kV Bus-2 at RAPS_A(NP)	Rajasthan	NPCIL, RVPNL	9-May-23	16:46	9-May-23	20:22	03:36	i) During antecedent condition, 220 KV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-1, 220 KV RAPS_B(NP)-RAPS_A(NP) (RS) Ckt-1 and 200 MW RAPS-A - UNIT 2 were connected to 220kV Bus-2 at RAPS_A(NP) and rest of the elements were connected to 220kV Bus-1 at RAPS_A(NP). 200 MW RAPS-A - UNIT 2 was generating approx. 170MW. ii) As reported, at 16:46hrs, 220 KV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-1 tripped on B-N phase to earth fault (Zone-1 distance protection operated at Sakatpura end). Fault distance was 20.97 km and fault current 6.93 kA from Sakatpura(RS). iii) However, RAPS_A(NP) end CB got stuck, hence LBB operated. Due to this, 220 KV RAPS_B(NP)-RAPS_A(NP) (RS) Ckt-1 and 200 MW RAPS-A - UNIT 2 also tripped and 220kV Bus-2 at RAPS_A(NP) became dead. iv) As per PMU at RAPP-C(NPC), Y-N phase to ground fault is observed in system with delayed fault clearance time of 280 ms. v) As per SCADA, change in generation of approx. 170 MW is observed at RAPP-A(NPC).	0	0.00	170	0	0.359	0.000	47395	52613	280
10	GI-2	1) 800 KV HVDC Kurukshetra(PG) Pole-02 2) 800 KV HVDC Kurukshetra(PG) Pole-04	Haryana	PGCIL	10-May-23	22:24	10-May-23	23:27	01:03	i) During antecedent condition, 800 KV HVDC Kurukshetra(PG) Pole-1, 2, 3 & 4 were carrying 494 MW, 483 MW, 469 MW and 481 MW respectively from Champa to Kurukshetra. ii) As reported at 22:24hrs, "Pole 4 sub-rack 3 Data Invalid" alarm appeared in Pole 4 resulting in Pole 4 lane changeover from lane 2 to lane 1. 800 KV HVDC Kurukshetra(PG) Pole-2 & 4 blocked due to control maloperation of newly installed V6 software after lane changeover at Kurukshetra end. iii) As reported, sequence of events are as follows: ▯ 22:24:49.108 – Pole 4 Subrack 3 DI/MR latched Kurukshetra ▯ 22:24:49.108 – Pole 4 lane changed from L2 to L1 due to DI/MR in P4 Subrack 3 at Kurukshetra. ▯ 22:24:49.930 – EAPR Active got high in P4 & P2. ("Master Control Power Control monidEAPRActiv_PowerLimit" alarm appeared at both ends in Pole 2 & Pole 4) ▯ 22:24:50.349 – Valves of Pole 4 at Champa blocked ▯ 22:24:50.864- Pole 4 at Kurukshetra blocked followed by Power limit alarm in Pole 2 & Pole 4 although minimum filter required were in service. Power limit alarm led to power ramp down in Pole 4 only and Pole 4 got blocked at 22:24:50 hrs. (The reason for ramp down of Power in Pole 4 is not clear.) ▯ 22:24:55.909 – CAT A2 from other end received at Kurukshetra in Pole 4 which is a clear control maloperation as blocked Pole shouldn't initiate any protective sequence after blocking. ▯ 22:24:56.151 –Again CATB from other end received at Kurukshetra in Pole 4 which is again control maloperation as Pole shouldn't initiate any protective sequence after blocking. ▯ 22:24:56.165 – As CAT B sequence trip both parallel Poles, Pole 2 blocked on CAT B initiated by Pole 4 from Champa end. ▯ Complete power was compensated by P1 & P3. iv) As per PMU at Kurukshetra(PG), no fault is observed in the system, but fluctuation in voltage is observed. v) As per SCADA, no load loss is observed in Haryana control area.	0	0.00	0	0	0.000	0.000	46977	58783	NA
11	GD-1	1) 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1 2) 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-2 3) 220KV Mohana(HV)-Sampla(HV) Ckt-1 4) 220KV Mohana(HV)-Sampla(HV) Ckt-2 5) 220KV Mohana(HV)-Samalkha(HV) Ckt-1 6) 220KV Mohana(HV)-Samalkha(HV) Ckt-2	Haryana	PGCIL, HVPNL	10-May-23	16:22	10-May-23	18:24	02:02	i) As reported, at 16:22hrs, a fire incident is observed in the field near to 220/132kV Mohana(HS) S/s. B-phase of float T/F burnt and AC/DC changeover card got damaged which led to defect in 220V Main DC Charger-1. Due to this, 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1 and 2 tripped. ii) At the same time, 220kV Mohana(HV)-Sampla(HV) Ckt-1 & 2 and 220kV Mohana(HV)-Samalkha(HV) Ckt-1 & 2 also tripped due to non-availability of the DC supply with the operation of Capacitor Trip Device (CTD) in the circuit breakers. Hence, 220/132kV Mohana(HS) S/s became dead. iii) After identifying the fault in 220V DC Charger 1, the complete DC load was put on alternate 220V DC Charger 2. iv) At 16:45 hrs, 220kV Mohana(HV)-Sampla(HV) Ckt-2 was charged and supply to 220kV Mohana was restored. v) As reported by Mohana S/s, no DR was recorded in distance protection relay at 220kV Mohana(HS) end of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1 and 2 due to DC supply fail. vi) As per DR at Sonipat(PG) end of 220 KV Mohana(HV)-Sonipat(PG) (HVPNL) Ckt-1 & 2, zone-2 distance protection operated at Sonipat end. Fault current was approx. 6kA and 5kA in Y and B-phase in both the circuits. vii) As per PMU at Sonipat(PG), B-N phase to ground fault converted to Y-B-N double phase to ground fault is observed in system with delayed fault clearance time of 360 ms. viii) As per SCADA, load loss of approx. 130MW occurred in Haryana control area.	0	0.264	0	130	0.000	0.244	48099	53343	360
12	GI-1	1) 220/33 kV 150 MVA ICT 1 at AzureMaplePSS SL_BHD_PG (APMPL) 2) 220/33 kV 150 MVA ICT 2 at AzureMaplePSS SL_BHD_PG (APMPL)	Rajasthan	Azure Maple	11-May-23	13:37	11-May-23	13:50	00:13	i) Total generation of 220kV Azure Maple evacuates through 220kV Bhadla(PG)- AzureMaplePSS SL_BHD_PG (APMPL) ckt which is connected to 220/33 kV 150 MVA ICT 1 & 2 at AzureMaplePSS SL_BHD_PG (APMPL). ii) As per PMU at 400kV Bhadla(PG), R-Y phase to phase fault is observed with fault clearing time of 80 ms. Voltage dip of approx. 33.8kV(L-L) is observed at Bhadla(PG). iii) After fault clearance, voltage increased upto 441.4kV(L-L) (1.1035 p.u.). Hence, over voltage (>1.1pu at 765kV & 400kV level at RE Pooling stations) scenario occurred immediately after the fault. iv) As reported by Azure Maple solar plant, at 13:37 hrs. 220/33 kV 150 MVA ICT 1 & 2 at AzureMaplePSS SL_BHD_PG (APMPL) tripped due to over voltage protection operation. v) As per SCADA, generation drop of approx. 940MW is observed in NR Solar generation. vi) As per PMU, due to significant dip in RE generation frequency dropped by 0.17Hz (from 49.95Hz to 49.78Hz). However frequency recovered to 49.98Hz within 1 minute. vii) Almost all the generation revived within 10 minutes except Azure maple which got revived at 13:50 hrs.	0.204	0	940	0	1.880	0.000	50003	56300	80

