सत्यमेव जयते

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

विषय: प्रचालन समन्वय उप-समिति की 226वीं बैठक की कार्यसूची।

Subject: Agenda of the 226th OCC meeting.

प्रचालन समन्वय उप-समिति की **226वीं** बैठक दिनांक 16.12.2024 को 10:30 बजे से एनआरपीसी सचिवालय, कटवारिया सराय, नई दिल्ली में आयोजित की जाएगी। उक्त बैठक की कार्यसूची उत्तर क्षेत्रीय विद्युत् समिति की वेबसाइट http://164.100.60.165 पर उपलब्ध है ।

कृपया बैठक में उपस्थित होने की सुविधा प्रदान करें।

The **226th** meeting of Operation Co-ordination Sub-Committee is scheduled to be held on **16.12.2024** from **10:30 Hrs** at **NRPC Secretariat, Katwaria Saarai, New Delhi**. The agenda of this meeting has been uploaded on the NRPC web-site http://164.100.60.165.

Kindly make it convenient to attend the meeting.

Signed by Dharmendra Kumar Meena
Date: 11-12-2024 18:30:21

(डी. के. मीना)
निदेशक (प्रचालन)

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

List of addressee (via mail)

OCC Members for FY 2024-25			
S. No.	**OCC Member**	**Category**	**E-mail**
1	NLDC	National Load Despatch Centre	nomination awaited
2	NRLDC	Northern Regional Load Despatch Centre	somara.lakra@grid-india.in
3	CTUIL	Central Transmission Utility	kashish@powergrid.in
4	PGCIL	Central Government owned Transmission Company	rtamc.nr1@powergrid.in rtamcjammu@powergrid.in cpcc.nr3@powergrid.in
5	NTPC	Central Generating Company	hrastogi@ntpc.co.in
6	BBMB		powerc@bbmb.nic.in
7	THDC		ravindrasrana@thdc.co.in
8	SJVN		sjvn.cso@sjvn.nic.in
9	NHPC		surendramishra@nhpc.nic.in
10	NPCIL		df@npcil.co.in
11	Delhi SLDC	State Load Despatch Centre	gmsldc@delhisldc.org
12	Haryana SLDC		cesocomml@hvpn.org.in
13	Rajasthan SLDC		ce.ld@rvpn.co.in
14	Uttar Pradesh SLDC		cepso@upsldc.org
15	Uttarakhand SLDC		se_sldc@ptcul.org
16	Punjab SLDC		ce-sldc@pstcl.org
17	Himachal Pradesh SLDC		cehpsldc@gmail.com
18	DTL	State Transmission Utility	bl.gujar@dtl.gov.in
19	HVPNL		cetspkl@hvpn.org.in
20	RRVPNL		ce.ppm@rvpn.co.in
21	UPPTCL		smart.saxena@gmail.com
22	PTCUL		ce_oandmk@ptcul.org
23	PSTCL		ce-tl@pstcl.org
24	HPPTCL		gmprojects.tcl@hpmail.in
25	IPGCL	State Generating Company	ncsharma@ipgcl-ppcl.nic.in
26	HPGCL		seom2.rgtpp@hpgcl.org.in
27	RRVUNL		ce.ppmcit@rrvun.com
28	UPRVUNL		cgm.to@uprvunl.org
29	UJVNL		gm_engg_ujvn@yahoo.co.in
30	HPPCL		gm_generation@hppcl.in
31	PSPCL	State Generating Company & State owned Distribution Company	ce-ppr@pspcl.in
32	UHBVN	State owned Distribution Company (alphabetical	nomination awaited (md@uhbvn.org.in)

33	Jodhpur Vidyut Vitran Nigam Ltd.	rotaional basis/nominated by state govt.)	addlcehqjdvvnl@gmail.com
34	Paschimanchal Vidyut Vitaran Nigam Ltd.		nomination awaited (md@pvvnl.org)
35	UPCL		cgmupcl@yahoo.com
36	HPSEB		cesysophpsebl@gmail.com
37	Prayagraj Power Generation Co. Ltd.	IPP having more than 1000 MW installed capacity	sanjay.bhargava@tatapower.com
38	Aravali Power Company Pvt. Ltd		amit.hooda01@gmail.com
39	Apraave Energy Ltd.,		rajneesh.setia@apraava.com
40	Talwandi Sabo Power Ltd.		ravinder.thakur@vedanta.co.in
41	Nabha Power Limited		Durvesh.Yadav@larsentoubro.com
42	MEIL Anpara Energy Limited		arun.tholia@meilanparapower.com
43	Rosa Power Supply Company Ltd		Suvendu.Dey@relianceada.com
44	Lalitpur Power Generation Company Ltd		avinashkumar.ltp@lpgcl.com
45	MEJA Urja Nigam Ltd.		rsjuneja@ntpc.co.in
46	Adani Power Rajasthan Limited		manoj.taunk@adani.com
47	JSW Energy Ltd. (KWHEP)		roshan.zipta@jsw.in
48	TATA POWER RENEWABLE	IPP having less than 1000 MW installed capacity (alphabetical rotational basis)	nomination awaited (dhmahabale@tatapower.com)
49	UT of J&K	From each of the Union Territories in the region, a representative nominated by the administration of the Union Territory concerned out of the entities engaged in generation/ transmission/ distribution of electricity in the Union Territory.	sojpdd@gmail.com
50	UT of Ladakh		cepdladakh@gmail.com
51	UT of Chandigarh		elop2-chd@nic.in
52	Noida Power Company limited	Private Distribution Company in region (alphabetical rotational basis)	nomination awaited (ssrivastava@noidapower.com)
53	Fatehgarh Bhadla Transmission Limited	Private transmission licensee (nominated by central govt.)	nomination awaited (nitesh.ranjan@adani.com)
54	NTPC Vidyut Vyapar Nigam Ltd.	Electricity Trader (nominated by central govt.)	nomination awaited (ceonvvn@ntpc.co.in)

Contents

खण्ड-क: उ.क्षे.वि.स. Part-A: NRPC

A.1. Confirmation of Minutes

225th OCC meeting was held on 12.11.2024. Minutes of the meeting were issued vide letter dt. 23.11.2024. No comments received till now.

Decision required from Forum:

Forum may approve the minutes of 225th OCC meeting.

A.2. Status of action taken on decisions of 225th OCC meeting of NRPC

A.2.1. Status of action taken on decisions of 225th NRPC meeting is attached as **Annexure- A.0**.

A.3. Review of Grid operations

A.3.1. **Power Supply Position (Provisional) for November 2024**

Anticipated Power Supply Position v/s Actual Power Supply Position (Provisional) of Northern Region during the month of November-2024 is as under:

State / UT	Req. / Avl.	Energy (MU)			Peak (MW)		
		Anticipated	Actual	% Variation	Anticipated	Actual	% Variation
CHANDIGARH	(Avl)	110	109	-1.1%	310	221	-28.7%
	(Req)	118	109	-7.8%	302	221	-26.8%
DELHI	(Avl)	3179	2241	-29.5%	4882	4259	-12.8%
	(Req)	2150	2241	4.3%	4400	4259	-3.2%
HARYANA	(Avl)	6126	4341	-29.1%	8526	7848	-8.0%
	(Req)	4105	4342	5.8%	7973	7848	-1.6%
HIMACHAL PRADESH	(Avl)	1012	1016	0.4%	1930	2107	9.2%
	(Req)	1070	1020	-4.7%	2036	2107	3.5%
J&K and LADAKH	(Avl)	1140	1638	43.7%	3000	2836	-5.5%
	(Req)	1832	1643	-10.3%	3431	2836	-17.3%
PUNJAB	(Avl)	5960	4239	-28.9%	10480	8962	-14.5%
	(Req)	4310	4239	-1.7%	8006	8962	11.9%
RAJASTHAN	(Avl)	8110	9609	18.5%	17270	17434	0.9%
	(Req)	9600	9609	0.1%	17238	17434	1.1%
UTTAR PRADESH	(Avl)	9750	10466	7.3%	19800	19929	0.7%
	(Req	9600	10467	9.0%	19800	19929	0.7%

	)						
UTTARAKHAND	(Avl)	1200	1167	-2.8%	2200	2249	2.2%
	(Req)	1230	1167	-5.1%	2250	2249	0.0%
NORTHERN REGION	(Avl)	36587	34826	-4.8%	72200	61000	-15.5%
	(Req)	34015	34836	2.4%	59500	61000	2.5%

As per above, negative / significant variation (≥5%) in Actual Power Supply Position (Provisional) vis-à-vis Anticipated figures is observed for the month of November-2024 in terms of Energy Requirement for Chandigarh, Haryana, HP, UTs of J&K and Ladakh, Punjab, UP and Uttarakhand and in terms of Peak Demand similar variation is noted for Chandigarh, Delhi, Haryana, UTs of J&K and Ladakh, Punjab, and Uttarakhand. 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.

A.4. Maintenance Programme of Generating Units and Transmission Lines

A.4.1. Maintenance Programme for Generating Units

The meeting on proposed maintenance programme for Generating Units for the month of January-2025 is scheduled on 13-December-2024 via Video Conferencing.

A.4.2. Outage Programme for Transmission Elements

The meeting on proposed outage programme of Transmission elements for the month of January-2025 is scheduled on 13-December-2024 via Video conferencing.

A.5. Planning of Grid Operation

A.5.1. Anticipated Power Supply Position in Northern Region for January 2025

The Anticipated Power Supply Position in Northern Region for January 2025 is as under:

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	120	300	No Revision submitted
	Requirement	164	314	
	Surplus / Shortfall	-44	-14	
	% Surplus / Shortfall	-26.8%	-4.6%	

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Availability	3260	6170	
DELHI	Requirement	2561	5814	No Revision submitted
	Surplus / Shortfall	699	356	
	% Surplus / Shortfall	27.3%	6.1%	
HARYANA	Availability	5850	10610	No Revision submitted
	Requirement	4040	9353	
	Surplus / Shortfall	1810	1257	
	% Surplus / Shortfall	44.8%	13.4%	
HIMACHAL PRADESH	Availability	1221	2150	10-Dec-24
	Requirement	1251	2268	
	Surplus / Shortfall	-29	-118	
	% Surplus / Shortfall	-2.4%	-5.2%	
J&K and LADAKH	Availability	1230	3130	No Revision submitted
	Requirement	2240	3455	
	Surplus / Shortfall	-1010	-325	
	% Surplus / Shortfall	-45.1%	-9.4%	
PUNJAB	Availability	6200	10840	No Revision submitted
	Requirement	5142	10026	
	Surplus / Shortfall	1058	814	
	% Surplus / Shortfall	20.6%	8.1%	
RAJASTHAN	Availability	8480	17790	No Revision submitted
	Requirement	11292	18972	
	Surplus / Shortfall	-2812	-1182	
	% Surplus / Shortfall	-24.9%	-6.2%	
UTTAR PRADESH	Availability	12400	23800	10-Dec-24
	Requirement	12059	23800	
	Surplus / Shortfall	341	0	
	% Surplus / Shortfall	2.8%	0.0%	
UTTARAKHAND	Availability	1426	2550	05-Dec-24
	Requirement	1442	2600	
	Surplus / Shortfall	-16	-50	
	% Surplus / Shortfall	-1.1%	-1.9%	

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Availability	40187	72500	
NORTHERN REGION	Requirement	40190	71800	
	Surplus / Shortfall	-3	700	
	% Surplus / Shortfall	0.0%	1.0%	

SLDCs are requested to update the anticipated power supply position of their respective state / UT for the month of January-2025 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.

A.6. 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.

A.7. NR Islanding scheme

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

Members may kindly deliberate.

A.8. Coal Supply Position of Thermal Plants in Northern Region

A.8.1In 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.

A.8.2 Accordingly, coal stock position of generating stations in northern region during current month (till 08th December 2024) is as follows:

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd (Days)	Actual Stock (Days)
ANPARA C TPS	1200	0.76	15	12.0
ANPARA TPS	2630	0.39	15	18.9
BARKHERA TPS	90	0.01	23	20.7
DADRI (NCTPP)	1820	0.44	23	7.8
GH TPS (LEH.MOH.)	920	0.46	23	33.1
GOINDWAL SAHIB TPP	540	0.69	23	27.3
HARDUAGANJ TPS	1265	0.00	23	19.9
INDIRA GANDHI STPP	1500	0.48	23	29.8
KAWAI TPS	1320	0.75	23	19.7
KHAMBARKHERA TPS	90	0.00	23	19.3

Station	Capacity (MW)	PLF % (prev. months)	Normative Stock Reqd (Days)	Actual Stock (Days)
KOTA TPS	1240	0.67	23	20.2
KUNDARKI TPS	90	0.00	23	23.3
LALITPUR TPS	1980	0.70	23	11.3
MAHATMA GANDHI TPS	1320	0.12	23	16.8
MAQSOODPUR TPS	90	0.00	23	14.3
MEJA STPP	1320	0.66	23	15.9
OBRA TPS	1094	0.45	23	8.2
PANIPAT TPS	710	0.77	23	32.8
PARICHHA TPS	1140	0.63	23	17.1
PRAYAGRAJ TPP	1980	0.49	23	23.3
RAJIV GANDHI TPS	1200	0.51	23	32.2
RAJPURA TPP	1400	0.70	23	24.9
RIHAND STPS	3000	0.82	15	13.0
ROPAR TPS	840	0.55	23	41.7
ROSA TPP Ph-I	1200	0.48	23	22.7
SINGRAULI STPS	2000	0.82	15	13.5
SURATGARH TPS	1500	0.43	23	12.2
TALWANDI SABO TPP	1980	0.40	23	8.4
TANDA TPS	1760	0.26	23	18.1
UNCHAHAR TPS	1550	0.53	23	16.9
UTRAULA TPS	90	0.00	23	27.8
YAMUNA NAGAR TPS	600	0.20	23	32.5
CHHABRA-I PH-1 TPP	500	0.86	23	11.0
KALISINDH TPS	1200	0.83	23	7.2
SURATGARH STPS	1320	0.68	23	6.4
CHHABRA-I PH-2 TPP	500	0.30	23	14.4
CHHABRA-II TPP	1320	0.76	23	6.1

A.9. Updating outage Details by Generating Station/utilities (Agenda by CEA)

A.9.1. To enhance the monitoring of approved Planned Maintenance schedules, Member (GO&D), CEA has directed that actual maintenance availed against approved planned maintenance is to be updated on priority by respective RPCs regularly on monthly basis.

A.9.2. In the 221st OCC meeting of NRPC, forum asked generating stations of NR to update the status of Planned Maintenance schedules versus actual maintenance availed for the previous month before every OCC meeting and it was decided that to

enhance the monitoring of approved Planned Maintenance schedules the said agenda item shall be taken as rolling/follow-up agenda in OCC meetings.

A.9.3. In this regard, list of Planned Maintenance schedules versus actual maintenance availed for the year 2024-25 for the month of November 2024 is attached as **Annexure-A.III.**

A.9.4. In this, regard, Generating Station/utilities of NR are requested to submit each month the details of the maintenance activities that transpired against the originally planned schedule. Further, any deviations from the planned schedule shall be explained by the concerned generating entities.

Generating utilities of NR to update status.

A.10. Compliance of "Workforce adequacy guidelines for Load Despatch Centres (agenda by NRPC Sectt.)

A.10.1. NRPC Sectt. vide letter dated 02.12.2024 (copy attached as **Annexure-A.IV**) has circulated to all SLDC's of NR alongwith Joint Secretary, MoP's D.O. letter dated 25.11.2024 regarding ***"Workforce adequacy guidelines for Load Despatch Centres".*** These guidelines will serve as a benchmark for enhancing the Load Despatch Centres by ensuring that they are equipped with sufficient skilled human resources.

A.10.2. As per these guidelines, States are required to identify exiting staffing gaps within the SLDCs and to formulate a phased staffing plan to address these gaps in order to ensure smooth grid operations. These guidelines also mandate training and certification of all System Operators at SLDCs in line with the Government of India's standards.

A.10.3. In view of above, all SLDC's of NR are requested to take necessary action for compliance/implement these guidelines which will play a significant role in enhancing the operation capacity of SLDCs.

SLDC's of NR to kindly note.