S.No.	Category of Grid Disturbance (GD-I to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserved due to Generation loss (MU)	Energy Unserved due to Load loss (MU)	Loss of generation / loss of load during the Grid Disturbance		% Loss of generation / loss of load w.r.t Antecedent Generation/Load in the Regional Grid during the Grid Disturbance		Antecedent Generation/Load in the Regional Grid		Fault Clearance time (in ms)
					Date	Time	Date	Time					Generation Loss(MW)	Load Loss (MW)	% Generation Loss(MW)	% Load Loss (MW)	Antecedent Generation (MW)	Antecedent Load (MW)	
13	GI-1	1) 220 KV Adani RenewPark_SL_FGARH_FBTL (AREPRL)-AHEJ4L PSS 3 HB_FGRAH_FBTL (AHEJ4L) (AREPRL) Ckt 2) 220 KV Fatehgarh_II(PG)-AHEJ3L PSS HB_FGRAH_PG (AHEJ3L) (AHEJ3L) Ckt 3) 220 KV Fatehgarh_II(PG)-AHEJOL PSS HB_FGRAH_PG (AHEJOL) (AHEJOL) Ckt-1	Rajasthan	PGCIL, AHEJ4L, AHEJ3L, AHEJOL	13-May-23	22:04	13-May-23	23:12	01:08	i) Total generation of 220kV AHEJ4L PSS3, AHEJ3L PSS, and AHEJOL PSS were feeding through 220 KV Adani RenewPark_SL_FGARH_FBTL (AREPRL)-AHEJ4L PSS 3 HB_FGRAH_FBTL (AHEJ4L) (AREPRL) Ckt, 220 KV Fatehgarh_II(PG)-AHEJ3L PSS HB_FGRAH_PG (AHEJ3L) (AHEJ3L) Ckt and 220 KV Fatehgarh_II(PG)-AHEJOL PSS HB_FGRAH_PG (AHEJOL) (AHEJOL) Ckt-1 & 2 respectively. ii) As reported, at 22:04 hrs, 220 KV Adani RenewPark_SL_FGARH_FBTL (AREPRL)-AHEJ4L PSS 3 HB_FGRAH_FBTL (AHEJ4L) (AREPRL) Ckt tripped on Y-N phase to earth fault during very high wind condition. At the same time, 220 KV Fatehgarh_II(PG)-AHEJ3L PSS HB_FGRAH_PG (AHEJ3L) (AHEJ3L) Ckt also tripped on R-N phase to earth fault (zone-1 from AHEJ3L end). iii) As reported, at 22:05 hrs, 220 KV Fatehgarh_II(PG)-AHEJOL PSS HB_FGRAH_PG (AHEJOL) (AHEJOL) Ckt-1 tripped on B-N phase to earth fault (zone-1 from AHEJOL end). iv) As per PMU and SCADA SOE, the details of event is as follows: ⁃ At 22:04:06 hrs: 220 KV Adani RenewPark_SL_FGARH_FBTL (AREPRL)-AHEJ4L PSS 3 HB_FGRAH_FBTL (AHEJ4L) (AREPRL) Ckt tripped. As per PMU, B-N phase to earth fault is observed with fault clearing time of 80 ms. As per PMU, generation loss of approx. 187 MW is observed at AWPS3. ⁃ At 22:04:34 hrs: 220 KV Fatehgarh_II(PG)-AHEJ3L PSS HB_FGRAH_PG (AHEJ3L) (AHEJ3L) Ckt tripped. As per PMU, R-N phase to earth fault is observed with fault clearing time of 80 ms. PMU data for generation at AHEJ3L is not available. ⁃ At 22:05:18 hrs: 220 KV Fatehgarh_II(PG)-AHEJOL PSS HB_FGRAH_PG (AHEJOL) (AHEJOL) Ckt-1 tripped. As per PMU, B-N phase to earth fault is observed with fault clearing time of 120 ms. As per PMU, generation loss of approx. 30 MW is observed at AHEJOL PSS. ⁃ At 22:07:20 hrs: As per PMU, B-N phase to earth fault is observed with fault clearing time of 80 ms. v) As per SCADA, generation loss of approx. 275MW is observed in NR wind generation.	0.312	0	275	0	0.546	0.000	50400	62238	80
14	GD-2	1) 765kV Bhadla-Bikaner ckt-1 2) 400kV Bikaner-Azure43 ckt 3) 400kV Fatehgarh1-Fatehgarh2 ckt-1 4) 400kV Bhadla-Bhadla2 ckt-1 5) 400kV Bhadla-Bhadla_Raj ckt-2 6) 765kV Fatehgarh2-Bhadla ckt-1 7) 400kV Bhadla-Bhadla2 ckt-2 8) 400kV Bhadla-Bhadla_Raj ckt-1 9) 765kV Bhadla2-Bikaner ckt-1 10) 765kV Ajmer-Phagi ckt-1 11) 765kV Fatehgarh2-Bhadla2 ckt-1 12) 765kV Bhadla-Bikaner ckt-2 13) 400kV Bhadla_Raj-Merta ckt 14) 400kV Bhadla_Raj-Jodhpur ckt 15) 400kV Bhadla_Raj-Ramgarh ckt-1 16) 400kV Bhadla_Raj-Ramgarh ckt-2	Rajasthan	PGCIL, RVPNL, Azure Power	15-May-23	11:51	15-May-23	14:38	02:47	i) As reported, at 11:51:55 hrs, 765kV Bhadla-Bikaner ckt-1 tripped on Y-B phase to phase fault during inclement weather condition (wind/dust storm), fault distance was ~111.6km from Bikaner end (line length is ~169km). ii) On this fault during voltage dip, significant dip in RE generation observed. Voltage dipped up to 0.65pu (as per PMU at Fatehgarh2). iii) Due to significant dip in RE generation and de-loading of 765kV EHV lines (as RE generation failed to recover 90% of pre-fault active power within 1 sec and further Inverters tripping on OV, LVRT/HVRT Non-compliant), over voltage (>1.1pu at 765kV & 400kV level at RE Pooling stations) scenario triggered immediately after the fault that led to multiple element tripping in the RE complex. iv) As per PMU & SCADA, total RE generation drop/loss was approx.7120MW (~6410MW ISTS RE generation and ~710MW Rajasthan RE generation). Due to significant dip in RE generation frequency dropped by 0.58Hz (from 49.98Hz to 49.4Hz). v) As frequency hit 49.40Hz, total all India load relief of approx. 4016MW is observed on operation of UFR & df/dt. Load relief of approx. 1635MW observed in NR region (as per details received from states). Region wise summary of load relief along with state wise details of UFR & df/dt operation is attached in Annexure-II. vi) After the fault, following 765 & 400 kV lines in RE complex tripped on high voltage: 765kV Fatehgarh2-Bhadla ckt-1, 765kV Bhadla2-Bikaner ckt-1, 765kV Ajmer-Phagi ckt-1, 765kV Fatehgarh2-Bhadla2 ckt-1 , 765kV Bhadla-Bikaner ckt-2, 400kV Fatehgarh1-Fatehgarh2 ckt-1, 400kV Bhadla-Bhadla2 ckt-1&2, 400kV Bhadla-Bhadla_Raj ckt-1&2, 400kV Bhadla_Raj-Merta ckt, 400kV Bhadla_Raj-Jodhpur ckt, 400kV Bhadla_Raj-Ramgarh ckt-1&2 vii) Multiple 220kV lines dedicated to RE stations also tripped on over voltage during same time. viii) Further at 12:08 hrs, 765kV Fatehgarh2-Bhadla2 ckt-1 was charged.			7120	1635	12.505	2.686	56939	60878	80
15	GD-1	1) 400kV Fatehgarh1-AFSPS ckt-1 2) 400kV Fatehgarh1-AFSPS ckt-2 3) 765kV Bhadla-Fatehgarh2 ckt-2 4) 400kV Bhadla2-Kolayat ckt 5) 765kV Bhadla2-Fatehgarh2 ckt-1	Rajasthan	PGCIL, AFSPS, NTPC	15-May-23	12:16	15-May-23	15:21	03:05	i) At 12:16hrs, charging attempt of 765kV Bhadla-Bikaner ckt-2 was taken from Bhadla end however, line didn't hold and over voltage (>1.1pu at 765kV & 400kV level at RE Pooling stations) scenario occurred in RE complex. ii) On this over voltage following 765 & 400 kV lines in RE complex tripped: a. 765kV Bhadla-Fatehgarh2 ckt-2 b. 765kV Bhadla2-Fatehgarh2 ckt-1 c. 400kV Fatehgarh1-AFSPS ckt-1 & 2 d. 400kV Bhadla2-Kolayat ckt iii) Multiple 220kV lines dedicated to RE stations also tripped on over voltage during same time. iv) With the tripping of 765kV Bhadla-Fatehgarh2 ckt-2 and 400kV Fatehgarh1-AFSPS ckt-1 & 2, blackout of 765/400/220kV Bhadla (PG) & 400/220kV ADANI Fatehgarh Solar park occurred. v) As per PMU & SCADA, total RE generation drop/loss was approx. 2700MW. Due to dip in RE generation frequency dropped by 0.25Hz (from 49.88Hz to 49.63Hz).			2700	0	5.321	0.000	50743	59684	NA
16	GI-1	1) 220/33/33 kV 150 MVA ICT 1 at AHEJ3L PSS HB_FGRAH_PG (AHEJ3L)	Rajasthan	AHEJ3L	16-May-23	15:13	16-May-23	16:03	00:50	i) During antecedent condition, total generation of 220kV AHEJ3L was evacuating through 220kV Fatehgarh2(PG)- AHEJ3L ckt which was connected to 220/33/33 kV 150 MVA ICT 1 & 2 at AHEJ3L PSS HB_FGRAH_PG (AHEJ3L) carrying approx. 156MW and 148MW respectively. ii) As reported, at 15:13 hrs. 220/33/33 kV 150 MVA ICT 1 at AHEJ3L PSS HB_FGRAH_PG (AHEJ3L) tripped due to operation of transformer protection on LV WTI instrument failure. iii) As per DR/EL, "WTI_LV1_Alarm" is observed and cooling supply failed. iv) As per PMU at 400kV Fatehgarh2(PG), no fault is observed in the system. MW generation drop of approx. 155MW is observed as per PMU at AHEJ3L v) As per SCADA, generation drop of approx. 175MW is observed in NR Solar generation.	0.146	0	175	0	0.298	0.000	58682	63664	NA
17	GD-1	1) 220 KV Ballabhgarh(BB)-Badarpur(NT) (BB) Ckt-1 2) 220 KV Ballabhgarh(BB)-Badarpur(NT) (BB) Ckt-2 3) 220 kV Ballabhgarh-Charkhi Dadri (BB) ckt-1 4) 220 KV Ballabhgarh-Samaypur (BB) Ckt-1 5) 220 KV Ballabhgarh-Samaypur (BB) Ckt-2 6) 220 KV Ballabhgarh-Samaypur (BB) Ckt-3 7) 220KV Bus 1 at Ballabhgarh(BB) 8) 220KV Bus 2 at Ballabhgarh(BB) 9) 220/66kV 100MVA ICT1 at Ballabhgarh(BB) 10) 220/66kV 100MVA ICT2 at Ballabhgarh(BB) 11) 220/66kV 100MVA ICT3 at Ballabhgarh(BB)	Haryana	BBMB, NTPC	16-May-23	01:52	16-May-23	04:23	02:31	i) As reported, at 01:52 hrs, Y-phase PT and R and Y phase breaker poles of 220 KV Ballabhgarh(BB)-Badarpur(NT) (BB) Ckt-2 burst at Ballabhgarh(BB) end. ii) This resulted in LBB protection operation and all the elements connected to Bus-1 and Bus-2 tripped and 220/66/33kV Ballabhgarh(BB) S/s became dead. iii) As per DR of 220 KV Ballabhgarh(BB)-Badarpur(NT) Ckt-1, zone-2 distance protection operated at Badarpur(NT) end (Y-B fault, fault current of approx. 6.9kA) and zone-4 distance protection operated at Ballabhgarh(BB) end (R-Y-N fault, fault current of approx. 12kA in each phase followed by R-N fault, fault current of approx. 17kA). iv) As per DR of 220KV Bus 1 at Ballabhgarh(BB), LBB protection operated (Y-N fault converted to 3-phase fault followed by R-N fault followed by R-Y-N fault were observed) v) As per PMU at Ballabhgarh(BB), multiple faults (Y-N fault converted to 3-phase fault followed by R-N fault followed by R-Y-N fault) were observed in system with delayed fault clearing time of 1400 ms. vi) As per SCADA, load loss of approx. 300MW is observed in Haryana control area.	0	0.755	0	300	0.000	0.547	43731	54888	1400
18	GD-1	1) 220kV Geeta Colony - South wazirabad (DTL) ckt-1 2) 220kV Geeta Colony - South wazirabad (DTL) ckt-2 3) GT-2 at Pragati(DTL) 4) STG at Pragati(DTL)	Delhi	DTL	17-May-23	12:21	17-May-23	13:26	01:05	i) As reported, at 12:05 hrs, 220kV Geeta Colony - South wazirabad (DTL) ckt-1 tripped on Y-N phase to earth fault, fault distance was ~3.3km(Z-1) from Geeta Colony end. During line patrolling heavy fire was found under the between tower no 349 to 350 in Jhuggies. R phase bottom conductor found napped and Y phase middle conductor found bulged of 220kV Geeta Colony - South wazirabad (DTL) ckt-1. ii) With the tripping of 220kV Geeta Colony - South wazirabad (DTL) ckt-1, MW loading of 220kV Geeta Colony - South wazirabad (DTL) ckt-2 increased to ~400MW. iii) Further at 12:21hrs, 220kV Geeta Colony - South wazirabad (DTL) ckt-2 tripped on B-N phase to earth fault. iv) With the tripping of 220kV Geeta Colony - South wazirabad (DTL) ckt-1 & 2, GT-2 and STG at Pragati(DTL) (generating approx. 94MW and 51MW respectively during antecedent condition) became islanded and collapsed. v) Complete load of Geeta Colony, IPPOWERSTN, RPH and part load of Patparganj and Park street were affected. vi) As per PMU at Mandola(PG), B-N phase to earth fault with unsuccessful A/R is observed with delayed fault clearing time of 240 ms. vii) As per SCADA, load loss of approx. 500MW is observed in Delhi control area and loss of generation of approx. 145MW is observed.	0	0.542	145	500	0.246	0.780	58926	64110	240
19	GD-1	1) 220/132kV 160MVA ICT-1 at Jhajra(UK) 2) 220/132kV 160MVA ICT-2 at Jhajra(UK)	Uttarakhand	PTCUL	17-May-23	20:25	17-May-23	21:00	00:35	i) As reported by SLDC Uttarakhand, increase in demand, low generation from hydro power plants of UJVN Ltd., outage of Dhakrani, Dhalipur and Kulhal Power house at 132 kV level in Dehradun area and fluctuations of generation from MB-I & II led to import of more power from Sherpur S/S of PGCIL. ii) As per Bus-wise arrangement at Jhajra(UK), 220/132kV 160MVA ICT-2 at Jhajra(UK) and 220 kV Jhajra(UK)-Dehradun(PG) ckt (load on the ckt before tripping was 393 MW) were connected to Bus-A. 220/132kV 160MVA ICT-1 at Jhajra(UK) and 220 kV Jhajra-Vyasi ckt, 220 kV Jhajra-Khodri ckt and 220 Jahjra-IIP Harrawala ckt were connected to Bus-B. Both 160 MVA transformers was running in parallel. iii) At 20:25hrs, 220/132kV 160MVA ICT-2 at Jhajra(UK) tripping on over-current protection operation. iv) Due to tripping of 220/132kV 160MVA ICT-2 at Jhajra(UK), entire load shifted to 220/132kV 160MVA ICT-1 at Jhajra(UK) and loaded this transformer up to 775 A resulted into tripping of 220/132kV 160MVA ICT-1 at Jhajra(UK). v) Tripping of both 160 MVA transformers resulted into more import of power from 220/132 kV S/s which led to tripping of 132 kV Rishikesh-Laltappar ckt and 132 kV Bindal-Majra ckt. vi) These trippings further led to tripping of 132 kV Khodri-Dhakrani ckt which resulted in complete supply disturbance in Dehradun area. vii) Supply was restored within 40 minutes in whole area. viii) As per PMU at Dehradun(PG), no fault is observed in the system. ix) As per SCADA, load loss of approx. 160MW is observed in Uttarakhand control area.	0	0.093	0	160	0.000	0.258	53580	62112	NA
20	GI-1	1) 220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-2 2) 220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1	Delhi	DTL, BBMB	17-May-23	14:50	17-May-23	18:49	03:59	i) During antecedent condition, 220kV Mandola-Narela Ckt-1 & 2 were connected to 220kV Bus-1 feeding the load of 220kV Narela S/s whereas 220kV Panipat-Narela ckt- 1, 2 & 3 were connected to 220kV Bus-2 and feeding the 220kV Narela-Delhi RR (Rohtak road) ckt-1 & 2. 220kV Bus Coupler was in off position at Narela(DV) and 220kV DSIDC - Narela ckt-1 & 2 were on no-load. ii) As reported, at 14:50 hrs, 220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-2 tripped on Y-N phase to earth fault (Zone 1 from Narela end) with fault distance of 15.62km from Delhi RR(BB) end. iii) Further at 15:02 hrs, B-phase jumper of 220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1 snapped between wavetrap and line isolator. Due to this, 220 KV Delhi RR(BB)-Narela(DV) (BBMB) Ckt-1 tripped on B-N phase to earth fault (Zone 3 from Narela(DV) end) with fault distance of 15.20km from Delhi RR(BB) end. iv) As per DR of 220 KV Delhi RR(BB)-Narela(DV) (end) (BBMB) Ckt-2, fault current was 4.3kA from Narela(DV) end and as per DR of 220 KV Delhi RR(BB)-Narela(DV) (end) (BBMB) Ckt-1, fault current was 8.6kA from Narela(DV) end. v) As per PMU at Dadri Thermal (NT), Y-N phase to earth fault is observed at 14:50 hrs with fault clearing time of 80 ms and B-N phase to earth fault is observed at 15:02 hrs with fault clearing time of 80 ms. vi) As per SCADA, load loss of approx. 110MW is observed in Delhi control area.	0	0.438	0	110	0.000	0.167	60161	65922	80
21	GI-2	1) 800 KV HVDC Kurukshetra(PG) Pole-01 2) 800 KV HVDC Kurukshetra(PG) Pole-02 3) 800 KV HVDC Kurukshetra(PG) Pole-03 4) 800 KV HVDC Kurukshetra(PG) Pole-04	Haryana	PGCIL	18-May-23	00:58	18-May-23	07:21	06:23	i) During antecedent condition, 800 KV HVDC Kurukshetra(PG) Pole-1, 2, 3 & 4 were carrying ~600 MW each from Champa to Kurukshetra. ii) As reported at 00:58hrs, Pole-1 was blocked from Kurukshetra end on emergency due to smoke observed from HV smoothing reactor in DC Yard. Pole 3 at Champa blocked on CAT B protection as Pole-1 failed to isolate (isolation auto sequence failure) at Kurukshetra end. At the same time, Pole-2 & Pole-4 blocked on CAT-B protection operated at Champa end. iii) As reported, sequence of events are as follows: ⁃ 00:58:38 hrs: Pole 1 was manually hand tripped from Kurukshetra end as smoke was observed in Pole 1 DC yard. During the event there were continuous AC side disturbances at Kurukshetra end which lead to several commutation failures and further control action at both Champa and Kurukshetra Stations. ⁃ 00:59 hrs: Due to failure of the parallel sequence of Pole-1 from Pole-3 at Kurukshetra, Pole 1 generated CAT B sequence that resulted in tripping of Pole 3 at both ends. ⁃ 00:59:56:30 hrs: After blocking of Pole 1 & Pole 3, system was running with all return current through DMR 1 & DMR 2. After few seconds, DMR 2 minor fail alarm also appeared, however fault was of transient nature and got reset after protective sequence initiation. ⁃ 00:59:56:907 hrs: Multiple commutation failures were occurring at Kurukshetra end due to persistent heavy thunderstorm and rain (tripping / AR of AC lines). During multiple commutation failure at Kurukshetra end "Instability Detection minor fail" latched in Pole-2 / Lane-1 at Champa end, resulted Pole 2 lane changeover from lane 1 to lane 2 at Champa. At Champa "HV CLD protective sequence" was latched in Pole 2 lane 2 which initiated CAT B sequence and caused the tripping of both Pole 2 & Pole 4. iv) As per PMU at Kurukshetra(PG), no fault is observed in the system, but fluctuation in voltage is observed. v) As per SCADA, no load loss is observed in Haryana control area.	0	0	0	0	0.000	0.000	46288	54707	NA
22	GI-2	1) 400 KV Singrauli(NT)-Vindhyachal(PG) (PG) Ckt-1 2) 500 MW Singrauli STPS - UNIT 7	Uttar Pradesh	PGCIL, NTPC	18-May-23	11:47	18-May-23	14:27	02:40	i) As reported, shifting of 400 KV Singrauli(NT)-Vindhyachal(PG) (PG) Ckt-1 from Main bus to Transfer bus was being done for relay modernization work. After shifting, LBB of Transfer bus coupler (TBC-2) mal-operated due to issue in wiring. TBC-2 tripped within 50msec and LBB reset. ii) At the same time, 500 MW Singrauli STPS - UNIT 7 also tripped due to shorting of contacts which sent general protection control signal. Both the issues has been resolved. iii) As per PMU at Singrauli(NT), no fault is observed in the system. iv) As per SCADA, no load loss is observed in Uttar Pradesh control area. Change in generation of approx. 470MW is observed at Singrauli(NTPC).	0	0	470	0	0.871	0.000	53946	56737	NA
23	GI-1	1) 220 KV Barn(JK)-Kishenpur(PG) Ckt-1 2) 220 KV Barn(JK)-Kishenpur(PG) Ckt-2	Jammu & Kashmir	PGCIL, PDD JK	20-May-23	12:22	20-May-23	13:26	01:04	i) During antecedent condition, active power loading of 220 KV Barn(JK)-Kishenpur(PG) Ckt-1 & 2 were 99MW and 101MW respectively. ii) As reported, at 12:22hrs, 220 KV Barn(JK)-Kishenpur(PG) Ckt-1 tripped on R-B phase to phase fault. iii) As per DR of 220 KV Barn(JK)-Kishenpur(PG) Ckt-1 at Kishenpur end, fault in R & B phase was persisting and line tripped from Kishenpur end on directional earth fault protection operation (back up protection). iv) Due to tripping of 220 KV Barn(JK)-Kishenpur(PG) Ckt-1, loading on 220 KV Barn(JK)-Kishenpur(PG) Ckt-2 increased and line CB at 220kV Barn(PDD JK) end of 220 KV Barn(JK)-Kishenpur(PG) Ckt-2 opened due to over-loading, but line remain charged from Kishenpur(PG) end. v) As per PMU at Kishenpur(PG), R-B phase to phase fault is observed in system with delayed fault clearance time of 840 ms. vi) As per SCADA, load loss of approx. 185MW occurred in J&K control area.	0	0.197	0	185	0.000	0.289	58638	63970	840
24	GD-1	1) 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 2) 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2 3) 33 MW Unit-1 at Singoli Bhatwari HEP	Uttarakhand	Singoli LTUHP, PTCUL	20-May-23	16:18	20-May-23	16:57	00:39	i) During antecedent condition, 33 MW Unit 1 at Singoli Bhatwari HEP was generating 36MW which was evacuating through 220 KV Singoli Bhatwari(Singoli(LTUHP))- Srinagar(UK) (PTCUL) Ckt-1 & 2, carrying 18MW each. ii) As reported, at 16:18hrs, 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 tripped on Y-B-N double phase to earth fault with fault distance of 45.11km from Srinagar(UK) end. iii) At the same time, 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-2 also tripped on Y-B-N double phase to earth fault with fault distance of 52.79km from Srinagar(UK) end. iv) Due to tripping of both 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (PTCUL) Ckt-1 & 2, 33MW Unit-1 at Singoli Bhatwari HEP tripped due to loss of evacuation path. v) As per DR of 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (end) (PTCUL) Ckt-1, zone-1 distance protection operated at Srinagar(UK) end with fault current of approx. 2.985kA and 2.33kA in Y and B-phase respectively. vi) As per DR of 220 KV Singoli Bhatwari(Singoli(LTUHP))-Srinagar(UK) (end) (PTCUL) Ckt-2, zone-1 distance protection operated at Srinagar(UK) end with fault current of approx. 1.454kA and 2.48kA in Y and B-phase respectively. vii) As per PMU, Y-B-N double phase to earth fault is observed with fault clearing time of 80ms. viii) As per SCADA, load loss of approx. 20MW is observed in Uttarakhand control area and change in generation of approx. 36MW is observed at Singoli Bhatwari HEP.	0.023	0.013	36	20	0.065	0.032	55208	61572	80

S.No.	Category of Grid Disturbance (GD-I to GD-V)	Name of Elements (Tripped/Manually opened)	Affected Area	Owner/ Agency	Outage		Revival		Duration (hh:mm)	Event (As reported)	Energy Unserved due to Generation loss (MU)	Energy Unserved due to Load loss (MU)	Loss of generation / loss of load during the Grid Disturbance		% Loss of generation / loss of load w.r.t Antecedent Generation/Load in the Regional Grid during the Grid Disturbance		Antecedent Generation/Load in the Regional Grid		Fault Clearance time (in ms)
					Date	Time	Date	Time					Generation Loss(MW)	Load Loss (MW)	% Generation Loss(MW)	% Load Loss (MW)	Antecedent Generation (MW)	Antecedent Load (MW)	
25	GI-1	1) 220 kV Bishnah(JK)-Hiranagar(JK) ckt 2) 220 kV Samba(PG)-Bishnah(JK) ckt	Jammu and Kashmir	PGCIL, PDD JK	22-May-23	14:36	22-May-23	15:19	00:43	i) As reported, at 14:36hrs, 220 kV Bishnah(JK)-Hiranagar(JK) ckt tripped on R-Y phase to phase fault with fault current of 3.92kA and 3.73kA in R and Y-phase respectively. ii) At the same time, 220 KV Samba(PG)-Bishnah(JK) ckt also tripped on R-Y phase to phase fault. iii) As per DR at Samba(PG) end of 220 KV Samba(PG) (end)-Bishnah(JK) (PDD JK) Ckt, zone-3 distance protection operated with fault current of 2.77kA and 2.34kA in R and Y-phase respectively at Samba(PG) end. Fault clearing time was ~840ms. iv) As per PMU at Kishenpur(PG), R-Y phase to phase fault is observed in system with fault clearance time of 840 ms. v) As per SCADA, load loss of approx. 310MW occurred in J&K control area.	0	0.222	0	310	0.000	0.449	62758	69083	840
26	GI-2	1) 400 KV Dehar(BB)-Panchkula(PG) (PG) Ckt 2) 400 KV Dehar(BB)-Rajpura(PS) (PG) Ckt 3) 400/220 kV 315 MVA ICT 1 at Dehar(BB) 4) 165MW Unit-4 at Dehar(BB) 5) 165MW Unit-5 at Dehar(BB)	Punjab	PGCIL, BBMB, PSTCL	24-May-23	22:12	24-May-23	22:53	00:41	i) As reported, at 21:31 hrs, 400 KV Dehar(BB)-Panchkula(PG) (PG) Ckt tripped on B-N phase to earth fault (zone-1 from Dehar end). ii) At 21:33 hrs, 400 KV Dehar(BB)-Rajpura(PS) (PG) Ckt tripped on R-N phase to earth fault (zone-2 from Rajpura end) with fault current 3.2kA and distance of 129.0km from Rajpura end. iii) Hence, during antecedent condition, both 400 KV Dehar(BB)-Panchkula(PG) (PG) Ckt and 400 KV Dehar(BB)-Rajpura(PS) (PG) Ckt were already out and total generation of 165MW Unit-4 & 5 at Dehar(BB) of approx. 300MW was evacuating through 400/220 kV 315 MVA ICT 1 at Dehar(BB). iv) Further, as reported, at 22:12 hrs, while charging 400 KV Dehar(BB)-Panchkula(PG) (PG) Ckt from Dehar end, 400/220 kV 315 MVA ICT 1 at Dehar(BB) tripped. Due to this, 165MW Unit-4 & 5 at Dehar(BB) also tripped due to loss of evacuation path. v) As per PMU at Jalandhar(PG), no fault is observed in the system at 22:12hrs. vi) As per SCADA, change in generation of approx. 300MW is observed at Dehar(BBMB) at 22:12 hrs.	0	0.00	300	0	0.636	0.000	47149	55608	NA
27	GI-2	1) 130 MW Dulhasti HPS - UNIT 1 2) 130 MW Dulhasti HPS - UNIT 2 3) 130 MW Dulhasti HPS - UNIT 3	Jammu and Kashmir	NHPC	24-May-23	15:09	24-May-23	16:41	01:32	i) During the antecedent condition, 130 MW Dulhasti HPS - UNIT 1, 2 & 3 were generating approx. 380MW in total and total power of 380MW was evacuating through 400kV Dulhasti(NH)-Kishenpur(PG) ckt-1&2. ii) As reported, at 15:09 hrs, UCB (Unit control board) discordance fault QSD (Quick shutdown) operated from SCADA because of malfunctioning of surge shaft gate opening signal. Due to this, 130 MW Dulhasti HPS - UNIT 1, 2 & 3 tripped. Incorrect signal of surge shaft gate closed generated due to malfunction of contacts. iii) As per PMU at Kishenpur(PG), no fault is observed. iv) As per SCADA, generation loss of approx. 380MW is observed at Dulhasti(NH). v) During investigation, no issue in contacts found.	0.583	0	380	0	0.691	0.000	55009	61070	NA
28	GD-1	1) 400KV Bus 1 at Jodhpur(RS) 2) 400KV Bus 2 at Jodhpur(RS) 3) 400 KV Akal-Jodhpur (RS) Ckt 4) 400 KV Rajwest(RW)-Jodhpur (RS) Ckt 5) 400/220 kV 315 MVA ICT 1 at Jodhpur(RS) 6) 400/220 kV 315 MVA ICT 2 at Jodhpur(RS) 7) 400 KV Jodhpur-Kankani (RS) Ckt-1 8) 400 KV Kankroli(PG)-Jodhpur(RS) (PG) Ckt	Rajasthan	RVPNL, PGCIL	24-May-23	20:14	24-May-23	23:40	03:26	i) 400/220kV Jodhpur(RS) has one and half breaker bus scheme at 400kV side. ii) As reported at 20:10 hrs, Isolator of 220 kV Jodhpur to Bilara line and the IPS tube of 400 kV main bus-A got damaged due to heavy storm at 400 kV GSS, Jodhpur. iii) On this fault, Bus bar protection operated at 400kV Bus-A (as reported and as verified from DR). iv) As reported, at the same time, all the elements connected to 400kV Bus-A & Bus-B tripped and substation became dead. v) As per PMU at Bhadla(PG), R-N phase to earth fault which further converted into three phase fault with delayed clearance of 2080ms is observed. vi) As per DR of 400 KV Jodhpur-Kankani (end) (RS) Ckt-1, at 20:14 hrs, line tripped on R-N phase to earth fault (zone-3 distance protection) with fault current of 1.16kA from Kankani(RS) end and fault clearance time of ~800msec. As reported, fault distance was 211km from Kankani(RS) end. vii) As per DR of 400 KV Kankroli(PG) (end)-Jodhpur(RS) (PG) Ckt, at 20:14 hrs, line tripped on R-N phase to earth fault later converted into R-Y-N fault is observed. Fault current was ~1.38kA from Kankroli(PG) end. Fault clearing time was ~1560ms. As reported, fault distance was 187.5km from Kankroli(PG) end. viii) As per DR of 400/220 kV 315 MVA ICT 1 & 2 at Jodhpur(RS), ICTs tripped on directional over current protection operation with the delay of approx. ~1300msec. Fault in R-phase which converted into R-Y-B is observed. ix) As per SCADA, change in demand of approx. 275MW in Rajasthan control area x) The damaged IPS tube of 400kV main bus-A has been fixed.	0	0.944	0	275	0.000	0.471	48757	58394	2080
29	GI-2	1) 400/220 kV 500 MVA ICT 2 at Mandola(PG) 2) 220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-1 3) 220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-2 4) 220 KV Mandola(PG)-Gopalpur(DTL) (DTL) Ckt-1 5) 220 KV Mandola(PG)-Gopalpur(DTL) (DTL) Ckt-2 6) 220KV Bus 1 at Mandola(PG) 7) 220KV Bus 2 at Mandola(PG) 8) 25 MVAR Bus Reactor No 1 at 220 KV Mandola(PG)	Delhi	PGCIL, DTL	24-May-23	17:43	24-May-23	17:59	00:16	i) During antecedent condition, 400/220 kV 500 MVA ICT-4 at Mandola(PG) was already under emergency shutdown for attending hot spot on 207 Bay's CT R and Y Phase terminals. ii) The load of 220kV Gopalpur and Sabji Mandi S/s was fed from 220 KV Mandola(PG)-Gopalpur(DTL) (DTL) Ckt-1 & 2 and the load of 220kV Narrela S/s was fed from 220 KV Mandola(PG)-Narela(DV) (DTL) Ckt-1 & 2. iii) As reported, the details of event is as follows: a. Y-Phase CT at 220kV side of ICT-4 was earthed from both sides for replacement of defective jumper. b. On connection of Tan delta kit earthing, sparking was observed in earthing lead. Discharge current from kit resulted in circulating current and eventually as spill current in Bus-1 & check zone. c. Further, low IR value of cable cores from busbar panel at Mandola(PG) to Gopalpur (ckt-1) isolator selection relays led to coupling of 220kV Bus 1 & 2 at Mandola(PG). d. This led to tripping of both 220kV Bus 1 & 2 at Mandola(PG). e. Due to tripping of 220kV Bus 1 & 2 at Mandola(PG), all the elements connected to Bus-1 & 2 also tripped and both the buses became dead. iv) As per DR of 400/220 kV 500 MVA ICT-4 at Mandola(PG), current of approx. 135A in Y-phase CT at LV side is observed. As reported, this spill current led to operation of bus bar differential protection. v) As per PMU at Mandola(PG), no fault is observed in the system. vi) As per SCADA, change in demand of approx. 380MW is observed in Delhi control area. vii) The load of 220kV Gopalpur and Sabji Mandi S/s was normalized through 220kV Wazirabad-Gopalpur ckt-1&2 at 17:46hrs and the load of 220kV Narrela S/s was normalized through 220 KV DSIDC Bawana- Narela ckt-1&2 at 17:59hrs.	0	0.101	0	380	0.000	0.706	45210	53847	NA
30	GI-2	1) 800 KV HVDC Kurukshetra(PG) Pole-01 2) 800 KV HVDC Kurukshetra(PG) Pole-02 3) 800 KV HVDC Kurukshetra(PG) Pole-03 4) 800 KV HVDC Kurukshetra(PG) Pole-04	Haryana	PGCIL	25-May-23	09:25	25-May-23	11:22	01:57	i) During antecedent condition, 800 KV HVDC Kurukshetra(PG) Pole-1, 2, 3 & 4 were carrying 243MW, 240MW, 232MW & 236MW respectively from Champa to Kurukshetra. ii) As reported at 09:25hrs, Pole-4 was blocked from Kurukshetra end due to issue in measurement panel DCCT. Due to this, Pole-2 blocked on CAT-B protection from Pole-4. iii) At the same time, Pole-1 and Pole-3 also blocked due to DMR-2 transient fault. iv) As per PMU at Kurukshetra(PG), no fault is observed in the system, but fluctuation in voltage is observed. v) As per SCADA, no load loss is observed in Haryana control area.	0	0	0	0	0.000	0.000	51159	50996	NA
31	GI-1	1) 220 KV Nallagarh(PG)-Mohali(PS) (PS) Ckt-1 2) 220 KV Nallagarh(PG)-Mohali(PS) (PS) Ckt-2	Punjab	PSTCL, PGCIL	27-May-23	12:26	27-May-23	15:04	02:38	i) As reported at 12:26 hrs, 220 KV Nallagarh(PG)-Mohali(PS) (PS) Ckt-1 and 2 tripped due to infringing of peacock which led to bus fault at 220kV Mohali S/s. Fault distance was 55km from Nallagarh(PG) end. ii) As per DR of 220 KV Nallagarh(PG) (end)-Mohali(PS) (PS) Ckt-1 and 2, both the ckts tripped on B-N phase to earth fault sensed in zone-2. Fault current was 2.6kA from Nallagarh(PG) end. Delayed fault clearance of 540ms is observed. iii) As per PMU at Nallagarh(PG), B-N phase to earth fault with delayed fault clearance time of 560msec is observed. iv) As per SCADA, change in load of approx. 355MW is observed in Punjab control area.	0	0.935	0	355	0.000	0.830	43398	42786	560
32	GI-2	1) 800 KV HVDC Kurukshetra(PG)-Champa(PG) (PG) Ckt-1 2) 800 KV HVDC Kurukshetra(PG)-Champa(PG) (PG) Ckt-3	Haryana	PGCIL	28-May-23	12:10	28-May-23	16:02	03:52	i) During antecedent condition, 800 KV HVDC Kurukshetra(PG) Pole-1, 2, 3 & 4 were carrying 369MW, 367MW, 354MW & 364MW respectively from Champa to Kurukshetra. ii) As reported at 12:10hrs, 800 KV HVDC Kurukshetra(PG)-Champa(PG) (PG) Ckt-1 & 3 tripped as block command was received from Champa end due to DC Filter overload protection operation at Champa end. iii) As per PMU at Kurukshetra(PG), no fault is observed in the system, but fluctuation in voltage is observed.	0	0	0	0	0.000	0.000	43900	47516	NA
33	GD-1	1) 220 KV Bhadla(PG)-TPREL Solar(TP) (Tata Power) Ckt-1 2) 220 KV Bhadla(PG)-ESUCRL SL_BHD_PG (ESUCRL) (ESUCRL) Ckt-1 3) 400/220 kV 500 MVA ICT 6 at Bhadla(PG) 4) 220 KV Bhadla(PG) - Bus 4 5) 220 KV Bhadla(PG)-CS_Jodhpur SL_BHD_PG (Cleansolar_Jodhpur) (Cleansolar_Jodhpur) Ckt-1 6) 765 KV Bhadla_2 (PG)-Fatehgarh_II(PG) (PFTL) Ckt-2 7) 765/400 kV 1500 MVA ICT 1 at Bhadla_2 (PG) 8) 220 KV Nokhra SL_BHD2 (NTPC)-Bhadla_2 (PG) (NTPC_NOKHRA) Ckt-1 9) 765 KV Bikaner-Bhadla_2 (PG) Ckt-1 10) 220 KV Bhadla_2 (PG)-Avaada Sunrays_SL_BHD2_PG (Avaada_Sunrays) (Avaada_Sunrays) Ckt-1 11) 765 KV Ajmer-Bhadla_2 (PG) Ckt-2 12) 400 KV Kolayat Solar NTPC_1 (NTPC_KOLAYAT SL)-Bhadla_2 (PG) (NTPC_KOLAYAT SL) Ckt-1 13) 765 KV Bhadla_2 (PG)-Fatehgarh_II(PG) (PFTL) Ckt-1 14) 765 KV Bhadla_2 –Ajmer (PG) Ckt-1	Rajasthan	PGCIL, TPREL, Avaada, ESUCRL, CSP Jodhpur, NTPC,	28-May-23	13:02 to 13:40	28-May-23	18:59		a) At 13:02:58.080 hrs, 220kV Bhadla-TPREL Line tripped due to R-N fault. It was reported that the fault occurred due to damage of wave trap at 220kV TPREL end. CB did not open at Bhadla end and therefore LBB operated at Bhadla end as per DR. Fault cleared with the delay of ~280msec. b) Due to LBB operation, element connected at 220kV Bus-4 at Bhadla(PG) i.e., 220kV Bhadla-ESSEL line & 400/220 kV 500 MVA ICT 6 at Bhadla(PG) also tripped at the same instant. c) At 13:03:01.120 hrs, 220kV Bhadla-CSP Jodhpur tripped due to R-N fault followed by Y-N fault during dead time of R-ph A/R. Fault occurred due to snapping of OPGW. d) During voltage dip of faults in lines, reduction in RE generation connected at Fatehgarh 1 & 2 was observed (as per SCADA) on LVRT operation. (Generation at Bhadla(PG) & Bhadla2(PG) was already near to zero before the tripping event). The total generation loss as per SCADA data was ~910 MW which recovered within ~2min. e) Further at, 13:29 hrs, 765kV Bhadla2-Fatehgarh2 ckt-2 tripped on permanent R-N fault in line followed by tripping of 765/400kV 1500MVA ICT-1 at Bhadla2(PG) on differential protection operation on B-N fault, flashover in 400kV side jumper and gantry was observed. f) During voltage dip of this fault also, reduction in RE generation connected at Fatehgarh 1 & 2 was observed (as per SCADA) on LVRT operation. (Generation at Bhadla(PG) & Bhadla2(PG) was already almost zero before the tripping event). The total generation loss as per SCADA data was ~1900 MW out of which ~1150MW recovered within ~2min. g) Further at 13:35 hrs, 765kV Bhadla2-Bikaner ckt-1 tripped on permanent Y-N fault in line followed by tripping of 220kV Bhadla2-ASEPL ckt on R-N fault. h) Further at 13:36hrs, 765kV Bhadla2-Ajmer ckt-2 tripped on R-B-N double phase to ground fault followed by tripping of 400kV Bhadla2-Kolayat ckt on R-N fault at 13:37hrs. i) During voltage dip of this fault also, reduction in RE generation connected at Fatehgarh 1 & 2 was observed (as per SCADA) on LVRT operation. (Generation at Bhadla(PG) & Bhadla2(PG) was already almost zero before the tripping event). The total generation loss as per SCADA data was ~800 MW which recovered within ~1.5min. j) Further at 13:40hrs, 765kV Bhadla2-Fatehgarh2 ckt-1 & 765kV Bhadla2-Ajmer ckt-1 tripped on R-N fault in respective lines during reclaim time. k) During voltage dip of this fault also, reduction in RE generation connected at Fatehgarh 1 & 2 was observed (as per SCADA) on LVRT operation. (Generation at Bhadla(PG) & Bhadla2(PG) was already almost zero before the tripping event). The total generation loss as per SCADA data was 1200 out of which ~700MW recovered within ~2min. l) With the tripping of these two lines, out of six 765kV lines at 765kV Bhadla2(PG), only one 765kV line i.e., 765kV Bhadla2-Bikaner ckt-2 remained intact.			8000	0	19.885	0.000	40231	47381	280
34	GD-1	1) 220 KV Dasuya(PS)-Jalandhar(BB) (BBMB) Ckt 2) 220 KV Dasuya(PS)-Jalandhar(PG) (PG) Ckt-1 3) 220 KV Dasuya(PS)-Jalandhar(PG) (PG) Ckt-2 4) 220 KV Pong(BB)-Dasuya(PS) (BBMB) Ckt-1 5) 220 KV Pong(BB)-Dasuya(PS) (BBMB) Ckt-2 6) 220 KV Dasuya-Alawalpur (PS) Ckt 7) 220 KV Sarna(PS)-Dasuya(PS) (PG) Ckt-1 8) 220 KV Sarna(PS)-Dasuya(PS) (PG) Ckt-2 9) 220KV Dasuya-Railwat ckt	Punjab	PSTCL, PGCIL, BBMB	31-May-23	04:48	31-May-23	07:08	02:20	i) 220 kV Dasuya(PS) S/s has double bus scheme. ii) As reported, brief of the event is as follows: a) At 04:48hrs on 31st May'23, 220 KV Dasuya-Alawalpur (PS) Ckt tripped on R-N phase to earth fault from Alawalpur end only; fault sensed in zone-1 from Alawalpur end. This fault was not sensed from Dasuya end. Hence distance protection did not operate and line did not trip from Dasuya end on this fault. b) On this fault, other lines from 200kV Dasuya(PS) tripped on back-up protection (Z-2/Z-3/directional E/F) operation from remote end only. c) Back up over current earth fault protection of 220 KV Dasuya-Alawalpur (PS) Ckt also didn't operate. iii) As per DR of 220 KV Dasuya(PS)-Jalandhar(PG) (end) (PG) Ckt-1 & 2, directional E/F protection operated at Jalandhar(PG) end. Fault current in R-phase were 700A and 950A respectively for Ckt-1 & 2 from Jalandhar(PG) end. iv) As per PMU at 400kV Jalandhar(PG), R-N phase to earth fault with delayed clearance of fault in 3520 ms is observed. v) As per SCADA change in demand of approx. 90MW is observed in Punjab control area.	0	0.21	0	90	0.000	0.200	39599	44912	3520