A.11. Production Linked Incentive (PLI) Scheme for the goods and services related to Power Sector (Agenda by NRPC Sectt.)

A.11.1. ET&I Division CEA has sought following information

- Format (**Annexure-A.V**) for Demand projections for items / equipment to be taken up for Production Linked Incentive (PLI) for local manufacturing.
- Format (**Annexure-A.VI**) for the all the equipment/component used in the power sector (Minimum Local Content trajectory and Demand projections for Power Sector Equipment/ Components)
- Furnish details as per the format given in the excel sheet (**Annexure-A.VII**)
- (ii) Confirmation/suggestions/inputs on MLC trajectory proposed in the excel sheet (**Annexure-A.VIII**) (trajectory from existing MLC to 100%)

- Furnish list of additional items for inclusion in self-sufficiency in capacity and competitiveness as per the para 3 (a) of PPP-MII order of DPIIT dated 19th July, 2024 (**Annexure-A.IX**)

A.11.2. Concerned utilities to submit above mentioned requisite information to ce-rndcea@gov.in at the earliest.

A.12. Procurement of cold spare transformers and reactor for Northern Region (Agenda by POWERGRID)

A.12.1. The subject cited matter was also deliberated in the 225th OCC meeting of NRPC wherein forum asked *Powergrid to submit a consolidated, capacity-wise list of the total number of transformers required as spares on a regional basis. The list should include the current shortfall in ICTs, the number of ICTs allocated States/UT's of NR as regional spares, and the expected timeline for their return.*

A.12.2. In line with above directive, Powergrid has prepared a consolidated, capacity-wise list of the total number of transformers required as spares on a regional basis and details of the same are mentioned below:

Capacity wise details of transformers and reactors with spare requirement in Northern Region

Sl No	State/ UT	MVA Rating and Phase	Voltage	Total installed unit	Spare Required as per CERC report	RPC Approved Spares	Qty Proposed for procurement	Approx Cost (Rs. In Crore)	Availability of RPC Spare	Remarks
1	DELHI	3Ø-500MVA	400/220	10	1	1	0		Tughlakabad	
2	HARYANA	3Ø-500MVA	400/220	17	1	2	0		Manesar GIS & Panchkula (Given to PSTCL)	
3	PUNJAB	3Ø-500MVA	400/220	12	1	1	0		Moga	
4	RAJASTHAN	3Ø-500MVA	400/220	32	2	1	0		Jaipur South	
5	UTTAR PRADESH	3Ø-500MVA	400/220	15	1	1	0		Lucknow	
6	UTTARAKHAND	3Ø-500MVA	400/220	1	1	0	1	26.81		Required at Roor

										kee
Total for Northern Region:				**87**	**7**	**6**	**1**	**26.81**		

Sl No	State/ UT	MVA Rating and Phase	Voltage	Total installed unit	Spare Required as per CERC report	RPC Approved Spares	Qty Proposed for procurement	Approx Cost (Rs. In Crore)	Availability of RPC Spare	Remarks
1	DELHI	3Ø-315MVA	400/220	3	1	0	1	20.24		Maharanibagh/ Bawana
2	HARYANA	3Ø-315MVA	400/220	22	2	1	0		Ballabgarh (GSI)	
3	HIMACHAL PRADESH	3Ø-315MVA	400/220	3	1	0	1	20.24		Required at Nallagarh
4	JAMMU & KASHMIR	3Ø-315MVA	400/220	3	1	0	1	20.24		Required at Sambha
5	PUNJAB	3Ø-315MVA	400/220	10	1	2	0		1 under procurement in POWERGRID & Ludhiana - Given to DTL	
6	RAJASTHAN	3Ø-315MVA	400/220	18	1	1	0		Bhiwadi - Given to RVPNL	
7	UTTAR PRADESH	3Ø-315MVA	400/220	21	2	2	0		2 under procurment in POWERGRID	
8	UTTARAKHAND	3Ø-315MVA	400/220	4	1	0	1	20.24		Required at Dehradun

Total for Northern Region:	**84**	**10**	**6**	**4**	**80.96**		

Apart from the above, 03 nos. 400/220/33kV ICTs given to DTL on loan basis.

Sl No	State/ UT	MVA Rating and Phase	Voltage	Total installed unit	Spare Required as per CERC report	RPC Approved Spares	Qty Proposed for procurement	Approx Cost (Rs. In Crore)	Availability of RPC Spare	Remarks
1	UTTAR PRADESH	3Ø-200MVA	220/132	2	1	1	0		Raibareilly	
Total for Northern Region:				**2**	**1**	**1**	**0**	**0**		

Sl No	State/ UT	MVA Rating and Phase	Voltage	Total installed unit	Spare Required as per CERC report	RPC Approved Spares	Qty Proposed for procurement	Approx Cost (Rs. In Crore)	Availability of RPC Spare	Remarks
	CHANDIGARH	3Ø-160MVA	220/66	2	1	0	1	11.7		Required at Chandigarh
Total for Northern Region:				**2**	**1**	**0**	**1**	**11.7**		

Sl. No.	State	Voltage Rating	Capacity in MVAR	Total installed Unit	Spare required as per CERC Committee report	RPC Approved Spares	Qty Proposed for procurement	Approx Cost (Rs. In Crore)	Availability of RPC Spare	Remarks

1	Delhi	420 kV	125	3	1	0	1	13.00		
2	Haryana	420 kV	125	11	1	0	1	13.00		
3	HP	420 kV	125	1	1	0	1	13.00		
4	J&K	420 kV	125	2	1	0	1	13.00		
5	Punjab	420 kV	125	7	1	0	1	13.00		
6	Rajasthan	420 kV	125	12	1	0	1	13.00		
7	UP	420 kV	125	21	2	0	1	13.00		
8	Uttrakhand	420 kV	125	2	1	0	1	13.00		
Total for Northern Region:				**59**	**9**	**0**	**8**	**104**		

Sl. No.	**State**	**Voltage Rating**	**Capacity in MVAR**	**Total installed Unit**	**Spare required as per CERC Committee report**	**RPC Approved Spares**	**Qty Proposed for procurement**	**Approx Cost (Rs. In Crore)**	**Availability of RPC Spare**	**Remarks**
1	Haryana	420 kV	80	7	1	0	1	11.25		
2	HP	420 kV	80	4	1	0	1	11.25		
3	J&K	420 kV	80	2	1	0	1	11.25		
4	Punjab	420 kV	80	2	1	0	1	11.25		
5	Rajasthan	420 kV	80	7	1	0	1	11.25		
6	UP	420 kV	80	16	1	0	1	11.25		
7	Uttrakhand	420 kV	80	1	1	0	1	11.25		
Total for Northern Region:				**39**	**7**	**0**	**7**	**78.75**		

Sl. No.	**State**	**Voltage Rating**	**Capacity in MVAR**	**Total installed Unit**	**Spare required as per CERC Committee report**	**RPC Approved Spares**	**Qty Proposed for procurement**	**Approx Cost (Rs. In Cro**	**Availability of RPC Spare**	**Remarks**

								re)		
1	Haryana	420 kV	50	12	1	0	1	9.26		
2	HP	420 kV	50	4	1	0	0	0		
3	HP	420 kV	63	2	1	0	1	9.56		
4	J&K	420 kV	50	5	1	0	0	0		
5	J&K	420 kV	63	3	1	0	1	9.56		
6	Punjab	420 kV	50	8	1	0	0	0		
7	Punjab	420 kV	63	4	1	0	1	9.56		
8	Rajasthan	420 kV	50	22	2	0	0	0.00		
9	Rajasthan	420 kV	63	2	1	0	1	9.56		
10	UP	420 kV	50	36	2	0	0			
11	UP	420 kV	63	11	1	0	1	9.56		
12	Uttrakhand	420 kV	50	0	0	0	1	9.56		
Total for Northern Region:				**109**	**13**	**0**	**7**	**66.62**		

Sl. No.	**State**	**Voltage Rating**	**Capacity in MVAR**	**Total installed Unit**	**Spare required as per CERC Committee report**	**RPC Approved Spares**	**Qty Proposed for procurement**	**Approx Cost (Rs. In Crore)**	**Availability of RPC Spare**	**Remarks**
1	Haryana	220 kV	25	2	1	0	1	5.00		
2	J&K	220 kV	25	1	1	0	1	5.00		
3	LADAKH	220 kV	25	2	1	0	1	5.00		
4	Punjab	220 kV	25	3	1	0	1	5.00		
5	UP	220 kV	25	1	1	0	1	5.00		
6	Uttrakhand	220 kV	25	2	1	0	1	5.00		
Total for Northern Region:				**11**	**6**	**0**	**6**	**30**		

Special type of transformer

1	GIS Maharani Bagh	3Ø-500MVA	400/220	2	1	0	1	30		HV bushings: Oil to GIS IV Bushings: Oil to Oil
2	GIS Baghpat	3Ø-500MVA	400/220	2	1	0	1	30		

Special type of Reactors

1	GIS Manesar	420 kV	125	2	1	0	1	14.00		HV bushings: Oil to GIS
2	GIS Baghpat	420 kV	125	1	1	0	1	14.00		

A.12.3. Powergrid has requested that considering the shortages of Cold spare Transformers and lead time for procurement, procurement of Cold spare Transformers & Reactors on regional basis at cost estimate of Rs 456.84 Cr may be deliberated by forum.

Members may kindly deliberate.

A.13. Consent for complete 400 kV Bus-1 &2 shutdown at Mandola & Ballabgarh SS for replacement of damaged sections 400 kV jack buses (Agenda by POWERGRID NR-1)

A.13.1. Powergrid has intimated that In line with discussion in 224th & 225th OCC, DTL has provided consent for 400 kV Bus section-1 &2 shutdown on daily basis from 21st - 28th Dec'24 for replacement of Jack bus.

A.13.2. Further, Powergrid has mentioned that matter for shutdown of 400 kV bus sections at Ballabgarh S/S has been taken up with HVPNL/Haryana SLDC & BBMB however consent for shutdown has not been provided for Ballabgarh S/S.

A.13.3. Considering the the deterioration in jack bus conductors due to ageing and possible fallout for bus fault in critical NCR station, Powergrid has requested for consent for complete 400 kV Bus-1 &2 shutdown at Ballabgarh SS.

Members may kindly deliberate.

A.14. Replacement of 48 Volt battery bank at Kashipur (PTCUL) (Agenda by POWERGRID NR-3)

A.14.1. Powergrid NR-3 has intimated that 48 Volt Battery Bank at Kashipur (PTCUL) end has deteriorated, due to this whenever LT supply fail at Kashipur end, PLCC system becomes non-functional.

A.14.2. On date 27.06.24, due to failure of LT supply at Kashipur end PLCC system was not functional and due to the same 400 KV Bareilly-Kashipur-1 line tripped on single-phase fault as Auto-reclosure feature was blocked.

A.14.3. Vide letter dated 27.06.24 and 23.08.2024 to executive engineer Kashipur (PTCUL), POWERGRID had requested PTCUL to change 48-volt battery bank at Kashipur end.

A.14.4. Taking into consideration of above-mentioned points, Powergrid has requested forum to kindly advise PTCUL to expedite the Battery bank replacement work.

Members may kindly deliberate.

A.15. PLCC issue in 220 KV Kanpur-Mainpuri (UP) line and 220 KV Kanpur-Sikandara (UP) Line (Agenda by POWERGRID NR-3)

A.15.1. Powergrid NR-3 has mentioned that 220 KV Kanpur-Mainpuri (UP) and 220 KV Kanpur-Sikandara (UP) are the important lines in northern region. Both line PLCC belongs to UPPTCL. PLCC panel in 220 KV Kanpur-Mainpuri (UP) is out of service since long times and in 220 KV Kanpur-Sikandara(UP) PLCC Panel doesn't have provision for transfer of permissive code and direct trip code in case of line fault and bus fault.

A.15.2. Due to non-healthiness of PLCC Panel, Carrier aided distance protection of line will not be possible and will lead to mal tripping/operation of system in case of Z2 fault or bus fault at either end of line.

A.15.3. Powergrid has stated that several communications had been done vide email and vide letter dated 27.01.2022 and 27.09.2023 to executive engineer Mainpuri (UP) and Sikandara (UP), wherein it had been communicated by POWERGRID to UPPTCL that, to restore the PLCC panel as soon as possible to avoid any maloperation.

A.15.4. Taking into consideration of above-mentioned points, Powergrid has requested forum to kindly advise UPPTCL to restore PLCC panel as soon as possible, so that any mal operation must be avoided.

Members may kindly deliberate.

A.16. No load Charging Code for 220 kV Fatehpur bays under NCR Consultancy (Agenda by POWERGRID NR-3)

A.16.1. Powergrid NR-3 has mentioned that two nos. 220 kV bays were constructed by POWERGRID under North Central Railways (NCR) Consultancy at 765/400/220KV Fatehpur Substation.

A.16.2. All the work including pre-commissioning tests was completed in all respect and subsequently CEA approval for energisation has been received on date 28.03.2023.

A.16.3. NRLDC code of these bays were requested vide email dated 15.06.2023 for no load test charging. Charging code was not issued by NRLDC due to the requirement of Connection Agreement and GNA (General Network accesses) certificate.

A.16.4. North Central Railways (NCR) had applied for the same, but it was gathered from CTU that same was not granted due to non-availability of Grid Substation (GSS) & line, which are yet to be constructed by North Central Railways (NCR) at their end.

A.16.5. It has been learnt that it will take at least one more year in completion of GSS & connecting line by North Central Railways (NCR).

A.16.6. The physical completion of above bays has already been completed on 28.03.2023 and performance check of the bay equipment during warranty are pending due to pending charging of the same.

A.16.7. In view of above, Powergrid has requested forum that it may allow NRLDC to issue provisional approval for test charging, commissioning and trial operation on no load for 201 and 215 bay at Fatehpur.

Members may kindly deliberate.

A.17. Review of existing combined islanding scheme of RAPP-A and RAPP-B (Agenda by RAPS)

A.17.1. RAPS has mentioned that in view of the event of 29th March 2024, RAPP-A survived on islanding but couldn't survive for more than 20 minutes due to four long transmission lines (2 Debari and 2 Chittorgarh) remained connected to it. This possibly could have been the reason for higher 220kV bus voltage at RAPP-A end, even generator was operating on the leading MVAR.

A.17.2. NPCIL has stated that had RAPP-2 been connected to single Debari line (isolated from RAPP-B), it is presumed that RAPS-2 would have survived. This would have saved NPCIL one unit during the event and also supported grid during disturbance.

A.17.3. In view of the above, NPCIL has requested to review RAPP-A and RAPP-B islanding scheme, in terms of economic for NPCIL and grid support, which is better combined or separate islanding scheme for RAPP-A and RAPP-B.

Members may kindly deliberate.

A.18. Deployment of the OPGW Network in Powerlinks Transmission Limited (Agenda by Powerlinks Transmission Limited)

A.18.1. Powerlinks Transmission Limited carries out O&M of EHV transmission line (220kV and 400kV) having towers spread across 3 states from West Bengal to Uttar

Pradesh. In existing transmission infrastructure, appx. 90% of the transmission line does not have OPGW which can be utilized for:

i. System Integration - OPGW facilitates the integration of Supervisory Control and Data Acquisition (SCADA) systems, which are essential for real-time monitoring, automation and control of the electrical grid.
ii. High Speed communication/ Data Transmission - The optical fibers within the OPGW are used for high-speed data transmission, which supports a range of communication needs.
iii. Lightning Protection - OPGW is installed at the top of the transmission tower, where it can intercept lightning and safely divert it to the ground.