S. No.	Name of Transmission Element Tripped	Owner/ Utility	Outage		Load Loss/ Gen. Loss	Brief Reason (As reported)	Category as per CEA Grid standards	# Fault Clearance Time (>100 ms for 400 kV and 160 ms for 220 kV)	*FIR Furnished (YES/NO)	DR/EL provided in 24 hrs (YES/NO)	Other Protection Issues and Non Compliance (inference from PMU, utility details)	Suggestive Remedial Measures	Remarks
			Date	Time									
1	220 KV Auraiya(NT)-Malanpur(MP) (PG) Ckt-1	POWERGRID	1-May-23	19:51	Nil	Phase to earth fault Y-N	NA	NA	YES	YES			As per PMU at Agra(PG) no fault is observed, As per DR of Auraiya end, Y-N fault with A/R start is observed. Complete A/R operation was not ascerained through DR as DR only 1sec is avaialble.
2	400 KV Kankroli-Zerda (PG) Ckt-1	POWERGRID	2-May-23	12:51	Nil	Phase to earth fault B-N	NA	NA	YES	YES (After 24hrs)	Reason of OV stage-1 protection operation.		As per PMU at Bhinmal(PG), B-N fault is observed. As per DR of Kankroli end, B-N fault in Z-1, distance protection operated, however simultaneously OV stage-1 operated at Kankroli end and line tripped.
3	132 KV Rihand(UP)-Garwa(JS) (UP) Ckt-1	UPPTCL	4-May-23	11:34	Nil	Phase to earth fault R-N	NA	NA	YES	YES			As per PMU at Allahabad(PG), no fault is observed. As per DR report of Rihand end, R-N fault with fault distance of ~30.2km(29.6%) from Rihand end occurred.
4	800 KV HVDC Kurukshetra(PG) Pole-4	POWERGRID	10-May-23	22:24	Nil	Blocked due to software malfunction.	NA	NA	YES	YES (After 24hrs)			As per PMU, fluctuation in voltage is observed.
5	800 KV HVDC Kurukshetra(PG) Pole-2	POWERGRID	10-May-23	22:24	Nil	Blocked due to software malfunction.	NA	NA	YES	YES (After 24hrs)			
6	765 KV Fatehpur-Sasaram (PG) Ckt-1	POWERGRID	14-May-23	11:33	Nil	Line tripped at Fatehpur only due to DT received from Sasaram end.	NA	NA	YES	YES (After 24hrs)			As per PMU at Fatehpur(PG) no fault is observed, As per DR of Fatehpur end, no fault is observed. Line tripped on DT received from Sasaram end, voltage was in the operating range.
7	800 KV HVDC Kurukshetra(PG) Pole-1	POWERGRID	18-May-23	00:58	Nil	External blocked due to detection of smoke from switchyard during heavy windstorm in the area.	NA	NA	YES	YES (After 24hrs)			As per PMU, fluctuation in voltage is observed.
8	800 KV HVDC Kurukshetra(PG) Pole-4	POWERGRID	18-May-23	00:59	Nil	Blocked due to DC line fault in DMR-II.	NA	NA	YES	YES (After 24hrs)			
9	800 KV HVDC Kurukshetra(PG) Pole-03	POWERGRID	18-May-23	00:59	Nil	Blocked due to DC line fault in DMR-II.	NA	NA	YES	YES (After 24hrs)			
10	800 KV HVDC Kurukshetra(PG) Pole-2	POWERGRID	18-May-23	00:59	Nil	Blocked due to DC line fault in DMR-II.	NA	NA	YES	YES (After 24hrs)			
11	132 KV Anpara(UP)-Morwa(MP) (UP) Ckt-1	UPPTCL	24-May-23	10:53	Nil	O/C R-phase, 86 trip relay operated at Anpara(UP).	NA	NA	NO	NO			As per PMU at Varanasi(UP) no fault is observed.
12	500 KV HVDC Mahindergarh(APL)-Adani Mundra(APL) (ATIL) Ckt-2	APL	24-May-23	12:18	Nil	Tripped due to DC line fault.	NA	NA	YES	YES			As per EL, DC line fault occurred.
13	765 KV Fatehpur-Sasaram (PG) Ckt-1	POWERGRID	24-May-23	21:08	Nil	Tripped due to DT send from Fatehpur end. (D/T problem due to PLCC)	NA	NA	YES	YES (After 24hrs)			As per PMU at Fatehpur(PG) no fault is observed, As per DR of Fatehpur end, no fault is observed, voltage was also in the operating range. As per EL at Fatehpur(PG), differential protection operated at Fatehpur end and DT was sent to remote end.
14	800 KV HVDC Kurukshetra(PG) Pole-2	POWERGRID	25-May-23	09:25	Nil	Pole-2 blocked by CAT B from Pole-4	NA	NA	NO	NO			

15	800 KV HVDC Kurukshetra(PG) Pole-1	POWERGRID	25-May-23	09:25	Nil	Pole-3 blocked due to DMR-2 transient fault.	NA	NA	NO	NO			As per PMU, fluctuation in voltage is observed.
16	800 KV HVDC Kurukshetra(PG) Pole-03	POWERGRID	25-May-23	09:25	Nil	Pole-3 blocked due to DMR-2 transient fault.	NA	NA	NO	NO			
17	800 KV HVDC Kurukshetra(PG) Pole-4	POWERGRID	25-May-23	09:25	Nil	Pole-4 blocked due to issue in measurement panel DCCT.	NA	NA	NO	NO			
18	765 KV Phagi(RS)-Gwalior(PG) (PG) Ckt-1	POWERGRID	25-May-23	22:31	Nil	Line tripped on B-N Fault during heavy windstorm in the area. FLR- Gwalior-306 Km/3.07Ka, Phagi-0.365Km/11.5 kA.	NA	NA	YES	YES			As per PMU at Bhiwani(PG) multiple B-N fault is observed. As per DR of Phagi end, line tripped on B-N fault in reclaim time.
19	400 KV RAPS_D(NP)-Shujalpur(PG) (RTCL) Ckt-2	POWERGRID	26-May-23	01:20	Nil	TEE-2 Protection operated at RAPP end and DT received at Shujalpur end.	NA	NA	NO	NO			As per PMU at Kota(PG), Y-B ph-ph fault with delayed clearance in 360msec is observed.
20	400 KV Kankroli-Zerda (PG) Ckt-1	POWERGRID	26-May-23	03:45	Nil	Line A/R successful at Kankroli, but tripped from Zerda. Dist. 44.1km, Fault current 6.7kA from Zerda.	NA	NA	YES	YES (After 24hrs)			As per PMU at Bhinmal(PG), Y-N fault is observed. As per DR of Kankroli end, successful A/R operation is observed. As per phase angle (90 degree), line tripped from Zerda end.
21	500 KV HVDC Mahindergarh(APL)-Adani Mundra(APL) (ATIL) Ckt-1	APL	26-May-23	10:45	Nil	Pole-1 tripped due to fault in VCS pump-2 at 10:45	NA	NA	YES	YES			As per EL, fault in VCS pump.
22	500 KV HVDC Mahindergarh(APL)-Adani Mundra(APL) (ATIL) Ckt-2	APL	26-May-23	16:19	Nil	HVDC Mundra-Mohindergarh Pole-1 tripped at 16:19 hrs after checking we have found that 220V DC power cable was found faulty	NA	NA	NO	NO			As per EL, fault in DC supply .
23	500 KV HVDC Mahindergarh(APL)-Adani Mundra(APL) (ATIL) Ckt-1	APL	26-May-23	16:19	Nil		NA	NA	YES	YES			
24	220 KV Ranpur(RS)-Bhanpura(MP) (RS) Ckt-1	RRVPNL	26-May-23	20:09	Nil	Relay Indication at Ranpur End: M2 Relay Details: E/F in Y Phase Fault current: IL1: 0.30KA IL2: 0.61KA IL3: 0.35KA Zone 1 General trip M1 Relay Details: Fault Current: IL1: 298.311A IL2: 615.995A IL3: 387.907A ILN: 1234.423A 86A & 86B operated Dist:43.5km Relay Indication at Bhanpura End: E/F in B Phase B PH: 3242amps AR lockout Dist: 27.44Km	NA	NA	YES	NO			As per PMU, no fault is observed. DR/EL not received.
25	800 KV HVDC Kurukshetra(PG) Pole-01	POWERGRID	28-May-23	12:10	Nil	block command received from Champa end due to DC Filter overload protection operation at Champa end	NA	NA	NO	NO			As per PMU, fluctuation in voltage is observed.
26	800 KV HVDC Kurukshetra(PG) Pole-03	POWERGRID	28-May-23	12:10	Nil	block command received from Champa end due to DC Filter overload protection operation at Champa end	NA	NA	NO	NO			
27	765 KV Agra-Gwalior (PG) Ckt-2	POWERGRID	29-May-23	15:26	Nil	tripped on Y-N fault .Gwalior end detail- F/D-117.0 kMS, F/C-5.85 KA and Agra end : fault distance- 2.4 Kms, FC=8KA	NA	NA	YES	YES (After 24hrs)			As per PMU at Bhiwani(PG) multiple Y-N fault is observed. As per DR of Agra end, line tripped on Y-N fault in reclaim time.
28	500 KV HVDC Mahindergarh(APL)-Adani Mundra(APL) (ATIL) Ckt-2	APL	31-May-23	17:03	Nil	HVDC Mundra–Mohindergarh Pole-2 tripped at 17:03 Hrs due to DC Line Fault	NA	NA	YES	YES			As per EL, DC line fault .