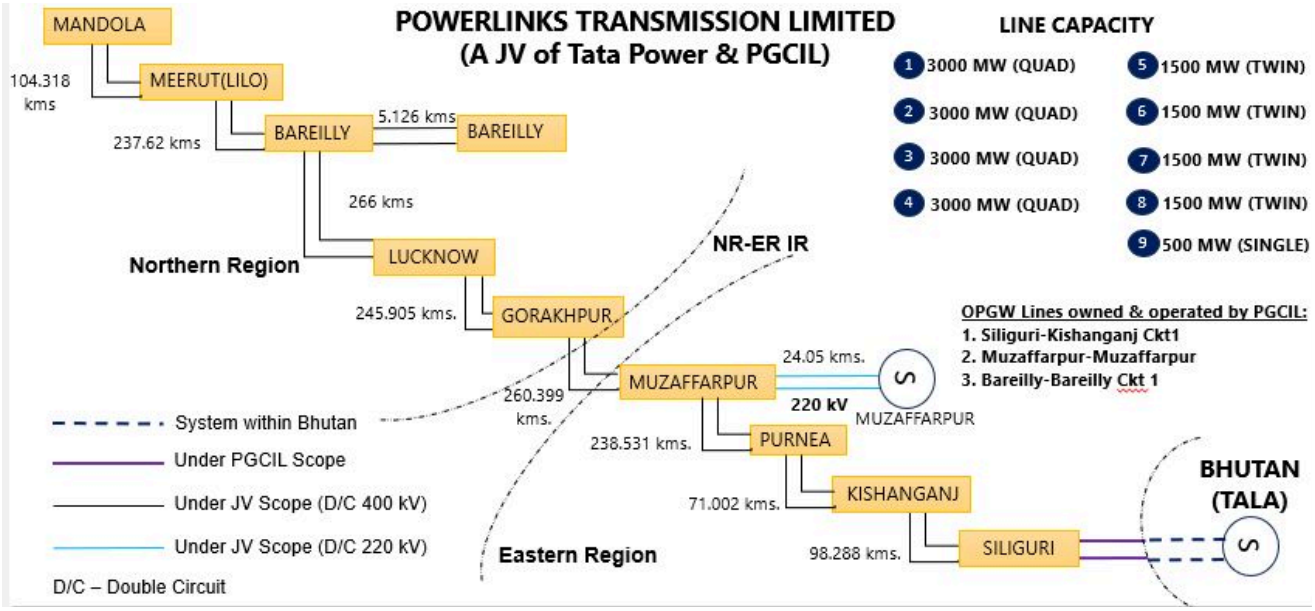
A.18.2. Also, as per the advisory by Central Electricity Authority dated 22.05.24, Central and State Sector utilities must prioritize the implementation of the OPGW laying across its transmission network to ensure compliance with regulatory requirements.

A.18.3. Hence, to optimally utilize the existing transmission assets covering three states with a significant line length and adhere to the compliance with regulatory requirements, Powerlinks Transmission Limited propose to set up OPGW network in entire line length of Powerlinks Transmission Limited.

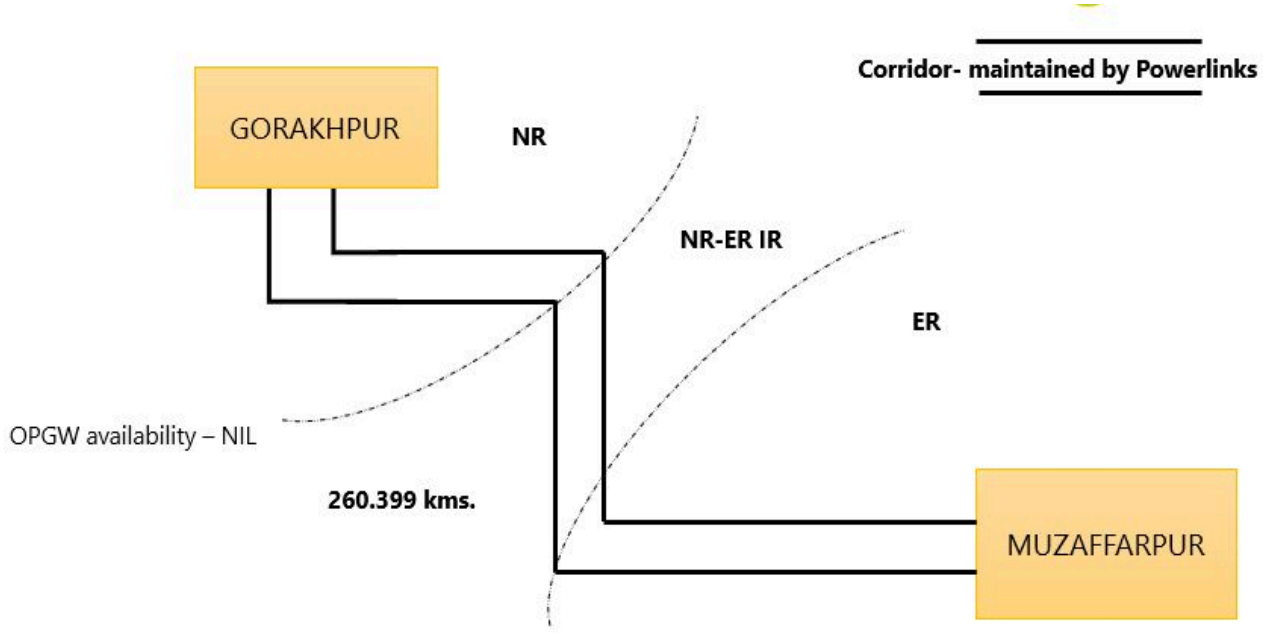
Details of transmission lines owned and maintained by Powerlinks in Northern Region

S.N.	Line name	Line Length (In KM)
1	Muzaffarpur-Gorakhpur Circuit 1	260.399
2	Gorakhpur-Lucknow Circuit 1	245.905
3	Bareilly-Lucknow Circuit 1	266
4	Bareilly-Meerut Circuit 1	237.62
5	Meerut-Mandola Circuit 1	104.318
	Total line length (kms.)	**1114.24**

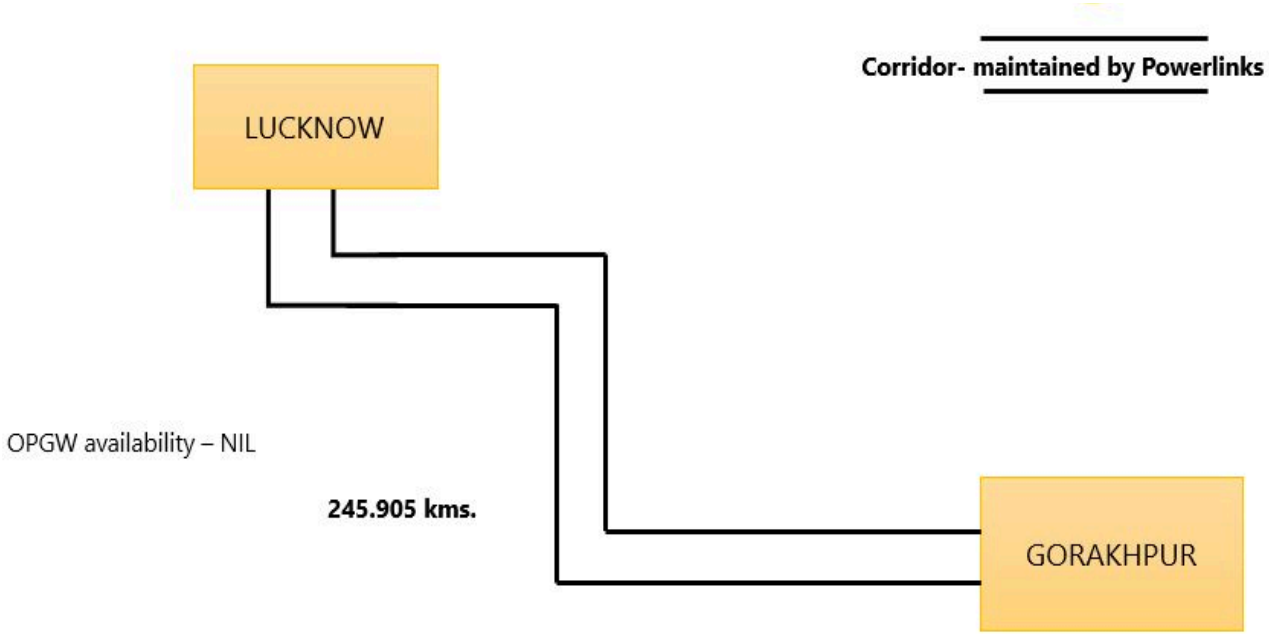
OVERVIEW



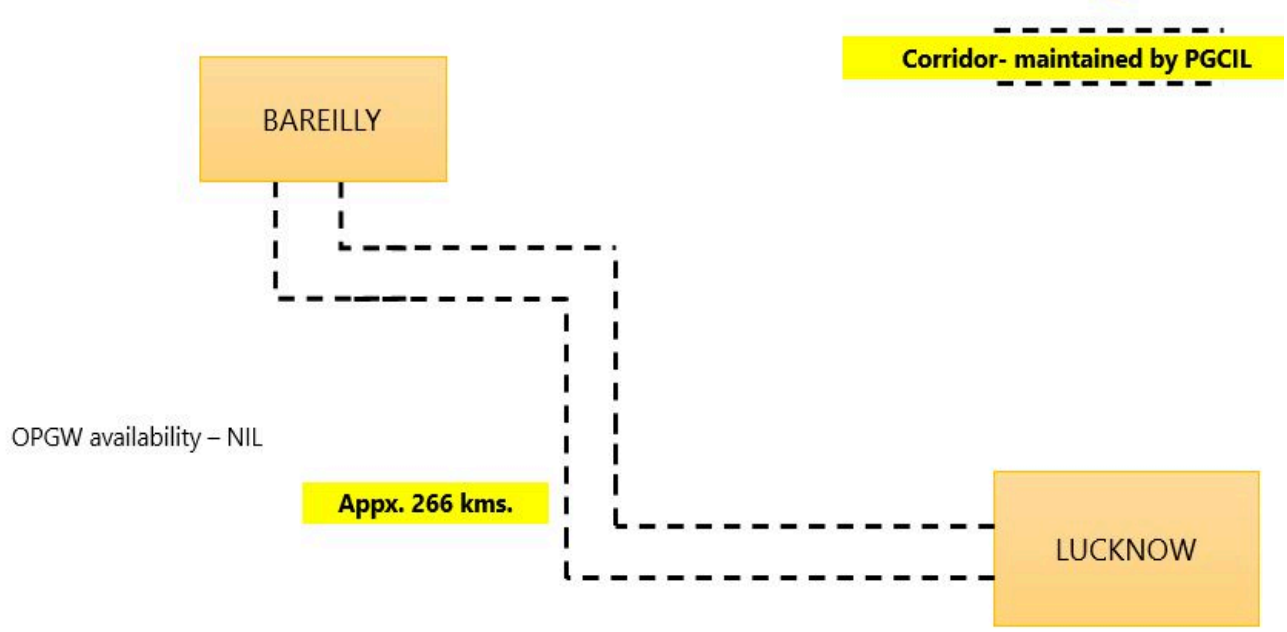
SECTION 1 (MUZAFFARPUR-GORAKHPUR)



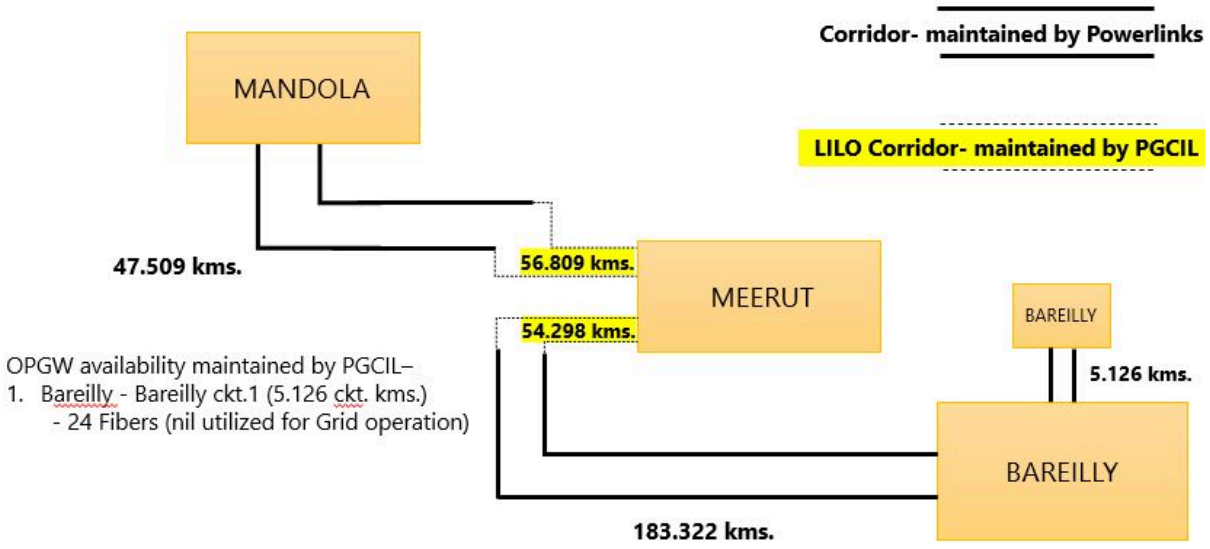
SECTION 2 (GORAKHPUR- LUCKNOW)



SECTION 3 (LUCKNOW-BAREILLY)



SECTION 4 (BAREILLY-MANDOLA)



Members may kindly deliberate.

A.19. Long outage of 400KV Baglihar-2 main Bay (Bay No 413) at Kishenpur Substation due to Oil leakage in Y-Phase CT. (Agenda by Powergrid NR-2)

A.19.1. Powergrid NR-2 has intimated that 400KV Baglihar-2 main Bay (Bay No 413) at Kishenpur Substation is out of service due to Oil leakage in Y-Phase CT since 24.10.2024 and needs to be replaced on priority. Line connected to this bay is also out of service since September '2024 due to problem in GIS Bay at Baglihar end. Another element in the Dia is 400KV Samba-1 Line and any outage of Samba main Bay will result in outage of this line also. Powergrid had written several communications to JKPDCL, but till now, no plan submitted by JKPDCL to replace the CT.

Members may kindly deliberate.

A.20. Shutdown of 220KV Kishenpur Bern 1 &2 required to complete stringing of 2nd circuit of 400kV Dulhasti Kishenpur#2 (Agenda by Powergrid NR-2)

A.20.1. Powergrid NR- 2 has intimated that the shut-down of 220kV Barn-Kishenpur D/C TL was approved in 223rd OCC w.e.f. 05.10.2024 to 19.10.2024 and was allowed for two days on alternate day basis but was denied later on 19.10.2024 as power supply to the districts of Rajouri, Poonch, Reasi and parts of Jammu city was affected.

S/D Work: Stringing work at span No 5-6 to cross 220kv Kishenpur Bern 1&2 and Kishenpur Salala 1 &2.

S/D period: Daily S/D of 14 days & 8 hours per day.

Powergrid has stated that in case S/D is not allowed, charging of 400KV Kishenpur Kishtwar (2nd circuit of Kishenpur Dulhasti #2) and 400KV Kishtwar Substation of Sterlite will be delayed.

Members may kindly deliberate.

A.21. Considering deemed availability of Outage of elements due to force majeure events beyond the control of the transmission licensee (Agenda by Powergrid NR-2)

A.21.1. Powergrid has requested for considering deemed availability of Outage of elements due to force majeure events beyond the control of the transmission licensee as per details:

- Tripping caused by lightening
- Tripping caused by loose flying objects during localised winds/storms
- Outage taken for removal of kite thread
- Outage due to Snow avalanche in snow bound areas

Members may kindly deliberate.

A.22. Generator hunting at RAPS-5 &6 dated 08/12/2024 (Agenda by NPCIL)

A.22.1. RAPS has informed that that since last one year hunting phenomena is regularly observed in the main generator of both RAPS-5 & RAPS-6. The hunting was observed in MWe and MVAR, for the duration varying from 15 min to 90min.

A.22.2. Again hunting (around 20-30MWe) was observed on 8th December 2024 around 10:30 hrs. in the main generator of both RAPS-5 & RAPS-6.

A.22.3. Regular hunting in the main generator may cause the breakdown of the generator and further unit outage, which is uneconomical for NPCIL. In addition, RAPS-7&8 COD is also expected in the new year 2025, if the phenomena continuous, it will affect the smooth operation of RAPP-7&8 also.

Members may kindly deliberate.