 # Fault Clearance time has been computed using PMU Data from nearest node available and/or DR provided by respective utilities (Annexure- II)

****Yes, if written Preliminary report furnished by constituent(s)***

R-Y-B phase sequencing (Red, Yellow, Blue) is used in the list content.All information is as per Northern Region unless specified.

^^ tripping seems to be in order as per PMU data, reported information. However, further details may be awaited.

Reporting of Violation of Regulation for various issues for above tripping

1	Fault Clearance time(>100ms for 400kV and >160ms for 220kV)	1. CEA Grid Standard-3.e 2. CEA Transmission Planning Criteria
2	DR/EL Not provided in 24hrs	1. IEGC 5.2(r) 2. CEA Grid Standard 15.3
3	FIR Not Furnished	1. IEGC 5.9.6.a 2. CEA Grid Standard 12.2 (Applicable for SLDC, ALDC only)
4	Protection System Mal/Non Operation	1. CEA Technical Standard of Electrical Plants and Electric Lines: 43.4.A 2. CEA (Technical Standards for connectivity to the Grid) Regulation, 2007: Schedule Part 1. (6.1, 6.2, 6.3)
5	A/R non operation	1. CEA Technical Standard of Electrical Plants and Electric Lines: 43.4.C 2. CEA Technical Planning Criteria

Status of submission of FIR/DR/EL/Tripping Report on NR Tripping Portal

Time Period: 1st May 2023 - 31st May 2023

S. No.	Utility	Total No. of tripping	First Information Report (Not Received)		Disturbance Recorder (Not Received)	Disturbance Recorder (NA) as informed by utility	Disturbance Recorder (Not Received)	Event Logger (Not Received)	Event Logger (NA) as informed by utility	Event Logger (Not Received)	Tripping Report (Not Received)	Tripping Report (NA) as informed by utility	Tripping Report (Not Received)	Remark
			Value	%	Value		%	Value		%	Value		%	
1	ACME	2	2	100	2	0	100	2	0	100	2	0	100	DR, EL & Tripping report need to be submitted
2	ADANI	3	3	100	3	0	100	3	0	100	3	0	100	
3	AHEJ2L	1	1	100	1	0	100	1	0	100	1	0	100	
4	AHEJ3L	3	1	33	1	0	33	1	0	33	1	0	33	
5	AHEJ4L	2	1	50	1	0	50	1	0	50	1	0	50	
6	AHEJOL	1	0	0	0	0	0	0	0	0	0	0	0	Details received
7	ANTA-NT	4	0	0	0	1	0	0	1	0	0	1	0	
8	AP43L	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report need to be submitted
9	APFOL	3	3	100	3	0	100	2	0	67	3	0	100	
10	APL	6	1	17	1	1	20	1	0	17	1	1	20	
11	APMPL	6	6	100	6	0	100	6	0	100	6	0	100	
12	APTFL	1	1	100	1	0	100	1	0	100	1	0	100	
13	AREPRL	2	0	0	0	0	0	0	0	0	0	0	0	Details received
15	AURAIYA-NT	2	0	0	0	0	0	0	0	0	0	0	0	
17	BAIRASUIL-NH	1	0	0	0	1	0	0	1	0	0	0	0	
14	ASEJOL	2	1	50	1	0	50	1	0	50	1	0	50	DR, EL & Tripping report need to be submitted
16	AVAADA_SUNRAYS	3	3	100	3	0	100	3	0	100	3	0	100	
18	BBMB	78	15	19	18	22	32	20	28	40	16	6	22	
19	CHAMERA-II-NH	3	0	0	0	3	0	0	3	0	0	1	0	Details received
20	CHAMERA-I-NH	1	0	0	0	0	0	0	0	0	0	0	0	
21	CLEANSOLAR_JODHPUR	2	2	100	2	0	100	2	0	100	2	0	100	DR, EL & Tripping report need to be submitted
22	CPCC1	229	6	3	6	72	4	7	63	4	6	10	3	
23	CPCC2	43	0	0	0	3	0	3	3	8	0	2	0	Details received
24	CPCC3	53	3	6	6	2	12	7	2	14	9	0	17	DR, EL & Tripping report need to be submitted
25	DADRIGAS-NT	2	2	100	2	0	100	2	0	100	2	0	100	
26	DADRI-NT	6	1	17	1	0	17	1	0	17	1	0	17	
27	DULHASTI-NH	3	0	0	0	3	0	0	0	0	0	0	0	Details received

Status of submission of FIR/DR/EL/Tripping Report on NR Tripping Portal

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			Value	%	Value		%	Value		%	Value		%	
28	EDEN (ERCPL)	2	0	**0**	1	1	**100**	0	0	**0**	1	1	**100**	**DR, EL & Tripping report need to be submitted**
29	ESUCRL	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
30	FBTL	4	0	**0**	0	0	**0**	0	2	**0**	0	1	**0**	**Details received**
31	JHAJJAR	4	1	**25**	0	0	**0**	0	0	**0**	3	0	**75**	**DR, EL & Tripping report need to be submitted**
32	KARCHAM	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
33	KISHENGANGA-NH	2	0	**0**	0	1	**0**	0	1	**0**	0	0	**0**	**Details received**
34	KOLDAM-NT	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	
35	MAHINDRA	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	
36	NAPP	4	0	**0**	0	1	**0**	0	1	**0**	0	1	**0**	
37	NTPC_KOLAYAT SL	4	4	**100**	4	0	**100**	4	0	**100**	4	0	**100**	**DR, EL & Tripping report need to be submitted**
38	NTPC_SL_DEVIKOT	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
39	PKTSL	2	0	**0**	1	1	**100**	2	0	**100**	1	0	**50**	
40	RAPPA	7	6	**86**	6	0	**86**	7	0	**100**	7	0	**100**	
41	RAPPB	2	2	**100**	2	0	**100**	2	0	**100**	2	0	**100**	
42	RAPPC	2	2	**100**	2	0	**100**	2	0	**100**	2	0	**100**	
43	SALAL-NH	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	**Details received**
45	SEWA-2-NH	1	0	**0**	0	0	**0**	0	0	**0**	0	0	**0**	
44	SAURYA	7	7	**100**	7	0	**100**	7	0	**100**	7	0	**100**	**DR, EL & Tripping report need to be submitted**
46	SINGOLI	12	12	**100**	12	0	**100**	12	0	**100**	12	0	**100**	
47	SINGRAULI-NT	6	0	**0**	3	0	**50**	3	0	**50**	3	0	**50**	
48	SLDC-CHD	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
49	SLDC-DV	33	0	**0**	2	11	**9**	2	11	**9**	5	0	**15**	
50	SLDC-HP	6	0	**0**	3	3	**100**	2	3	**67**	1	0	**17**	
51	SLDC-HR	32	1	**3**	3	2	**10**	3	0	**9**	11	0	**34**	
52	SLDC-JK	11	0	**0**	11	0	**100**	11	0	**100**	11	0	**100**	
53	SLDC-PS	36	2	**6**	22	5	**71**	22	6	**73**	27	0	**75**	
54	SLDC-RS	183	6	**3**	67	0	**37**	67	0	**37**	93	1	**51**	
55	SLDC-UK	33	0	**0**	0	10	**0**	0	9	**0**	1	1	**3**	

Status of submission of FIR/DR/EL/Tripping Report on NR Tripping Portal

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			Value	%	Value		%	Value		%	Value		%	
56	SLDC-UP	115	9	**8**	12	10	**11**	12	21	**13**	9	2	**8**	
57	TANAKPUR-NH	3	0	**0**	0	2	**0**	0	2	**0**	0	0	**0**	**Details received**
58	TANDA-NT	1	0	**0**	0	1	**0**	0	0	**0**	0	0	**0**	
59	TATAPOWER	2	2	**100**	2	0	**100**	2	0	**100**	2	0	**100**	**DR, EL & Tripping report need to be submitted**
60	UNCHAHAR-NT	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
Total in NR Region		**985**	**112**	**11**	**224**	**156**	**27**	**230**	**157**	**28**	**267**	**28**	**28**	

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

S. No.	Name of the Generatng Station (Capacity in MW)	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/NRPC (Yes/ No)	Remarks (if any)	Tentative schedule for PSS tuning / re-tuning
1	**THDC**					
	TEHRI HPS(4 * 250)	15.12.2021 to 20.12.2021	15.12.2021 to 20.12.2021	Yes	(Report shared vide email dt.19.01.2019)	
	KOTESHWAR HPS(4 * 100)	17/03/2019 to 19/03/2019	17/03/2019 to 19/03/2019	Yes	(Report shared vide email dt.11.02.2021)	
2	**SJVNL**					
	NATHPA-JHAKRI HPS(Unit1 #250)	10.03.2020	-	No	Excitation system upgraded in 2020	
	NATHPA-JHAKRI HPS(Unit2 #250)	14.03.2013	-	No	The upgradation of old excitation system of Unit No.#2&4 will be carried out during Annual Plant Maintenance of FY 20222-23, therefore PSS tuning shall be carried out at the time of upgradation of unit. It is also submitted that step response test of other Units shall also be carried out during upgradation work of Unit # 2 &4 by the OEM, being a system and software specific job.	
	NATHPA-JHAKRI HPS(Unit3 #250)	03.03.2020	-	No	Excitation system upgraded in 2020	
	NATHPA-JHAKRI HPS(Unit4 #250)	14.03.2013	-	NO	The upgradation of old excitation system of Unit No.#2&4 will be carried out during Annual Plant Maintenance of FY 20222-23, therefore PSS tuning shall be carried out at the time of upgradation of unit. It is also submitted that step response test of other Units shall also be carried out during upgradation work of Unit # 2 &4 by the OEM, being a system and software specific job.	
	NATHPA-JHAKRI HPS(Unit5 #250)	14.05.2016	14.05.2016	NO	Excitation system upgraded in 2013	
	NATHPA-JHAKRI HPS(Unit6 #250)	14.05.2017	14.05.2017	NO	Excitation system upgraded in 2013	
	RAMPUR HEP(6 * 68.67)	29.11.2014	27.10.2020,10.02.2021	YES	PSS Response and Step Test response was checked in February, 2021 by Rampur HPS and report of the same was submitted to NRLDC. Now the work of PSS tuning and step response testing has been awarded to BHEL, Bengaluru. Testing shall be carried out in November, 2022.	
3	**HVPNL**					
	PANIPAT TPS(unit1# 250)	29.03.2016	29.03.2016	YES	--	
	PANIPAT TPS(unit2# 250)	15.01.2018	15.01.2018	YES	--	
	DCRTPP (YAMUNA NAGAR)(unit1#300)	19-12-2018	19-12-2018	YES	(Report attached)	
	DCRTPP (YAMUNA NAGAR)(unit1#300)	Will be carried out shortly				
	RGTPP(KHEDAR) (2*600)	5th to 6th July 2013	5th to 6th July 2013	Report attached. Previous record being looked into	No MW capacity addition after 2013 at RGTPP Khedar. No new line addition in vicinity of station	
	JHAJJAR(CLP) (2*660)	20-05-2017	20-05-2017	YES	--	
4	**NTPC**					
	Rihand (Unit1#500)	03-03-2017	03-03-2017	YES	Next test will be done during re-commissioning of unit after O/H	
	Rihand (Unit2#500)	02-07-2016	02-07-2016	YES	Next test will be done during re-commissioning of unit after O/H	
	Rihand (Unit3#500)	15-08-2015	15-08-2015	YES	Next test will be done during re-commissioning of unit after O/H	
	Rihand (Unit4#500)	25-05-2017	25-05-2017	YES	Next test will be done during re-commissioning of unit after O/H	
	Rihand (Unit4#500)	11-12-2014	11-12-2014	YES	Next test will be done during re-commissioning of unit after O/H	
	Rihand (Unit5#500)	11-12-2014	11-12-2014	YES	Next test will be done during re-commissioning of unit after O/H	
	SINGRAULI STPS(Unit1#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit2#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit3#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit4#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit5#200)	-	-	-	Not done in last three years	
	SINGRAULI STPS(Unit6#500)	02.05.2018	02.05.2018	NO	--	
	SINGRAULI STPS(Unit7#500)	15.07.2018	15.07.2018	NO	--	