A.23. Tripping of Rihand Stage-3 Units, during Monopole Ground Return Mode Operation of Rihand Dadri HVDC line. (Agenda by NTPC)

A.23.1. NTPC has mentioned that the problem of abnormal noise & excessive vibrations in GTs of Rihand Stage-Ill and Vindhyachal Stage-IV during monopole operation of HVDC Rihand – Dadri link was earlier discussed, and it was decided in 45th TCC meeting (27th & 28th August 2020) and 48th NRPC Meeting (2nd September 2020) to limit HVDC line loading to 300MW during monopole ground return operation.

A.23.2. During such monopole ground return operation, Stage-3 units of 2 X 500 MW (Unit-05 & 06) tripped on 11.11.2024 at NTPC-Rihand. Rihand Unit # 5 tripped on Buchholz relay protection in GT-5Y at 01:13:27 hrs & Rihand Unit # 6 tripped in GT-6R & 6B transformers at 01:16:40 hrs. After units tripping, DC current in GT/ST neutral were found significantly high at 300 MW HVDC power flow, so same was reduced to 200 MW and finally to 100 MW as mentioned in below table to minimize the DC current.

Sr No.	Date	Unit	DC Current at 300MW HVDC flow	DC component at 200MW HVDC flow	DC component at 100MW HVDC flow
1	11.11.2024	GT-1 (400/20 kV)	16.1 Amp	9.5 Amp	0.2 Amp
2	11.11.2024	GT-2(400/20 kV)	16.3 Amp	9.6 Amp	1.6 Amp
3	11.11.2024	GT-3(400/21 kV)	15.1 Amp	8.3 Amp	0.5 Amp
4	11.11.2024	GT-4(400/21 kV)	15.0 Amp	10.0 Amp	0.6 Amp
5	11.11.2024	ST-5 (400/11/11 kV)	37.1 Amp	24.0 Amp	0.6 Amp
6	11.11.2024	ST-6 (400/11/11 kV)	37.5 Amp	24.6 Amp	0.5 Amp

A.23.3. The unwarranted unit outages, causing heavy loss of revenue to NTPC and which is having detrimental impact to the health and life of these critical & costly assets installed at Rihand.

A.23.4. In view of above NTPC has proposed to make a detailed study in respect of the following aspects:

1. Establish root causes for high DC current in flow via neutral, during monopole operation with ground return
2. Establish a safe operation procedure of HVDC system in different modes, especially with load-limiting features during monopole operation in different situations/ operations

Members may kindly deliberate.

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

B.1. NR Grid Highlights for November 2024 and demand forecasting related

Detailed presentation on grid highlights of November'2024 will be shared by NRLDC in OCC meeting.

S.No.	Constituents	Max Demand met (in MW)	Date & Time of Max Demand met	Max Consumption (in MUs)	Date of Max Consumption	Average Demand met (in Mus)
1	Chandigarh	221	05.11.24 at 18:00	4.0	06.11.24	3.6
2	Delhi	4259	08.11.24 at	82.8	08.11.24	74.8

			18:03			
3	Haryana	7848	11.11.24 at 18:30	156.0	12.11.24	144.8
4	H.P.	2107	29.11.24 at 08:15	37.7	29.11.24	33.9
5	J&K	2836	26.11.24 at 19:00	58.5	30.11.24	54.6
6	Punjab	8962	30.11.24 at 09:45	160.5	30.11.24	143.6
7	Rajasthan	17434	27.11.24 at 09:45	333.5	09.11.24	320.2
8	U.P	19929	05.11.24 at 18:29	392.7	09.11.24	349.5
9	Uttarakhand	2249	28.11.24 at 08:00	42.4	09.11.24	39.8
10	Northern Region	**61434**	29.11.24 at 10:43	**1247.9**	**09.11.24**	**1164.7**

***As per SCADA**

- In Nov'24, the Maximum energy consumption of Northern Region was **1248 MUs** on 09th Nov'24 and it was 7 % higher than Nov'23 (1165 MU 1st Nov'23)

- In Nov'24, the Average energy consumption per day of Northern Region was **1165 MUs** and it was 9.4 % higher than Nov'23 (1065 MUs/day)

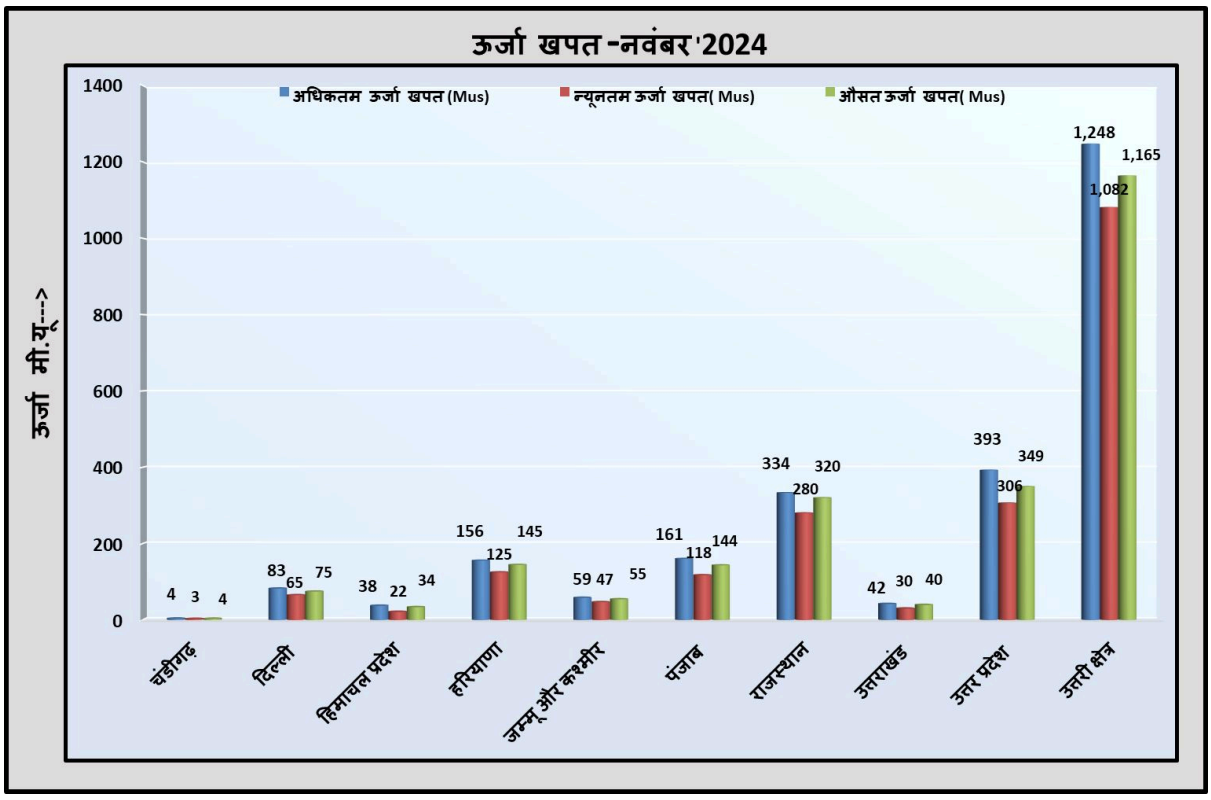
- In Nov'24, the Maximum Demand met of Northern Region was **61434 MW** on 29th Nov'24 @10:43 hours (*as per SCADA data)* as compared to 56849 MW on 8th Nov'23 @18:17hours.

Comparison of Average Energy Consumption (MUs/Day) of NR States for the Nov'23 vs Nov'24

क्षेत्र/राज्य	नवंबर- 2023	नवंबर- 2024	% अंतर
चंडीगढ़	3.4	3.6	7.1%

दिल्ली	70.5	74.8	6.1%
हिमाचल प्रदेश	32.3	33.9	5.2%
हरियाणा	131.7	144.8	9.9%
जम्मू और कश्मीर	52.3	54.6	4.5%
पंजाब	130.8	143.6	9.8%
राजस्थान	292.0	320.2	9.7%
उत्तराखंड	37.1	39.8	7.1%
उत्तर प्रदेश	314.8	349.5	11.0%
उत्तरी क्षेत्र	**1064.8**	**1164.7**	**9.4%**

Energy Consumptions

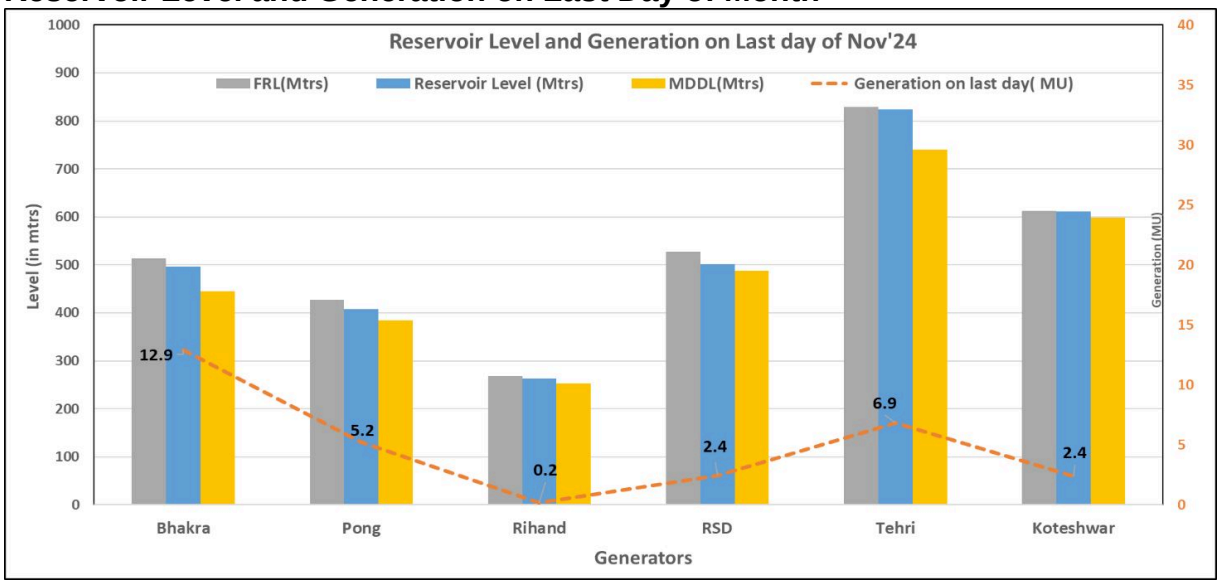


Frequency profile

Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
Nov'24	49.995	50.317 (02.11.24 at 11:04:20 hrs)	49.553 (27.11.24 at 17:18:50 hrs)	5.2	80.8	14.0

Nov'23	50.00	50.39 27.11.23 at 00:02:00 hrs	49.55 25.11.23 at 14:17:10 hrs	6.83	74.36	18.81

Reservoir Level and Generation on Last Day of Month



Reservoir Level on last day of Nov (Low: -ve) (High: +ve)

Year	Bhakra	Pong	Rihand	RSD	Tehri	Koteshwar
2024	497	408	264	502	824	611
2023	502	418	259	513	818	610
Diff (in m)	-5	-10	5	-12	6	1

B.2. Restriction on load ability of HVDC Rihand-Dadri under monopolar mode of operation

Rihand stage-III generating station (2x500 MW) is evacuated through Western Region via 400 kV Rihand stage-III- Vindhyachal PS D/C. Further, the station is disconnected from NR by keeping the bus coupler between Rihand-III and Rihand- I&II open. In order to relieve the loading of 765 kV Vindhyanchal – Varanasi D/C during peak NR import season and enhancement of NR Import TTC, the shifting of Rihand stage-III generating station (2x500 MW) to NR by closing the bus coupler between Rihand-III and Rihand-I & II and disconnecting Rihand-III from WR by opening 400 kV Rihand stage-III - Vindhyachal PS D/C as an interim measure was proposed.

Subsequently, after detailed studies at NLDC/NRLDC/WRLDC and discussions, it was proposed in the meeting chaired by MS, NRPC on 24th July 2024 that shifting of Rihand-III to NR for enhancement of WR-NR transfer capability may be carried out and the above rearrangement of Rihand-III would be reversed to the original configuration (Rihand-III back to WR) in October 2024.

Accordingly, operation circulars were issued by NRLDC/NLDC for shifting of Rihand – III units for both operations. Rihand – III units were shifted to NR on 14th August 2024 and then again shifted back to WR on 4th November 2024.

After successful changeover of Rihand-III to WR, shutdown of Rihand-Dadri HVDC was facilitated in Northern region.

During this shutdown, there was also monopolar operation of HVDC pole via ground return.

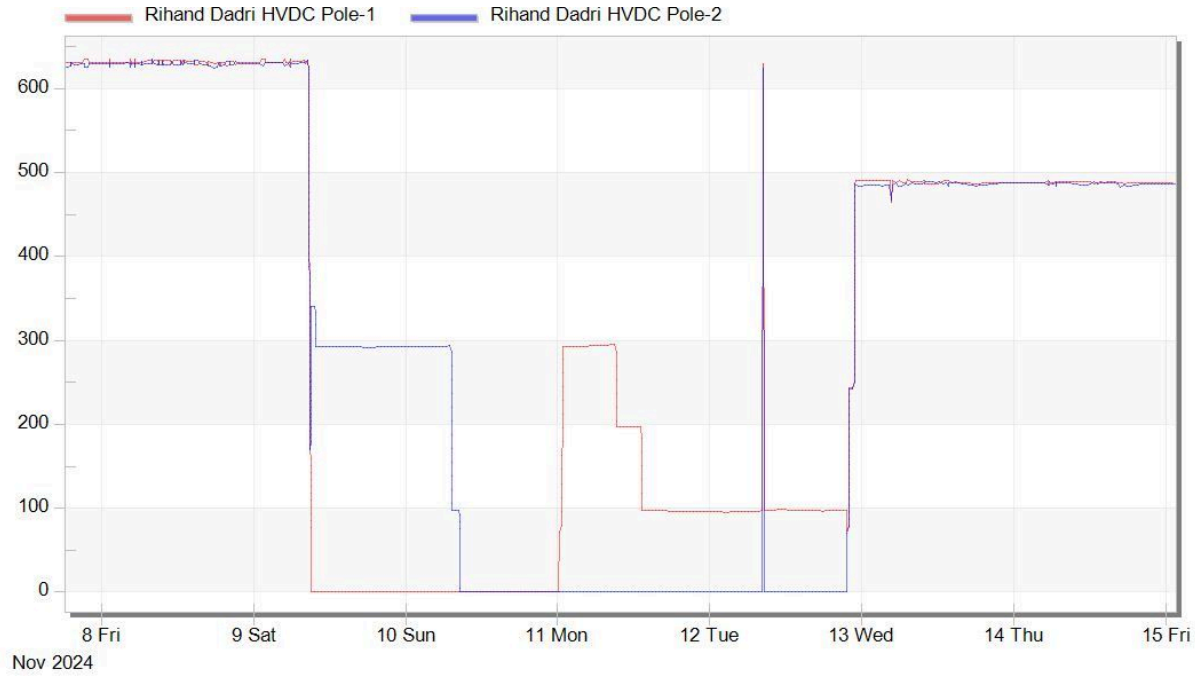
Under such operation, NTPC has reported vibrations in Rihand units and also that DC current is entering HV neutral of GTs. The DC current component in Rihand-III (Unit-5 and Unit-6) are much higher than Rihand Stage-I and Stage-II units.

Earlier, also such vibrations were observed when Rihand-Dadri was operated in monopolar mode with ground return.

To resolve this, committee was formed at NRPC level, and POWERGRID/CTUIL & NTPC were asked to take up further study and power order under monopolar mode of operation was restricted to 300MW. No vibrations were observed with power order of 300MW.

However, this time (in Nov'2024) even with 300MW and lower, power order on Rihand-Dadri pole under monopolar ground return mode of operation, vibrations were observed and Rihand-III units (Unit-5 (GT-5Y) & Unit-6 (GT-6R & 6B)) tripped on Buchholz operation on 11.11.2024 at 01:13 hrs / 01:16 hrs respectively.

Due to such vibrations, power order on Rihand-Dadri HVDC monopole had to be further reduced and it was lowered to 100MW, at which vibrations were minimal.