	UNCHAHAR I(2 * 210)	29-03-2016	29-03-2016	YES	--	
	UNCHAHAR II TPS(unit1# 210)	13-07-2019	13-07-2019	YES	--	
	UNCHAHAR II TPS(unit2# 210)	10-08-2018	10-08-2018	YES	--	
	UNCHAHAR UNIT6#500	-	31.03.2017	YES	--	
	KOLDAM HPS(4 * 200)	01-07-2015	01-07-2015	YES	--	
	DADRI GPS(2 * 154.51) (ST-Steam Turbine)	-	18-11-2015	YES	Next test will be done during re-commissioning of unit after O/H	
	DADRI GPS(2 * 154.51) (GT-Steam Turbine)	2017-18	2017 & 2018	YES	Next test will be done during re-commissioning of unit after O/H	
	ANTA GPS GT-1 (88.71)(GT- Gas Turbine)	10-10-2021	10-10-2021	YES		
	ANTA GPS GT-2 (88.71)(GT- Gas Turbine)	10-10-2021	10-10-2021	YES		
	ANTA GPS GT-3 (88.71)(GT- Gas Turbine)	08-08-2014	08-08-2014	YES	Next test will be done when Station will get opprtunity to have shcedule to run on full load.	
	ANTA GPS(1 * 153.2)(ST- Steam Turbine)	08-08-2014	08-08-2014	YES	Next test will be done when Station will get opprtunity to have shcedule to run on full load.	
5	**Aravali Power Company Private Ltd**					
	ISTPP (JHAJJAR)(3 * 500)	-	25-08-2015	YES	--	
6	**NHPC**					
	CHAMERA HPS (3*180)	06-08-2020	27-12-2019	YES	--	
	CHAMERA II HPS(3 * 100)	11-10-2015	11-10-2015	NO	Replacement of Excitation system in two units	
	CHAMERA III HPS(Unit1#77)	29-10-2015	07-01-2012	YES	--	
	CHAMERA III HPS(Unit2,3#77)	29-10-2015	19-06-2012	YES	--	
	PARBATI III HEP (Unit1# 130)	21-01-2016	21-01-2016	YES	Have been done recetly. The report on PSS turning shall be submitted seperately.	
	DULHASTI HPS(Unit2#130)	21-01-2020	21-01-2020	YES	--	
	DULHASTI HPS(Unit1#130)	29-12-2019	29-12-2019	YES	--	
	URI HPS(Unit3# 120)	10-01-2021	10-01-2021	YES	--	
	URI HPS(Unit4# 120)	15-02-2021	15-02-2021	YES	--	
	URI HPS(Unit2# 120)	07-03-2016	07-03-2016	YES	--	
	URI-II HPS(4 * 60)	Mar-14	Mar-14		2021-22	
	SALAL HPS (Unit-3,4,5,6 # 115)	16-12-2014	16-12-2014	YES	--	
	KISHANGANGA(3 * 110)	18-05-20 18	18-05-20 18	YES	--	
	BAIRASIUL HPS(3 * 60)	30-07-2015	30-07-2016	YES	--	
	SEWA-II HPS(3 * 40)	09-07-2016	09-07-2016	YES	--	
	PARBATI III HEP(4 * 130)	16-12-2016	16-12-2016	YES	--	
	TANAKPUR HPS(Unit1# 31.42)	09-01-2015	09-01-2015	YES	--	
	TANAKPUR HPS(Unit2,3#31.4)	24-05-2014	24-05-2014	YES	--	
	DHAULIGANGA HPS(Unit1 ,2# 70)	04-05-2014	17-04-2018	YES	--	
	DHAULIGANGA HPS(Unit3,4# 70)	26-06-2014	17-04-2018	YES	--	
7	**PUNJAB**					
	RAJPURA(NPL) TPS(2 * 700)	22-04-2014	22-04-2014	YES	--	
8	**Rajasthan**					
	KAWAI TPS(Unt1# 660)	03-02-2023	03-02-2023	YES	--	
	KAWAI TPS(Unt2# 660)	03-02-2023	03-02-2023	YES	--	
	CHHABRA TPS(Unit 1#250)	28-02-2023	28-02-2023	NO	--	
	CHHABRA TPS(Unit 2,3,4#250)	28-02-2023	28-02-2023	NO	--	
	CHHABRA TPS(Unit5# 660)	10-02-2016	10-02-2016	YES	--	
	CHHABRA TPS(Unit6# 660)	7/28/2018	7/28/2018	YES	--	
	KALISINDH TPS(Unit1# 600)	03-02-2023	03-02-2023	YES	--	
	KALISINDH TPS(Unit2# 600)	03-02-2023	03-02-2023	YES	--	
	KOTA TPS(Unit1#110)	PSS tuning and step response test of Unit#1,2,3,4,6&7 conducted sucessfully during 02.03.22 to 04.03.22		YES		
	KOTA TPS(Unit2#110)				--	
	KOTA TPS(Unit3#195)				--	
	KOTA TPS(Unit4#195)				--	
	KOTA TPS(Unit6#110)				--	
	KOTA TPS(Unit7#110)				--	
	SURATGARH TPS (Unit5#250)	14-03-2022	14-03-2022	Yes	--	
	SURATGARH TPS (Unit2,4#250)	06-06-2022		Yes	--	
	SURATGARH TPS (Unit1,3,,6#250)	05.02.22 & 06.02.22		Yes	--	
	SURATGARH SSCTPS (Unit 7&8)	PSS tuning and step response test of Unit#7&8 were carried out on 28.11.20 & 30.03.21.				
	RAJWEST (IPP) LTPS(Unit1# 135)	26-04-2016	26-04-2016	No	--	
	RAJWEST (IPP) LTPS(Unit2# 135)	14-07-2016	14-07-2016	No	--	
	RAJWEST (IPP) LTPS(Unit3# 135)	03-01-2014	03-01-2014	No	--	
	RAJWEST (IPP) LTPS(Unit4# 135)	03-11-2015	03-11-2015	No	--	
	RAJWEST (IPP) LTPS(Unit5# 135)	21-09-2014	21-09-2014	No	--	
	RAJWEST (IPP) LTPS(Unit6# 135)	14-08-2014	14-08-2014	No	--	
	RAJWEST (IPP) LTPS(Unit7# 135)	20-02-2016	20-02-2016	No	--	
	RAJWEST (IPP) LTPS(Unit8# 135)	11-06-2014	11-06-2014	No		
9	**UTTAR PRADESH**					
	ANPARA-C TPS(Unit1# 600)	22-08-2015	22-08-2015	Yes	--	

	ANPARA-C TPS(Unit2# 600)	08-03-2016	08-03-2016	Yes	--	
	ROSA TPS(Unit1 #300)	05-10-2021	05-10-2021	Yes	--	
	ROSA TPS(Unit2# 300)	15-01-2022	15-01-2022	Yes	--	
	ROSA TPS(Unit3 # 300)	03-02-2017	03-02-2017	Yes	--	
	ROSA TPS(Unit4# 300)	05-10-2021	05-10-2021	Yes	--	
	Anpara-A (Unit1#210)	27.09.2021	27.09.2021	Yes	--	
	Anpara-A(Unit2#210)	27.09.2021	27.09.2021	Yes	--	
	Anpara-A(Unit3#210)	25.09.2020	25.09.2020	Yes	--	
	Anpara-B(Unit4#500)	07.12.2014	07.12.2014	Yes		
	Anpara-B (Unit5#500)	17.08.2014	Dec., 2019	Yes	--	
	Anpara-D(Unit6#500)	15.11.2016	15.11.2016	No	--	
	Anpara-D (Unit7#500)	15.04.2017	15.04.2017	No	--	
	Obra-B(Unit9#200)	22.03.2016	22.03.2016	Yes	Report enclosed.	
	Obra-B(Unit10#200)	28.06.2016	20.06.2016	Yes	Report enclosed.	
	Obra-B (Unit11#200)	21.01.2017	21.01.2017	Yes	Report enclosed.	
	Obra-B (Unit12#200)	Unit taken on load after R&M on 22		-	PSS tuning and SRT scheduled in April, 2021.	
	Obra-B(Unit13#200)	Unit closed under R&M.		-	PSS tuning and SRT scheduled in April, 2021.	
	Parichha-B(Unit3#210)	08.01.2016	08.01.2016	Yes	--	
	Parichha-B (Unit4#210)	08.01.2016	08.01.2016	Yes	--	
	Parichha-C (Unit5#250)	08.02.2020	08.02.2020	No	--	
	Parichha-C(Unit3#250)	09.01.2016	09.01.2016	No	--	
	Harduaganj (Unit8#250)	20.08.2015	20.08.2015	No	--	
	Harduaganj (Unit3#250)	13.04.2016	13.04.2016	No	--	
	Harduaganj(Unit7#105)	16.07.2021	16.07.2021	yes	--	
	Harduaganj(Unit9#250)	16.07.2021	16.07.2021	yes	--	
	LALITPUR TPS(Unit1# 660)	23.02.2022	23.02.2022	yes	--	
	LALITPUR TPS(Unit2# 660)	30.03.2021	30.03.2021	yes	--	
	LALITPUR TPS(Unit3# 660)	15.01.2022	15.01.2022	yes	--	
	ALAKNANDA HEP(Unit1# 82.5)	12.072017	12.072017	No	--	
	ALAKNANDA HEP(Unit2# 82.5)	12.072017	12.072017	No	--	
	ALAKNANDA HEP(Unit3# 82.5)	12.072017	12.072017	No	--	
	ALAKNANDA HEP(Unit4# 82.5)	12.072017	12.072017	No	--	
	MEJA TPS(Unit1#660)	16.10.2018	05.09.2017	yes	--	
	MEJA TPS(Unit2#660)	16.01.2021	18.05.2020	yes	--	
	Bara Unit#1				Step test for PSS checking was not performed since commissioning by erstwhile owner as per information available. PSS tuning along with step test will be performed in next AOH (May 2022 or planned shutdown)	
	Bara Unit#2	01.02.2022	01.02.2022	Yes		
	Bara Unit#3				Step test for PSS checking was not performed since commissioning by erstwhile owner as per information available. PSS tuning along with step test will be performed in next AOH (May 2022 or planned shutdown)	
	Vishnuprayag Unit#1	06/02/2021	06/02/2021	Submitted in the prescribed format provided by NRLDC to SE (R&A)		
	Vishnuprayag Unit#2	06/04/2021	06/04/2021			
	Vishnuprayag Unit#3	06/04/2021	06/04/2021			
	Vishnuprayag Unit#4	05/02/2021	05/02/2021			
10	**BBMB**					
	BHAKRA HPS(Unit1#108)	--	--	No	PSS is not provided ,shall be provided in ongoing RM&U	
	BHAKRA HPS(Unit1#108)	24.07.2015	24.07.2015	No	--	
	BHAKRA HPS(Unit3#126)	--	--	No	PSS is not provided ,shall be provided in ongoing RM&U	
	BHAKRA HPS(Unit4#126)	--	--	No	--	
	BHAKRA HPS(Unit5#126)	--	--	No	--	
	BHAKRA HPS(Unit6#157)	--	--	No	The original Rusian excitation system is under replacement PO issued Hence,PSS not got tuned.	
	BHAKRA HPS(Unit7#157)	--	--	No	The original Rusian excitation system is under replacement PO issued Hence,PSS not got tuned.	
	BHAKRA HPS(Unit7#157)	--	--	No	The original Rusian excitation system is under replacement PO issued Hence,PSS not got tuned.	
	BHAKRA HPS(Unit7#157)	18.02.2016	18.02.2016	No	--	
	BHAKRA HPS(Unit7#157)	18.02.2017	18.02.2017	No	--	
	DEHAR HPS(Unit#1 165)	08.08.2017	08.08.2017	No	--	
	DEHAR HPS(Unit#2 165)	08.08.2018	08.08.2018	No	--	
	DEHAR HPS(Unit#3 165)	08.08.2019	08.08.2019	No	--	
	DEHAR HPS(Unit#4 165)	02.07.2017	02.07.2017	No	--	
	DEHAR HPS(Unit#5 165)	08.08.2019	08.08.2019	No	--	
	DEHAR HPS(Unit#6 165)	02.07.2017	02.07.2017	No	--	
	PONG HPS(6 * 66)	--	--	--	PSS not provided.RM&U agenda under considration.	