Extract of MoM of 45th TCC meeting (27th & 28th August 2020) & 48th NRPC Meeting (2nd September 2020) is quoted below:

"B.27.6 After deliberations, TCC recommended following:

B.27.6.1 It was decided that power flow during ground return mono polar operation may be restricted at 300 MW on automatic mode of operation rather than manual mode of operation as being followed currently to avoid damage due to excessive vibrations.

B.27.6.2 Further, it was noted that NTPC is no way responsible for excessive vibrations since flow of harmful DC current above the permissible limit in the neutral of the

surrounding transformers is due to HVDC ground return mode of operation. Therefore, it was decided that CTU in consultation with NTPC will examine the issue in details and come out with a solution for discussions in OCC.

B.27.6.3 In continuation to decision in 2nd meeting of the committee constituted to look into the issue, it was decided that outage of one pole of Rihand-Dadri may be given only when both units of stage-Ill of Rihand or both units of stage-IV / stage-V of Vindhyachal are not simultaneously planned for outage so that neutral current is shared among GTs.

NRPC Deliberations

B.27.7 NRPC concurred with the deliberation of TCC and advised CTU and NTPC to jointly decide on the study to be conducted for resolving the issue of vibrations in GTs.

It is to be noted that such restriction on power order of HVDC Rihand-Dadri under monopolar mode of operation, reduce the flexibility and utility of Rihand-Dadri HVDC for power evacuation and grid management.

It is requested that the issues of vibrations in Rihand-III units under monopolar mode of operation of Rihand-Dadri HVDC is resolved at the earliest based on study by POWERGRID/CTUIL & NTPC.

NTPC may also confirm whether any vibrations were reported on 09.11.2024 when Rihand Dadri Pole-2 was under operation or such vibrations were only reported on 11.11.2024 when Rihand Dadri Pole-1 was under operation.

Members may please discuss.

B.3. Periodic testing of generators and FACTS/HVDC Devices

In 213 OCC meeting held in Nov 2024, the requirements w.r.t. periodic testing of generators and FACTS/HVDC Devices were discussed when presentation was made by Solvina team in OCC forum.

Subsequently, in 219 OCC meeting and 73 NRPC meeting held in May 2024, the agenda was again discussed. During these meetings, it was discussed that:

Regulation 40 (1) of CERC (IEGC) Regulations, 2023 stipulate that there shall be periodic tests, as required under clause (3) of this Regulation, carried out on power system elements for ascertaining the correctness of mathematical models used for simulation studies as well as ensuring desired performance during an event in the system.

The tests shall be performed once every five (5) years or whenever major retrofitting is done. If any adverse performance is observed during any grid event, then the tests shall be carried out even earlier, if advised by SLDC or RLDC or NLDC or RPC, as the case may be.

Further, Regulation 40(1)(b) stipulate that “All equipment owners shall submit a testing plan for the next year to the concerned RPC by 31st October to ensure proper coordination during testing as per the schedule. In case of any change in the schedule, the owners shall inform the concerned RPC in advance.”

Extract of IEGC 2023 clause 40,

“40. PERIODIC TESTING

(1) There shall be periodic tests, as required under clause (3) of this Regulation, carried out on power system elements for ascertaining the correctness of mathematical models used for simulation studies as well as ensuring desired performance during an event in the system.

(2) General provisions

(a) The owner of the power system element shall be responsible for carrying out tests as specified in these regulations and for submitting reports to NLDC, RLDCs, CEA and CTU for all elements and to STUs and SLDCs for intra-State elements.

(b) ***All equipment owners shall submit a testing plan for the next year to the concerned RPC by 31st October to ensure proper coordination during testing as per the schedule****. In case of any change in the schedule, the owners shall inform the concerned RPC in advance.*

(c) The tests shall be performed once every five (5) years or whenever major retrofitting is done. If any adverse performance is observed during any grid event, then the tests shall be carried out even earlier, if so advised by SLDC or RLDC or NLDC or RPC, as the case may be.

(d) The owners of the power system elements shall implement the recommendations, if any, suggested in the test reports in consultation with NLDC, RLDC, CEA, RPC and CTU.

(3) Testing requirements

The following tests shall be carried out on the respective power system elements:

TABLE 9 : TESTS REQUIRED FOR POWER SYSTEM ELEMENTS

Power System Elements	Tests	Applicability
Synchronous Generator	(1) Real and Reactive Power Capability assessment. (2) Assessment of Reactive Power Control Capability as per CEA Technical Standards for Connectivity (3) Model Validation and verification test for the complete Generator and Excitation System model including PSS. (4) Model Validation and verification of Turbine/Governor and Load Control or Active Power/ Frequency Control Functions. (5) Testing of Governor performance and Automatic Generation Control.	Individual Unit of rating 100MW and above for Coal/lignite, 50MW and above gas turbine and 25 MW and above for Hydro.
Non synchronous Generator (Solar/Wind)	(1) Real and Reactive Power Capability for Generator (2) Power Plant Controller Function Test (3) Frequency Response Test (4) Active Power Set Point change test. (5) Reactive Power (Voltage / Power Factor / Q) Set Point change test	Applicable as per CEA Technical Standards for Connectivity.
HVDC/FACTS Devices	(1) Reactive Power Controller (RPC) Capability for HVDC/FACTS (2) Filter bank adequacy assessment based on present grid condition, in consultation with NLDC. (3) Validation of response by FACTS devices as per settings.	To all ISTS HVDC as well as Intra-State HVDC/FACTS, as applicable

In accordance with above, Generators and HVDC/FACT owners were required to furnish the Testing schedule for 2024-25 by 31st October 2023. As the time has already passed, Generators and HVDC/FACT owners were supposed to furnish the Testing schedule for 2025-26 by 31st October 2024.

The procedure for testing is available at the NLDC website at https://posoco.in/wpcontent/uploads/2023/09/Final-Procedure-of-Periodic-Testing-for-Power-System-Elements-submitted-to-CERC.pdf. This may be used for testing.

Along with testing, the mathematical models (preferably PSSE models) based on the results of testing need to be provided, so that All India case can be built with the respective generic models.

As per the decision of 73 NRPC meeting, NRPC forum asked all Generators and HVDC/FACT owners to furnish the Testing schedule for 2024-25 and 2045-26 to NRPC/NRLDC at the earliest.

However, the same is still pending.

Matter was then once again discussed in 54th Protection Sub-Committee Meeting held on 25th November, 2024. During the meeting, utilities had requested that list of third party testing agencies may be provided by NRLDC/NRPC. It was discussed that as of now there is no such criteria for selection of third party for carrying out testing. However, the third party should be a certified agency.

As the testing plan is yet to be received from utilities, a google sheet has been prepared and it is requested that testing plan for 2024-25 and 2025-26 may be updated in the sheet provided at the earliest as per the requirement of IEGC 2023 and decision of 73 NRPC meeting. Google sheet link is:

https://docs.google.com/spreadsheets/d/18KTutJ66bK9LdOOhuHfzlmBeYH7_TgMs/edit?gid=849497112#gid=849497112

Members may please discuss.

B.4. Demand forecasting and resource adequacy related

Hon'ble CERC In the matter of Planning for safe, secure, and reliable integrated operation of the power system during critical periods arising on account of seasonal variations wherein the electricity demand increases rapidly by undertaking specific measures to mitigate the risks on the power system, under clause (h) of sub-section (1) of Section 79 of the Electricity Act, 2003 and the Regulation 31 of the Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023 has issued suo-motto order 9/SM/2024 dated 07.10.2024.

Commission has issued the following directions to NLDC, RLDCs, and SLDCs in connection with the implementation of Regulations 31 and 33 of the Grid Code to address the anticipated surge in demand of electricity during October 2024 on account of seasonal variations:

a) All the State Load Despatch Centres and RLDCs shall furnish the details of operational planning undertaken by them in terms of Regulation 31(4) (a) of the Grid Code especially for October 2024. RLDC shall validate the adequacy of resources in terms of Regulation 31(4)(b) of the Grid Code.

b) All State Load Despatch Centres and Regional Load Despatch Centres shall prepare the worst-case scenario due to possible surge in demand during the period 1.10.2024 to 31.10.2024 in their respective control area and submit within seven days to the Commission with a copy to National Load Despatch Centre.

c) The State Load Despatch Centres or Regional Load Despatch Centres, as the case may be, should assess their demand-generation scenario in the upcoming months, ensure the optimum generation, avoid undesirable planned outages, and advise the generating company to offer their availability. The State Load Despatch Centre or Regional Load Despatch Centre shall ensure the optimum scheduling during the shortage period and surplus power to get despatched during the deficit period.

d) The Distribution Companies, in case of a shortage scenario, can procure the power from surplus or requisitioned capacity of other states so that optimum despatch can be ensured for safe and reliable power system operations. The State Load Despatch Centre shall monitor the generation-demand deficit of the respective distribution companies.

e) The generating companies operating their plant with capacity less than its installed capacity due to technical issues, i.e., capacity under partial outage or forced outage, are advised to fix the issues to ensure the maximum generation capacity on-bar.

f) The draw schedule of the respective control area needs to adhere to prevent the reduction of system frequency. The State Load Despatch Centre or Regional Load Despatch Centre, as the case may be, shall monitor the deviation of the key system parameters.

g) The State Load Despatch Centres or Regional Load Despatch Centres, as the case may be, shall issue the system alerts to their respective grid-connected entities for the possible deficit during the likely surge in demand

The Regional Load Despatch Centres and State Load Despatch Centres shall submit the report on the implementation of the above measures, a load-generation scenario in their respective control areas, and any other measures taken to address the deficit of power supply during the period 1.10.2024 to 31.10.2024.

NLDC, RLDCs, and SLDCs were directed to submit their responses to the measures contained in para 9 of this order by 16.10.2024.

As per the information available with NRLDC, only J&K, Punjab, Rajasthan, HP & Uttarakhand have submitted their formal reply to CERC as per latest information available with NRLDC.

Whereas other states have neither submitted their response to CERC nor NRLDC with regard to order 9/SM/2024 dated 07.10.2024.

In 225 OCC meeting, NRLDC representative mentioned that:

- *As per the information available with NRLDC, only HP & Uttarakhand have submitted their formal reply to CERC.*
- *Punjab and J&K have shared some information with NRLDC, but formal communication to CERC from their side is yet to be done.*
- *Whereas other states have neither submitted their response to CERC nor NRLDC with regard to order 9/SM/2024 dated 07.10.2024.*

Delhi SLDC representative had mentioned that reply is with their legal team and would be submitted shortly to Hon'ble Commission. Punjab SLDC mentioned that nodewise data has been requested from PSPCL, after receipt of the same, official reply would be submitted to CERC. No other update could be received from SLDCs in the meeting.

Delhi, UP, Haryana and Chandigarh may provide update in this regard.

With reference to the Clause 31(2) of Central Electricity Regulatory Commission-IEGC Regulations, 2023 and the Operating Procedure of NRLDC prepared in accordance with the same, each SLDC has to furnish the demand estimation for day ahead, week ahead, month ahead (with time block wise granularity) and demand estimation for year ahead

(with hour granularity). The sub-clause 31(2) (h) of IEGC-2023 states the following timeline

for the submission of demand estimate data to RLDC.

Type of Demand Estimation	**Timeline**
Daily	10:00 hours of previous day
Weekly	First working day of previous week
Monthly	Fifth day of previous month
Yearly	30th September of previous year

Status of Day Ahead Forecasting, week ahead, month-ahead and year-ahead submission status for November-2024 as per Clause 31(4) (a) & (b) of IEGC-2023 is shown below:

Region	State	Day ahead	Weeky	Monthly	Yearly
		Data submission (Y/N)	Data submission (Y/N)	Data submission (Y/N)	Data submission (Y/N)
NR	Punjab	Y	Y	Y	N
	Haryana	Y	N	N	N
	Rajasthan	Y	N	N	N
	Delhi	Y	N	Y	Y
	UP	Y	Y	Y	Y
	Uttarakhand	Y	N	Y	N
	HP	Y	Y	Y	Y
	J&K	Y	N	N	N
	Chandigarh	Y	Y	N	N

In accordance with above, all SLDCs are requested to timely furnish the demand estimation data along with generation adequacy data as per the formats available at *https://drive.google.com/drive/folders/1KWY4G9gTBLV5wTJkhGEIeRptKP-QbhjL?usp=drive_link* to NRLDC through mail (nrldcmis@grid-india.in) and FTP as per above timeline.

The relevant clauses from IEGC 2023 related to demand forecasting exercise and resource adequacy exercise as discussed in 225 OCC meeting are enclosed in Annexure-B.I:

All SLDCs need to take actions at their end for timely submission of demand forecasting and resource adequacy data on day-ahead, week-ahead, month ahead and year ahead basis. It is also requested to share actions being taken at your end to ensure compliance of listed clauses of IEGC 2023 as Annex-B.I.

In 225 OCC meeting, it was requested that SLDCs share actions being taken at their end to ensure compliance of above listed clauses of IEGC 2023. Further, report of self-

audit carried out as per compliance of IEGC 2023 may also be submitted to NRLDC/ NRPC. All SLDCs agreed to take actions as discussed in the meeting.

SLDCs to provide update. Members may please discuss.

B.5. Status of insulator washing and replacement of porcelain insulators with polymer insulators

With low temperature across Northern region and with high humidity in the air, fog starts to appear across the Northern region. This problem is generally most severe from 15Dec- 15Feb period & more prominent in areas having high pollution. During this time, additional care need to be taken by system operator as many multiple element tripping events have been reported in the past especially in Punjab, Rajasthan, Haryana and Eastern UP. Such tripping are more severe if the lines are tripping from generation complex.

To furnish details of Progress on cleaning and replacement of porcelain insulator with polymer insulator. NRLDC has already requested vide emails dated 26.09.2024, 30.09.2024 & 07.11.2024, all transmission utilities to furnish the utility-wise latest status of the replacement of porcelain insulators with polymer insulators so that crucial lines for which such works are pending may be identified & prioritized. List is also attached as **Annexure-B.II** of agenda.

List of line that reported tripping on 4 or more instances last year during Dec-Jan months during fog-prone time of 21:00-10:00hrs along with their insulator status is shown below:

S. No.	Line Name	Tripping instances	Owner	Insulator status
1	220 KV RAPS_A(NP)-Sakatpura(RS) Ckt-2	12	RRVPNL	N/A
2	220 KV RAPS_B(NP)-Sakatpura(RS) Ckt-1	10	RRVPNL	N/A
3	220 KV RAPS_A(NP)-Sakatpura(RS) Ckt-1	9	RRVPNL	N/A
4	400 KV Agra-Unnao Ckt-1	8	UPPTCL	Partial polymer (25%)
5	220 KV Debari(RS)-RAPS_A(NP) Ckt-1	6	RRVPNL	N/A
6	220 KV Nara(UP)-Roorkee(UK) Ckt-1	5	UPPTCL	N/A
7	220 KV Ratangarh(RS)-Sikar(PG) Ckt-1	5	POWERGRID	N/A
8	220 KV Panipat(BB)-Chajpur(HV) Ckt-2	5	HVPNL	N/A
9	400 KV Muktsar-Makhu Ckt-2	5	PSTCL	Porcelain
10	400 KV Suratgarh(RVUN)-Ratangarh(RS) Ckt-1	4	RRVPNL	Porcelain
11	220 KV Shahjahanpur(PG)-Lakhimpur(Gola) Ckt-2	4	UPPTCL	N/A
12	220 KV Ratangarh(RS)-Sikar(PG) Ckt-2	4	POWERGRID	N/A
13	400 KV Shree Cement(SCL)-Kota(PG) Ckt-1	4	POWERGRID	Polymer
14	400 KV Muradnagar_2-Mathura Ckt-1	4	UPPTCL	N/A

During 225 OCC meeting, Punjab SLDC representative stated that due to smog, number of transmission lines had tripped in last one week. However, lines for which washing and cleaning was not done and had tripped recently, would be taken on priority.

NRLDC had also conducted a meeting with PSTCL representatives on 21.11.2024 to discuss preparedness measures taken by Punjab to minimise tripping of lines due to fog.

All transmission utilities are once again requested to furnish the utility-wise latest status of the replacement of porcelain insulators with polymer insulators so that crucial lines for which such works are pending may be identified & prioritized. Members may please discuss.

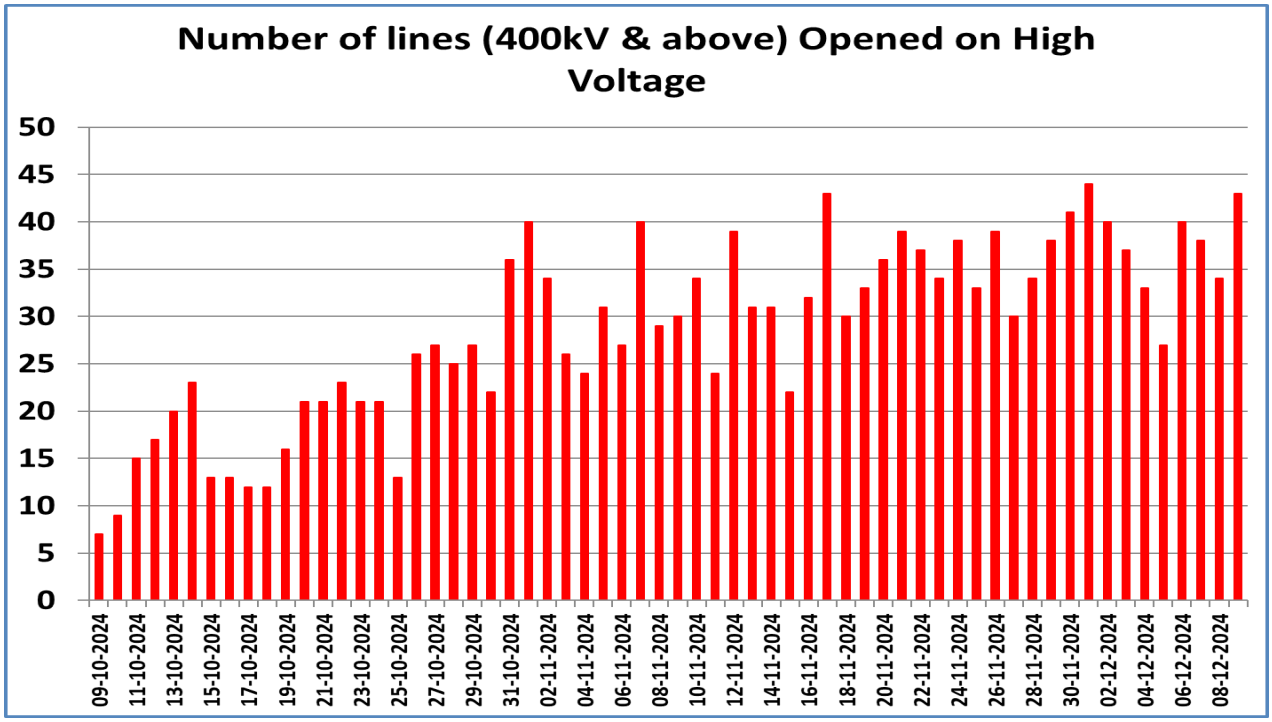
B.6. Grid operation challenges during winter 2024-25

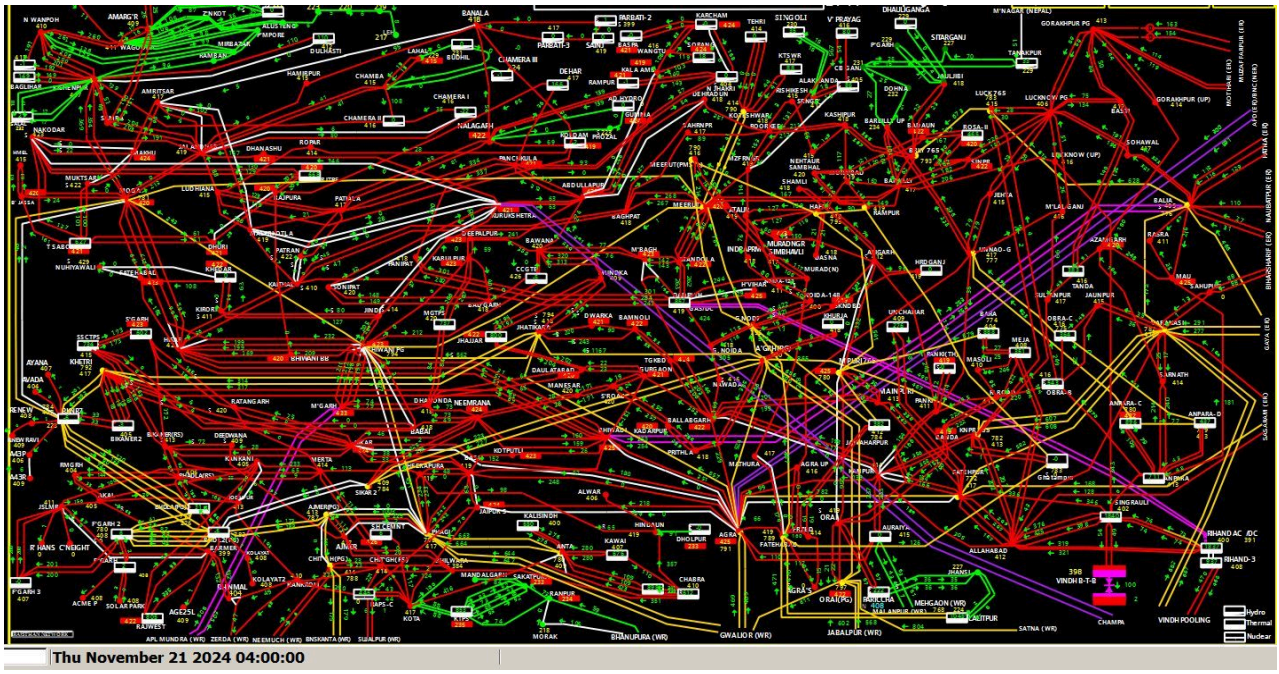
As it is well known that Northern region faces issues related to severe high voltages in the grid in winter months due to less demand as the transmission system remains lightly loaded. A number of measures are already being taken to control high voltages in the grid such as:

- Ensuring to switch off capacitors & switch on reactors.
- Ensuring healthiness of all commissioned reactors in the system
- Monitoring of reactive power through SCADA displays.
- Reactive power support (absorption) by generating stations as per the capability curve.
- Synchronous condenser operation especially of hydro units during night hours for dynamic voltage support.
- ICT Tap Optimization at 400kV & above is carried out by NRLDC.
- Utilisation of line reactors as bus reactor incase of opening of EHVAC transmission lines.
- Opening of EHV lines based on expected voltage reduction and also considering security & reliability of system

Switching of bus reactors, line reactors are done as frequently as twice in a day at same location. For instance, during peak hours, voltages being on lower side, reactors are switched off while during off peak hours, reactors are brought into relieve high voltages. Capacitors switching is done primarily at lower voltage levels. The dynamic reactive power resources like generators, SVC, STATCOM keep on changing the VAr value as per system requirement or system operator's instructions. Tap optimization is being done mainly on seasonal basis. Manual opening of high voltage line is also carried out as a last resort to alleviate alarming high voltages in the system.

Even after taking all measures it is being seen that large number of EHVAC transmission lines have to be opened to control high voltages in the grid. Number of transmission lines (400kV & above) opened to control high voltage in last 60 days as well as snapshot of high voltages in grid is shown below:





Such opening of transmission lines always increases risk of system insecurity as transmission system gets weak due to opening of transmission lines and also susceptibility of tripping of lines especially during foggy weather. As such there seems to be requirement for planning of additional reactive compensation in the grid to control high voltages at both interstate as well as intrastate level.

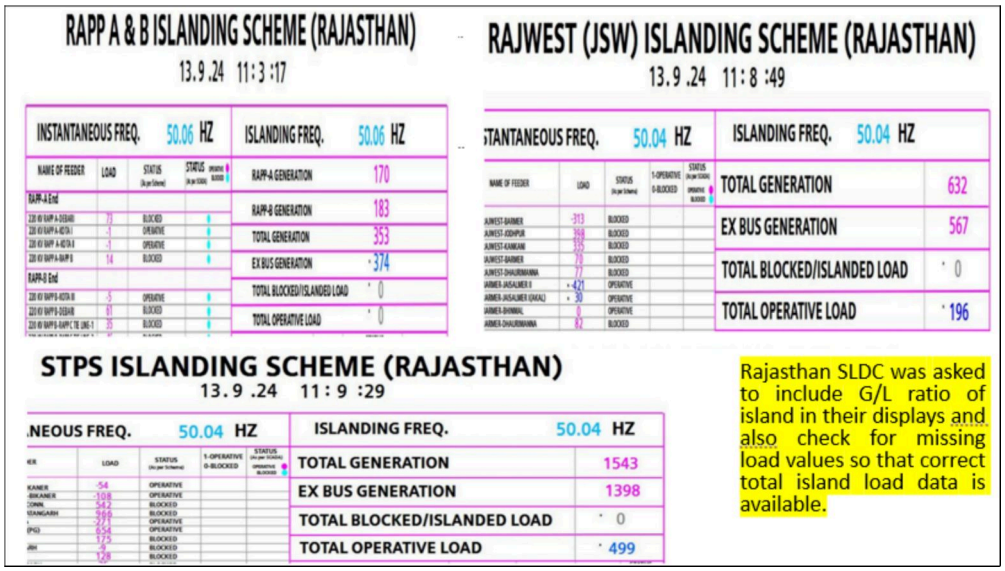
Members may please discuss.

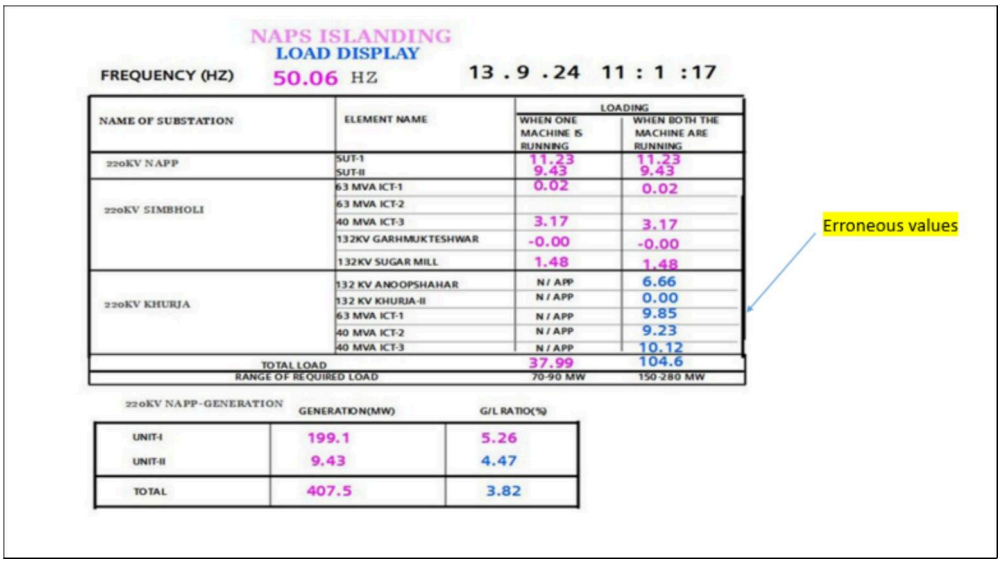
B.7. Mock testing of islanding scheme and simulation studies

Following four islanding schemes are operational in the Northern Region: NAPP Islanding Scheme (Uttar Pradesh), RAPP Islanding Scheme (Rajasthan), Bawana Islanding Scheme (Delhi), and Pathankot-RSD Islanding Scheme (Punjab). As per the SOP for mock islanding schemes approved in the recently concluded OCC 223,

SLDCs are requested to prepare and share their plans for conducting mock testing of islanding schemes in their control areas.

None of the four utilities have yet created a SCADA network map for their island areas. However, Uttar Pradesh and Rajasthan have developed SCADA displays with partial island summaries, although telemetry issues still need resolution.





During 224 OCC meeting, NRLDC representative mentioned that only the NAPS Islanding Scheme of UP has incorporated the G/L ratio in its SCADA display according to the shared format. UP representative added that due to a recent fire incident at Khurja S/S, the telemetry from the 220kV Khurja S/S is currently unavailable, and they promised to share an update on the restoration of telemetry from Khurja as soon as possible.

NRLDC representative also requested that all concerned utilities provide updated islanding base cases for different load-generation balance scenarios (Summer: Peak/Off-peak and Winter: Peak/Off-peak) along with dynamic data of the generators in the island for conducting dynamic simulation studies. He reiterated that the Islanding SCADA display should be made available at NRLDC as per the format shared in previous OCC meetings.

During 225 OCC meeting, UP, Rajasthan, Punjab and Delhi SLDC were requested to provide update.

UP SLDC representative informed that NAPS has been asked to carry out mock testing of ufr which are part of islanding scheme. After receiving testing report from NAPS, same shall be shared with OCC forum.

No other update could be received from other SLDCs.

OCC asked all SLDCs to proactively take actions as discussed in the meeting.

Further, NRLDC had also conducted an online meeting on 03.12.2024 with all relevant stakeholders from UP, Rajasthan, Delhi and Punjab regarding any issues being faced in carrying out mock testing exercise of islanding scheme.

Following updates were received in the meeting:

1. Uttar Pradesh (NAPS Islanding Scheme)
   - Field testing of relays has been completed; a detailed report will be shared by 15th December 2024.
   - PSSE basecase files will be submitted within one month.
   - NRLDC demonstrated modelling the island in PSSE using the Bawana Island example (Delhi SLDC).
2. Rajasthan (RAPS Islanding Scheme)
   - Regular UFR testing is ongoing and will extend to Islanding UFR relays.
   - A detailed report as per the SOP will be submitted by the first week of January 2025.
   - PSSE basecase files will be provided within one month.
3. Delhi (Bawana Islanding Scheme)
   - DTL will conduct field mock testing as per the SOP within one month and submit a detailed report accordingly.
   - PSSE basecase files will be shared within one month.
4. Punjab (RSD Islanding Scheme)
   - Field mock testing as per SOP will be conducted within one month, and a detailed report will follow.
   - PSSE basecase files will be submitted within one month.

UP, Rajasthan, Delhi and Punjab SLDCs are requested to provide update. Members may please discuss.

B.8. Utilisation of FSC/TCSCs installed in Northern region

From the data available in NRLDC control room, it is seen that numbers of Fixed Series Capacitors and Thyristor Controlled Series capacitors in Northern region are under long outage. The purpose of installation of these devices was to enhance the power transfer capability of transmission lines and also reduce the voltage drop across the line.

As per present status available with NRLDC, following is status of outage of FSC/TCSC in Northern region:

S.No.	Name of Transmission	COMPEN	END	Outage	REASON	Remarks

	Line	SATION		Date		
1	400 kV Unnao-Bareilly(UP) - 1	45%	Unnao	25-Oct-2024	Forced Outage	Due to capacitor unbalanced
2	400 kV Unnao-Bareilly(UP) - 2	45%	Unnao	23-Apr-2024	System Requirement	Out of service to avoid overloading on line
3	400 kV Kanpur-Ballabhgarh 2	40%	Ballabhgarh	23-Sep-2022	Forced Outage	DC earth fault in main power supply.
4	400 kV Kanpur-Ballabhgarh 3	40%	Ballabhgarh	23-Sep-2022	Forced Outage	Forced shut down taken to attend DC earth fault in ckt-2.
5	400 kV Lucknow - Gorakhpur 1	30%	Lucknow (PG)	13-Sep-2024	Low Current	Out of service due to low current and can be taken any time whenever current limit permits.
6	400 kV Lucknow - Gorakhpur 2	30%	Lucknow (PG)	09-Sep-2024		
7	400 kV Lucknow - Basti-1	30%	Lucknow (PG)	26-Sep-2024		
8	400 kV Lucknow - Basti-2	30%	Lucknow (PG)	01-Oct-2024		
9	400 kV Fatehpur-Mainpuri 1	56%	Mainpuri	24-Oct-2021	Forced Outage	BHEL breaker hydraulic pressure could not be developed in B phase and (loss of N2 pressure) doesn't allow the FSC-1 taken into service. OEM support stopped
10	400 kV Fatehpur-Mainpuri 2	56%	Mainpuri	29-Jan-2022	Forced Outage	VME protection system was blocking the FSC back in service as reported by CPCC3. OEM support stopped.
11	400 kV Meerut-Bareilly 1	30%	Bareilly (PG)	31-Mar-2023	Low Current	Out of service due to low current and can be taken any time whenever current limit permits.
12	400 kV Meerut-Bareilly 2	30%	Bareilly (PG)	23-Mar-2023		
13	765 KV	50%	Meerut	08-	Forced	B-Phase to ground

	Koteswar-Meerut-1			Jun-2023	Outage	fault occurred in the line fault. FSC1 failed
14	765 KV Koteswar-Meerut-2	50%	Meerut	18-Apr-2023	Forced Outage	Capacitor bank current disbalance protection acted
15	400 kV Sorang – Kalaamb	40%	Kalaamb	26-Sep-2022	Forced Outage	Unbalance Current in B-phase

To address these challenges of under-utilisation of TCSC/FSC, following are proposed for necessary action:

- Conduct a detailed technical evaluation of the out-of-service FSCs/TCSCs to determine the feasibility of their restoration.
- Explore the possibility of relocating and deploying FSCs/TCSCs on other critical high-power transmission corridors to enhance grid reliability and import capability.