Status of Bus bar protection					
Constituent Name	**Name of Station**	**Status of Bus bar protection(as reported)**	**Expected date of revival(as reported)**	**Present Status**	**Remark**
Uttarakhand	220 KV Substation, Ramnagar, Roorkee	Blocked due to more elements added at 220 KV Voltage level.			
	220 KV Sub Station, SIDCUL, Haridwar				
	220kV Jhajhra, Dehradun	Not commissioned yet			
	400KV Kashipur	Available but Non operational			
	220kv Haldwani	Not Available			
	220kv Pantnagar	Available but Non operational			
	220kV Rishikesh	Available but Non operational			
	220kV Chamba	Not commissioned yet			
Haryana	220kV S/Stn Badshahpur	Not Installed	15.01.2023		
	220kV S/Stn Sec-52A, Gurgaon	Not Installed	31.03.2023		
	220kV S/Stn Sec-1 Manesar	Installed, Non-Operational	31.01.2023		Additional 100MVA, 220/66kV TF T-4 is required to be added in the existing Bus Bar Protection scheme. Further, testing of the scheme is pending and will be done by 31.01.2023.
	220kV S/Stn Panchgaon	Not Installed	31.03.2023		The firm i.e., M/s ETA has left the work. Now the leftover work is being carried out departmentally. The matter has been taken up with the firm i.e. M/s Siemens for providing offer regarding commissioning of Bus-bar. Presently, one no. 220kV Busbar and 220kV Bus Coupler is not commissioned. So, the Bus Bar protection will be commissioned with all pending work.
	220kV S/Stn Rewari	Not Installed	31.08.2023		Estimate stands sanctioned. Bus Bar will be commissioned subject to the complete allocation of material.
	220kV S/Stn Narnaul	Not Installed	31.03.2023		Till date, busbar protection was not required as the substation is radially fed. However, a new transmission line viz. 220 kV D/C Deroli Ahir-Narnaul line is under construction on turnkey mode. Thus, the work of providing 220 kV take-in bays(02 no.) alongwith the work of providing the requisite busbar protection stands also awarded to other turnkey contractor
	220kV S/Stn Mohinder Garh	Not Installed	01.06.2023		Estimate stands sanctioned. Bus Bar will be commissioned subject to the complete allocation of material.
	220 KV S/Stn Palwal	Not Installed	30.06.2023		Earlier, the necessity of bus bar protection had not been comprehended, however, expanded transmission network with establishment of new substations/transmission elements in synchronism mode, there was call for introduction of Bus Bar Protection Scheme.
	220 KV S/Stn Rangala Rajpur	Installed but Non-Operational	31.03.2023		Defective. Work order has been issued for restoration of bus bar protection at the substation
	220 kV Unispur	Installed but Non-Operational	Mar-23		Relay Mal-functioning
	220 kV Mund	Installed but Non-Operational	Feb-23		Isolator status Ambigous
	220 kV Nissing	Installed but Non-Operational	May-23		New scheme is being installed at place of old Bus Bar Protection Scheme
	220KV Pehowa	Installed but Non-Operational	BBP will be commissioned within 2 Months after receiving of material		Old & Obsolete, Allocation of New BBP and allied Material awaited.
	220kV Kaithal	Not Installed	Within 2month After Allocation of Bus-Bar Protection Panel		
	220 KV Sonepat	Not Installed	220 KV Bus Bar Protection Scheme will be installed within a month after the availability of the necessary material required for commissioning		
	220 KV REGC, Sonepat	Not Installed	220 KV Bus Bar Protection Scheme will be installed within a month after the availability of the necessary material required for commissioning		
	220KV Jind	Installed but Non-Operational	31.01.2023		Existing Bus bar panel is of old and obsolete design. New Bus Bar protection scheme panel has been drawn from the store. New Panel will be commissioned at earliest.
	220 KV Fatehabad	Installed but Non-Operational			
	220 KV Bhuna	Installed but Non-Operational			
	220 KV Sirsa	Not Installed			
	220 KV Rania	Not Installed	31.03.2023		
	220 KV Bhiwani	Not Installed	Work likely to be completed in FY 2023- 24.		
	220kV Madanpur	Not Installed			The existing BBP was shifted to 220 kV S/Stn. Salempur. The requirement has been sent to CE/ PDF, vide this office letter no Ch-85/W-312/Vol-Vf dt- 28.12.2022
	220kV Tepla	Installed but Non-Operational			The existing BBP is out being old and obsolete. The requirement replacement of existing BBP has been sent to CE/PM, vide thjs office letter no Ch-85/W-3 12/Vol-VI dt- 28.12.2022

	220kV Rajokheri	Installed but Non-Operational			The substation is being constructed in turnkey, BBP has been installed. Commissioning is yet to be completed by me firm.
BBMB	220kV Charkhi Dadri	Installed, under commissioing yet	15.01.2023		Old high impedence Charkhi Dadri (SAS) Bus Bar Protection has been replaced with low impedence Bus Bar Protection during SAS. Testing is under process and will be Commissioned shortly
	220kV Samaypur	Installed but Non-Operational	30.04.2023		Failure of modules
	220kV Barnala	Not Installed			
	220kV Dhulkote	Not Installed			
	220kV Jagadhari	Not Installed			
	220kV Narela	Not Installed			
UP	220kV Parichha	Installed but Non-Operational	30.06.2023		Due to 10 to 15% differential current error, busbar protection was not taken in srvice, an order has been placed to M/s Tirupati Industrial Agency authorized channel partner M/s AB for rectification and of same.
	220kV Partapur	Installed but Non-Operational	Jan-23		Busbar relya configuration problem to be rectified by firm engineer
	220kV Nirpura	Installed but Non-Operational	Jan-23		Bus bar protection has been made out of service by maintenance wing due to defective module for 220kV Baraut line
	220kV IITGNL	Installed but Non-Operational	Expected to be commissioned by Apr-23		commissioning work pending
	220kV Rampur	Installed but Non-Operational			01 no. of 220kV feeder (Rampur -CB Ganj) not configured
	220kV Chandausi	Not Installed			Bus bar protection pane l not alloted
	220kV Rampur	Installed but Non-Operational			01 no. of 220kV feeder (Rampur -CB Ganj) not configured
	220kV Sec. - 148, Noida	Installed but Non-Operational	Jan-23		Communication card defective
	220kV sec. 38A, Botanicla Garde	Not Installed			Bus Bar protection panel not alloted
	220kV sec.-62, Noida	Not Installed	Feb-23		
	220kV Dadri	Not Installed	Sep-23		
	400kV S/S Agra	Installed but Non-Operational	2023		Old and out dated
	220kV S/S Bah	Not Installed			
	220kV Sirsaganj	Not Installed			
	220kV S/S Farrukhabad (New)	Not Installed			
	220kV Boner	Not Installed			
	220kV Kasganj (Soron)	Installed but Non-Operational			Error alarm in busbar
	220kV Khair	Installed but Non-Operational			New IIIrd 160MVA T/F is not configured with busbar protection
	220kV Kidwainagar	Installed but Non-Operational			
	220kV Chhata	Installed but Non-Operational			New IIIrd 160MVA T/F is not configured with busbar protection
	Harduaganj	Installed but Non-Operational	31.12.2023		Due to 4 to 7 % differential current error the busbar protection was not taken in srvice. O.E.M M/s Siemens is being pursued to rectify it.
	220kV Lalitpur	Not Installed	Apr-23		Due to non availability of pannel & cable
	220kV Sarnath	Installed but Non-Operational	Apr-23		Old & defective Electorstatic panel (ABB Make)
	220kV Sirathu, Kaushambi	Not Installed	Apr-23		Relay Panel is not availabe
	220kV substation Fatehpur	Installed but Non-Operational	Apr-23		Brekaer status not available
	220kV S/S Raja Talab	Installed but Non-Operational	Apr-23		relay defective
	220kV S/S Bhelupur	Not Installed	Apr-23		Not required due to radial substation
	20kV S/S Harahua	Installed but Non-Operational	Apr-23		Not commissioned
	220kV S/S Sahupuri	Installed but Non-Operational	Apr-23		Defective
	220kV S/S Mirzapur	Installed but Non-Operational	Apr-23		
HP	220kV Chamba	Main-2 non operational	30.04.2023		Relay faulty
	220kV MattaSidh	Installed but Non-Operational			Relay faulty
	220kV kangoo	Installed but Non-Operational			Commissioning awaited from firm
	220kV Nangal	Installed but Non-Operational	Jun-23		
	220kV Katha Baddi	Installed but Non-Operational	Jun-23		

Annexure-XI

List of trippings of 800kV HVDC Champa-Kurukshetra inter-regional link occurred since May 2023

S. No	Element Name	Outage Date	Outage Time	Reason
1	800 KV HVDC Kurukshetra(PG) Pole-2	10-May-23	22:24	Blocked due to software malfunction.
2	800 KV HVDC Kurukshetra(PG) Pole-4	10-May-23	22:24	
3	800 KV HVDC Kurukshetra(PG) Pole-3	18-May-23	00:59	Blocked due to DC line fault in DMR-II.
4	800 KV HVDC Kurukshetra(PG) Pole-1	18-May-23	00:58	External blocked due to detection of smoke from switchyard during heavy windstorm in the area.
5	800 KV HVDC Kurukshetra(PG) Pole-2	18-May-23	00:59	Blocked due to DC line fault in DMR-II.
6	800 KV HVDC Kurukshetra(PG) Pole-4	18-May-23	00:59	
7	800 KV HVDC Kurukshetra(PG) Pole-3	25-May-23	09:25	Pole-3 blocked due to DMR-2 transient fault.
8	800 KV HVDC Kurukshetra(PG) Pole-1	25-May-23	09:25	
9	800 KV HVDC Kurukshetra(PG) Pole-2	25-May-23	09:25	Pole-2 blocked by CAT B from Pole-4
10	800 KV HVDC Kurukshetra(PG) Pole-4	25-May-23	09:25	Pole-4 blocked due to issue in measurement panel DCCT.
11	800 KV HVDC Kurukshetra(PG) Pole-3	28-May-23	15:59	Block command received from Champa due to DC Filter Overload Protection
12	800 KV HVDC Kurukshetra(PG) Pole-1	28-May-23	16:00	
13	800 KV HVDC Kurukshetra(PG) Pole-2	07-June-23	21:55	Blocked due to TEED protection operated at Champa end. Contactor got burnt at Champa end.