Further, Tehri PSP has also been synchronized with NR grid and also injecting power on few occasions. The issues related to model development of Tehri PSP in PSSe and PSCAD are already being discussed at CEA level.

It is to be noted that there is always possibility of subsynchronous resonance in the grid when power of PSP will be evacuated through lines having Fixed Series Capacitors as Tehri PSP will generate current harmonics in the grid side which may interact with series compensated lines.

It is requested that THDC/CTUIL may share any kind of sub synchronous torsional interaction or sub synchronous control interaction studies that may have been carried out at their end.

Further, the requirement of FSC on 765kV Koteshwar-Meerut D/C line may be studied by CTUIL/CEA and accordingly decision may be taken whether FSCs shall be kept in service or not.

Members may please discuss.

B.9. Reactive power performance of generators

During winter season, demand of Northern region is low and high voltages are a common phenomenon predominantly in Punjab, Haryana and Delhi area. Even after several actions being taken by control centers, it is seen that there is persistent high voltage in Northern region. The reactive power absorption by generators becomes an important resource that helps in managing high voltages in the grid. However, even after continuous follow up in OCC meetings, it is seen that MVAR data telemetry is poor/ inaccurate from most of the generating stations. For some of the generators it is seen that there is inadequate reactive power absorption based on their capability curve especially during night hours. The performance of generators in absorption of reactive power for last 20 days (20 Nov 2024 – 09 Dec 2024) is shown below:

S.No.	Station	Unit No.	Capacity	Geographical location	MVAR capacity as per capability curve (on LV side)	MVAR performance (-) Absorption (+) Generation (HV side data)	Voltage absorption above (in KV)
1	Dadri NTPC	1	490	Delhi-NCR	-147 to 294	-160 to 100	410
		2	490		-147 to 294	-150 to 100	410
2	Singrauli NTPC	1	200	UP	-60 to 120	-10 to 20	402
		2	200		-60 to 120	-20 to 20	400
		3	200		-60 to 120	-10 to 20	402
		4	200		-60 to 120	-30 to 10	400
		5	200		-60 to 120	-15 to 10	400
		6	500		-150 to 300	0 to 50	404
		7	500		-150 to 300	0 to 50	402
3	Rihand NTPC	1	500	UP	-150 to 300	-40 to 20	397
		2	500		-150 to 300	-60 to 0	395
		3	500		-150 to 300	-80 to 0	394
		4	500		-150 to 300	-80 to 0	394
4	Kalisindh RS	1	600	Rajasthan	-180 to 360	-100 to 150	-
		2	600		-180 to 360	-130 to 50	-
5	Anpara C UP	1	600	UP	-180 to 360	-150 to 0	770
		2	600		-180 to 360	-150 to 50	770
6	Talwandi Saboo PB	1	660	Punjab	-198 to 396	-200 to 50	412
		2	660		-198 to 396	-200 to 20	410
		3	660		-198 to 396	-	-
7	Kawai RS	1	660	Rajasthan	-198 to 396	-80 to 80	404
		2	660		-198 to 396	-90 to 50	404
8	IGSTPP Jhajjar	1	500	Haryana	-150 to 300	-120 to 120	415
		2	500		-150 to 300	-100 to 150	412
		3	500		-150 to	-110 to 120	418

					300		
9	Rajpura (NPL)	1	700	Punjab	-210 to 420	-200 to 50	405
		2	700		-210 to 420	-200 to 50	405
10	MGTPS	1	660	Haryana	-198 to 396	-150 to 100	410
		2	660		-198 to 396	-130 to 120	408
11	Bawana	1	216	Delhi-NCR	-65 to 130	-	-
		2	216		-65 to 130	-	-
		3	216		-65 to 130	-	-
		4	216		-65 to 130	-	-
		5	253		-65 to 130	-	-
		6	253		-65 to 130	-	-
12	Bara PPGCL	1	660	UP	-198 to 396	-100 to 80	770
		2	660		-198 to 396	-	-
		3	660		-198 to 396	-150 to 50	770
13	Lalitpur TPS	1	660	UP	-198 to 396	-90 to 50	760
		2	660		-198 to 396	-20 to 60	770
		3	660		-198 to 396	-100 to 50	760
14	Anpara D UP	1	500	UP	-150 to 300	-	-
		2	500		-150 to 300	-200 to -80	760
15	Chhabra TPS	1	250	Rajasthan	-75 to 150	-20 to 40	410
		2	250		-75 to 150	-60 to 30	410
		3	250		-75 to 150	-20 to 30	410
		4	250		-75 to 150	-	-
		5	660		-198 to 396	-50 to 200	410
		6	660		-198 to 396	-60 to 200	410

All generating stations are requested to resolve any issues related to telemetry and make sure that MVAr absorption is as per grid requirement and capability curve of machine.

Since with IEGC 2023 implementation, reactive energy performance also has financial impact, it is desirable that all generating stations continue to support grid voltages by having reactive power performance as per their capability curve and grid requirement.

Some of the generating units such IGSTPP Jhajjar, MGTPS Jhajjar, Bara need to explore possibility of further MVAR absorption. Further, intrastate generators in Rajasthan control area may be asked to support through adequate reactive power generation during day-time when Rajasthan grid experiences low voltage.

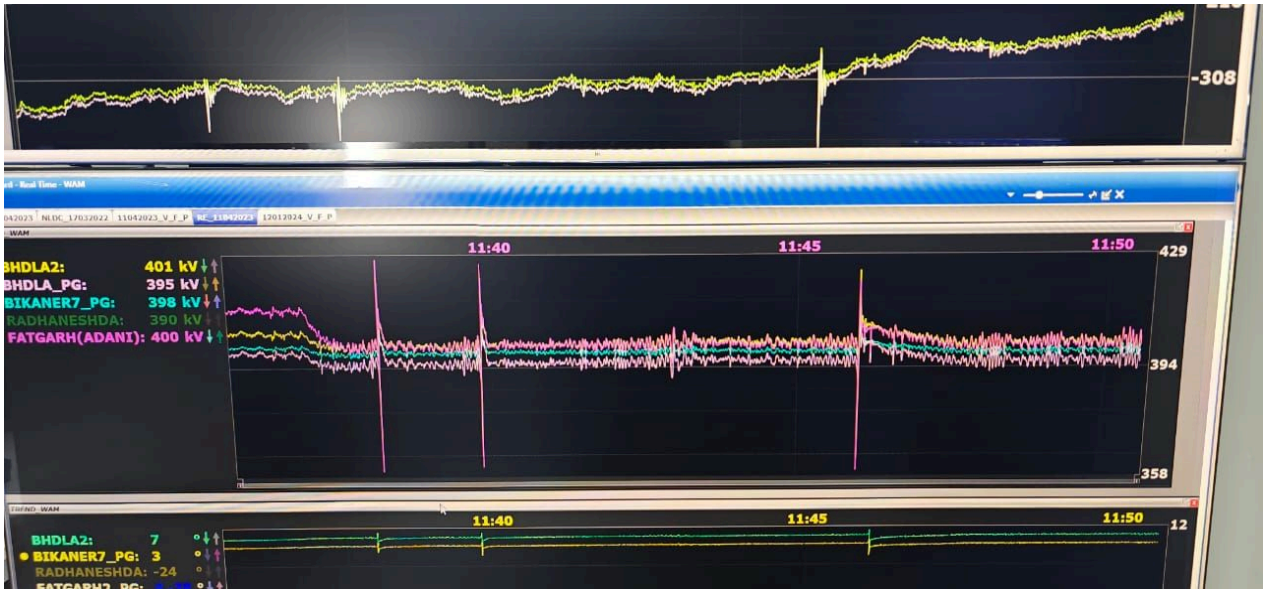
Following are few observations based on data of 20 Nov 2024 – 09 Dec 2024 analysed at NRLDC end:

- Some of the machines at NTPC Singrauli are generating MVAr whereas some are absorbing MVAr
- IGSTPP Jhajjar and MGTPS performance needs improvement, unnecessary MVAR generation could be avoided. AVR setpoint to be reduced.
- AVR setpoint may also be reduced for Dadri Stage-II, Talwandi Saboo stations.
- More reactive power support can be obtained from Chhabra 250MW generating units.
- No internal generation in Delhi state control area is leading to high voltages in the Delhi network as no dynamic reactive compensation is available from thermal machines for MVAR generation from cables.

All generating stations are requested to resolve any issues related to telemetry and make sure that MVAr absorption is as per grid requirement and capability curve of machine. Generators may also set their Vsch (voltage set point) such that units are absorbing MVAR as per their capability and grid requirement with intimation to RLDC/SLDC.

B.10. Observance of sudden voltage dips in Western Rajasthan

Since the month of November, it is being observed that sudden voltage dips in Western Rajasthan are being observed on some of the days. During such voltage dips, the voltage at 400kV bus dips to below 360kV and rises beyond 420kV within few milliseconds. It is to be noted that no fault is being recorded for such events and there is also some generation loss that is taking place due to such voltage dips. The magnitude of these dips is higher in Fatehgarh and Bhadla area of Western Rajasthan. One such sample dip from 06.12.2024 is shown below:



It is to be noted that these voltage fluctuations in the range of 690-820 KV (765kV level) are observed during these spikes. Root cause of these voltage spikes couldn't be ascertained yet. Monitoring is being done at NRLDC using PMU data however,

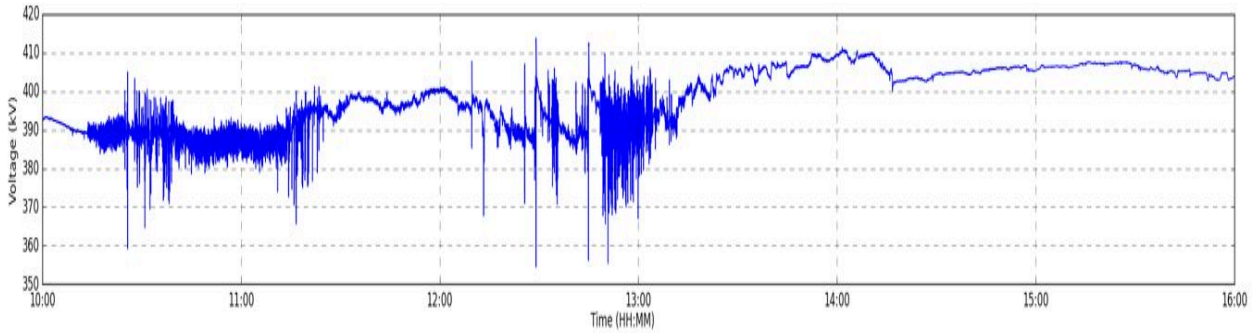
availability of more better resolution data may help in better monitoring and analysis of these events.

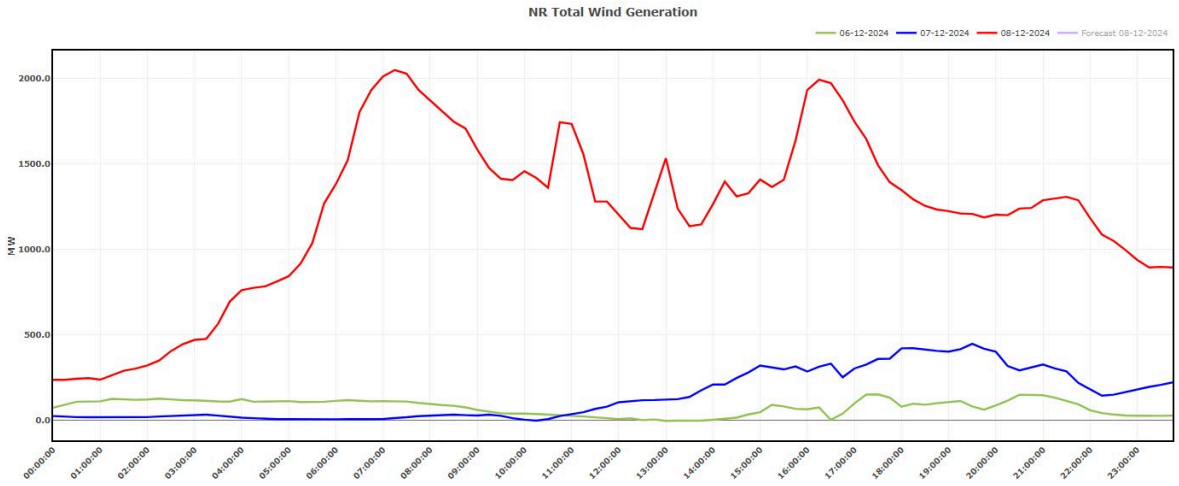
In view of above, it is requested to enable the triggering of Disturbance Recorder on START of Over Voltage (at OV stage-1/2 setting) and Under Voltage (0.9 p.u.) at 220kV & above voltage level in all the lines of RE plants and POWERGRID in RE complex wherever feasible.

Such voltage dips are also leading to some generation loss in Western Rajasthan and may also create other issues in the grid. Accordingly, it is discussed that the data with highest resolution is shared with NRLDC from POWERGRID and RE plants side for further analysis at NRLDC end.

Furthermore, severe voltage dips were observed on 08.12.2024, when there was high wind generation in Rajasthan state control area as shown below:

Voltage dips observed on 08.12.204 at Bhadla(PG) are shown below:





It is important to note that there was high wind generation on 08.12.2024, continuous voltage dips were observed in the grid and number of thermal generators in the Northern region complained of hunting.

As the old wind turbines are drawing reactive power from the grid and hampering grid voltage profile during peak solar generation, RVPN in coordination with wind developers is requested to install suitable reactive compensation devices or restrict generation from wind plants which are drawing reactive power from the grid, incase wind generation is present during period of solar generation i.e. 10:00hrs to 14:00hrs.

Further, maximum allowable loading in 765kV Bhadla-II(PG)-Ajmer(PG) D/C line is 2400MW each ckt. Angular separation is exceeding 30° under N-1 contingency of

765kV Bhadla-II(PG)-Ajmer(PG) D/C line if pre-contingency loading remains 2400MW each ckt. Sensitivity on one ckt under N-1 contingency of other ckt is ~36%

765kV Bhadla-II(PG)-Ajmer(PG) D/C line			
Basecase		N-1 contingency	
Loading (MW)	Angular seperation (°)	Loading (MW)	Angular seperation (°)
2371	20.47	3230	28.59

Therefore, there does not seem to be additional margin in the transmission system considering present network configuration. Accordingly, POWERGRID/ other transmission licensees are once again requested to expedite commissioning of associated transmission system to avoid any bottling of RE evacuation.

Members may please discuss.

B.11. Sharing of ATC/TTC assessment and basecase with NRLDC

All NR states except Chandigarh UT 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.

CERC vide their order dated 29.09.2023 has granted approval of "'Detailed Procedure for Allocation of Transmission Corridor for Scheduling of General Network Access and Temporary General Network Access under Central Electricity Regulatory Commission (Connectivity and General Network Access to the inter-State Transmission System) Regulations, 2022".

Detailed roles and responsibilities for State Load Dispatch Centers in various timelines of the approved procedure are provided in the table below.

Purpose	***S No***	***Action of Stakeholder***	***Responsibility***	***Submission to***	***Data/ Information Submission Time line***
1. Revision 0 TTC/ATC Declaration for Month 'M'	*1(a)*	*Submission of node wise Load and generation data along with envisaged scenarios for assessment of transfer capability*	*SLDC*	*RLDC*	*10th Day of 'M-12' month*
		Assessment of TTC/ATC of the import/export capability of the state and intra-state system and sharing of updated network simulation models			
	1(b)	*Declaration of TTC/ATC of the intra- state system by SLDC in consultation with RLDC*			*26th Day of 'M-12' month*

2. Interconnection Studies for elements to be integrated in the month 'M'	*2(a)*	*Submission of node-wise load and generation data & sharing of network simulation models for intra-state elements coming in the next six months*	*SLDC*	*RLDC*	*8th Day of 'M- 6' month*
	2(b)	*Sharing of inter-connection study results*			*21st Day of 'M-6' month*
3. Month Ahead TTC/ATC Declaration & Base case for Operational Studies for Month 'M'	*3(a)*	*Submission of node wise Load and generation data along with envisaged scenarios for assessment of transfer capability*	*SLDC*	*RLDC*	*8th Day of 'M- 1' month*
		Assessment of TTC/ATC of the intra- state system and sharing of updated network simulation models			
	3(b)	*Declaration of TTC/ATC of the intra- state system in consultation with RLDC*	*SLDC*	*RLDC*	*22nd Day of 'M-1' month*

To encourage participation from SLDCs regarding basecase preparation and ATC/TTC assessment, two workshops have been conducted from Grid-India/NRLDC side. One workshop was conducted 31.08.2023 before the finalization of the procedure and another on 10.01.2024 recently to involve further participation from SLDCs.

Although all SLDCs are now involved in preparation of basecase & ATC/TTC assessment, **it is seen that the timelines as per CERC approved procedure are not being followed and number of times basecases are not received from SLDC side.**

B.11.1 ATC/TTC assessment sharing 11 months in advance

The procedure mentions that:

"SLDCs in consultation with RLDCs shall declare the import and export TTC, ATC, and TRM of the individual control/bid areas within the region in accordance with Regulation 44 (3) of the Grid Code 2023. RLDCs shall assess the import and export TTC, TRM and ATC for the group of control/bid areas within the region (if required). The computed TTC, TRM and ATC figures shall be published on the website of respective SLDCs and RLDCs, along with the details of the basis of calculations, including assumptions, if any, **at least eleven (11) months in advance**. The specific constraints indicated in the system study shall also be published on the website."

Accordingly, SLDCs are requested to send the PSSE cases for four scenarios for Oct'25 i.e. Afternoon Peak, Solar Peak, Evening Peak & Off-Peak hours as communicated from NRLDC side. It is requested that the basecases as well as ATC/TTC assessments may

be shared with NRLDC as per CERC approved procedure. Further, the above exercise needs to be carried out regularly monthly.

It was discussed in last several OCC meetings & all states were requested to share basecase as well as ATC/TTC assessments for M-12 scenarios on monthly basis with NRLDC as per CERC approved procedure. Accordingly, it is requested to submit the basecase as well as ATC/TTC assessments.

B.11.2 Sharing of Data and study results for interconnection studies

As per **Regulation 33 of IEGC 2023,**

(9) Each SLDC shall undertake a study on the impact of new elements to be commissioned in the intra-state system in the next six (6) months on the TTC and ATC for the State and share the results of the studies with RLDC.
(10) Each RLDC shall undertake a study on the impact of new elements to be commissioned in the next six (6) months in (a) the ISTS of the region and (b) the intra-state system on the inter-state system and share the results of the studies with NLDC.
(11) NLDC shall undertake study on the impact of new elements to be commissioned in the next six (6) months in (a) inter-regional system, (b) cross-border link and (c) intra-regional system on the inter-regional system.

In line with above, utilities are requested to share the list of elements/LGB data/interconnection study results etc as per the approved procedure which are expected to be commissioned within next six months. This needs to be practised as monthly exercise on regular basis.

The agenda was discussed in last several OCC meetings & all utilities were requested to share list of elements/LGB data/interconnection study results etc as per the approved procedure on monthly basis.

B.11.3 TTC/ATC of state control areas for Jan 2025 (M-1)

As discussed in previous OCC meetings, most of the NR states except Ladakh and Chandigarh U/Ts are sharing basecase and ATC/TTC assessment with NRLDC.

Based on simulation studies and discussions between SLDCs and NRLDC, ATC/TTC limits for NR states for the month of Jan’2025 are attached as **Annexure-B.III**.

OCC has advised all states to timely declare TTC/ATC for prospective months and revise the figures as per requirement.

The agenda was also discussed in last several OCC meetings wherein all states agreed to send the data as well as PSSE basecases on time for all three (M-1, M-6, M-11) scenarios.

In 225 OCC meeting,

- NRLDC representative stated that the agenda was also discussed in last several OCC meeting wherein all states agreed to send the data as well as PSSE basecases on time for all three (M-1, M-6, M-11) scenarios. CGM

NRLDC asked states to get help from NRLDC in case of any difficulty and emphasized on the need for regularity in sharing the data.

- NRLDC representative presented the status of basecase and data sharing by NR states for the last six months.
- It was mentioned that UP, Punjab, Rajasthan and J&K are regularly sharing basecase as well ATC/TTC assessment with NRLDC. Haryana, Uttarakhand and HP are sharing data, but on some occasions it is getting missed. It was requested that all SLDCs may timely share the same.
- All SLDCs agreed to share basecase as well as ATC/TTC assessment as per CERC approved procedure.

Still, it is being observed that response from some SLDCs is not as per desired levels. Latest status for December 2024 is shown below:

July 2024 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (August-24)		M-11 (July-25)		M-6 (Jan-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	No	No	No	No
Haryana	No	No	No	No	No	No
Himachal	No	No	No	No	No	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	No	No	No	No	No	No
Rajasthan	No	No	No	No	No	No
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	No	Shared only for 1 cardinal point	No	No	No	No

August 2024 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (September-24)		M-11 (August-25)		M-6 (Feb-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	Yes	Yes	No	No
Haryana	No	Shared only for 1 cardinal point	No	No	No	No
Himachal	No	No	No	No	No	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	No	No	Yes	Yes	Yes	Yes
Rajasthan	No	No	No	No	No	No
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	No	No	No	No	No	No

September 2024 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (October-24)		M-12 (September-25)		M-6 (Mar-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	No	No	No	No
Haryana	No	No	No	No	No	Shared only for 1 cardinal point
Himachal	Shared only for 1 cardinal point	Shared only for 1 cardinal point	Shared only for 1 cardinal point	Shared only for 1 cardinal point	No	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	No	No	Yes	Yes	Yes	Yes
Rajasthan	Yes	Yes	Yes	Yes	Yes	Yes
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	No	No	No	No	No	No

October 2024 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (November-24)		M-12 (October-25)		M-6 (Apr-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	No	No	No	No
Haryana	Yes	Yes	No	No	No	No
Himachal	Yes	No	Yes	No	No	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	No	No	Yes	Yes	Yes	Yes
Rajasthan	Yes	Yes	Yes	Yes	Yes	Yes
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	Shared only TTC value and TTC case, no data regarding cardinal points		No	No	No	No

Submitted with one month delay

November 2024 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (December-24)		M-12 (November-25)		M-6 (May-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	Yes	Yes	No	No
Haryana	Yes	Yes	No	No	No	No
Himachal	Yes	No	Yes	No	No	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	No	No	Yes	Yes	Yes	Yes
Rajasthan	Yes	Yes	Yes	Yes	Yes	Yes
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand	No	No	No	No	No	No

December 2024 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (January-25)		M-12 (December-25)		M-6 (June-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh						
Delhi			Yes	Yes		
Haryana						
Himachal						
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh						
Punjab						
Rajasthan						
Uttar Pradesh						
Uttarakhand						

All SLDCs are requested to provide update.

Members may please discuss.

B.12. Corrective action for healthiness of 500kV Mundra-Mahindergarh SPS

On 17th May 2024 on outage of both pole (carrying total ~1500MW), SPS of 500kV HVDC Mundra-Mahindergarh inter regional link didn't operate. This issue was discussed during 51st PSC meeting and ADANI was requested to share the details w.r.t. SPS operation during the meeting.

Further, NRLDC in coordination with NLDC conducted an online discussion meeting with concerned stakeholders (SLDCs, ADANI, POWERGRID) on 12th August 2024, for further remedial actions required to make this SPS healthy.

Following actions were decided during the meeting:

i. POWERGRID, ADANI and concerned states were requested to identify the issue in communication links and take expeditious actions to make the all the communication link healthy. POWERGRID & ADANI shall review the healthiness of SPS system at different load centres and communication path between them in coordination with the SLDCs.
ii. States were requested to go through the details of load feeders mentioned in SPS document and share the changes / modifications as per present scenario and share the inputs w.r.t. unavailability in identified load feeders and load shedding. SLDCs shall share the revised updated feeder details (radial) along with expected average/peak load relief through respective feeders.
iii. SLDCs in coordination with their transmission and protection team shall share the status and healthiness of existing SPS system along with details of availability of communication path for incorporation of proposed revised/additional feeders.

Load end details have been received from UP, Haryana, Punjab Rajasthan & Delhi. Details are attached as **Annexure-B.IV**.

ADANI has submitted the status of healthiness of communication network and hardware system at different locations on the basis of preliminary inspection. As per details submitted, counter status was found OFF at Alwar, Ratangarh, Gobindgarh, Malerkotla, Bamnauli, Shamli and Dhanonda.

Details of nodal officer of different substation involved in SPS scheme has already been shared with ADANI team for coordination and further remedial actions.

During 53rd PSC meeting, ADANI was requested to coordinate with the respective states to rectify the issues in the SPS system and share the status of remedial action taken / planned to be taken. Desired remedial actions need to be expedited.

ADANI agreed for the same and stated that update would be given within 01 week. However, no detail received yet from ADANI.

During discussion in 54th PSC meeting also there was no further update received from ADANI team.

In view of above, PSC forum is requested to discuss the issue and propose action plan for necessary remedial action plans needed for making SPS scheme of HVDC Mundra-Mahindergarh healthy & operational.

Members may like to discuss.

B.13. Frequent elements tripping during *November 2024*:

The following transmission elements were frequently tripping during the month of **November'24**:

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	220 KV RAPS_A(NP)-Sakatpura (RS) (RS) Ckt-1	5	Raj/NPCIL
2	220 KV RAPS_A(NP)-Sakatpura (RS) (RS) Ckt-2	4	Raj/NPCIL
3	400 KV Agra-Unnao (UP) Ckt-1	4	UP
4	400 KV Aligarh-Shamli (UP) Ckt-2	3	UP
5	400 KV Aligarh-Sikandrabad (UP) Ckt-1	3	UP
6	400 KV Amritsar(PG)-Makhu(PS) (PSTCL) Ckt-1	3	PG/PS
7	400 KV Anpara_B(UPUN)-Mau (UP) (UP) Ckt-1	3	UP
8	400 KV Bareilly-Unnao (UP) Ckt-1	4	UP
9	400 KV Talwandi Saboo(PSG)-Nakodar (PSG) (PS) Ckt-1	3	PS

List of tripping is attached as **Annexure-B.V**.

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

B.14. Multiple element tripping events in Northern region in the month of *November '24*:

A total of 10 grid events occurred in the month of **November'24** of which **01** are of GD-1 category, **04** are of GI-2 Category and **05** are 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.**

Maximum delayed clearance of fault observed in event of multiple elements tripping at 400/220/132kV Merta (RS) on 11th November, 2024 (As per PMU at Merta(RS), R-Y-B phase to phase fault was observed with delayed fault clearance time of 720 msec is observed).

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **03** events out of **10** grid events occurred in the month. In 01 (no.) of grid event, there was no fault in the grid.

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

As per IEGC clause 37.2 (c), Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) shall be submitted within 24 hrs of the event and as per IEGC clause 37.2 (e), the user shall submit a detailed report in

the case of grid disturbance or grid incidence within one (1) week of the occurrence of event to RLDC and RPC.

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 like to discuss.

B.15. Details of tripping of Inter-Regional lines from Northern Region for *November '24*:

A total of 5 inter-regional lines tripping occurred in the month of **November'24**. 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 37.2(c) 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.

Members may like to discuss.

B.16. Status of submission of DR/EL and tripping report of utilities for the month of *November '24*.

The status of receipt of DR/EL and tripping report of utilities for the month of **November '24** is attached at **Annexure-B.VIII**. It is to be noted that as per the IEGC provision under clause 37.2 (c), 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.

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 37.2(c) 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.

Members may like to discuss.

B.17. Frequency response performance for the reportable events of month of *November '24*:

In the month of November 2024, there was no reportable event during November 2024.

As per IEGC clause 30.10 (d)

'' The generating stations and units thereof shall have electronically controlled governing systems or frequency controllers in accordance with the CEA Technical Standards for Connectivity and are mandated to provide PRAS. The generating stations and units thereof with governors shall be under Free Governor Mode of Operation.''

As per IEGC clause 30.10 (g

''All the generating units shall have their governors or frequency controllers in operation all the time with droop settings of 3 to 6 % (for thermal generating units and WS Seller) or 0-10% (for hydro generating units) as specified in the CEA Technical Standards for Connectivity''

ISGS were requested to confirm whether FGMO as per IEGC 2023 has been implemented at their respective stations or not. Updated sheet on the basis of details receicved is as follows:

Sl. No.	Entity	Capacity(MW)	Governor Mode (FGMO as per IEGC 2023) Yes or No	Droop setting (%)	Remarks (if any)
1	Dadri-1 (TH)	4*200			
2	Dadri -2 (TH)	2*490			
3	Jhajjar (TH)	3*500			
4	Rihand-1 (TH)	2*500	Yes	5.0	Under Implementation
5	Rihand-2 (TH)	2*500	Yes	5.0	Under Implementation
6	Rihand-3 (TH)	2*500	Yes	5.0	Under Implementation
7	Shree Cement (TH)	(2 * 150)			
8	Singrauli (TH)	2*500+5*200			
9	Tanda-2 (TH)	2*660			
10	Unchahar stg-4 (TH)	1*500			
11	Unchahar (TH)	2*210			
12	Anta (G)	(1 * 153.2 + 3 * 88.71)			
13	Auraiya (G)	(2 * 109.3 + 4 * 111.19)			
14	Dadri (G)	(2 * 154.51 + 4 * 130.19)			

15	AD Hydro (H)	(2 * 96)	YES	4.0	-
16	Bairasiul (H)	(3 * 60)	Yes	4.0	
17	Bhakra (H)	(5 * 126 + 5 * 157)			
18	Budhil (H)	(2 * 35)			
19	Chamera-1 (H)	(3 * 180)	Yes	5.0	
20	Chamera-2 (H)	(3 * 100)	Yes	5.0	
21	Chamera-3 (H)	(3 * 77)	Yes	4.0	
22	Dehar (H)	(6 * 165)			
23	Dhauliganga (H)	(4 * 70)	Yes	5.0	
24	Dulhasti (H)	(3 * 130)	Yes	5.0	
25	Karcham (H)	(4 * 261.25)	Yes	5.0	
26	Kishenganga	(3 * 110)	Yes	4.0	
27	Koldam (H)	(4 * 200)	Yes	4.0	
28	Koteswar (H)	(4 * 100)	Yes	4.0	
29	Malana-2 (H)	(2 * 50)			
30	Nathpa Jhakri (H)	(6 * 250)	Yes	5.5	
31	Parbati-2 (H)	(4 * 200)			
32	Parbati-3 (H)	(4 * 130)	Yes	4.0	
33	Pong (H)	(6 * 66)			
34	Rampur (H)	(6 * 68.67)			
35	Sainj (H)	(2 * 50)			
36	Salal (H)	(6 * 115)	Yes	3.0	
37	Sewa-II (H)	(3 * 40)	Yes	4.0	
38	Singoli Bhatwari (H)	(3 * 33)			
39	Sorang (H)	(2 * 50)			
40	Tanakpur (H)	(1 * 31.42 + 2 * 31.4)	Yes	4.0	
41	Tehri (H)	(4 * 250)	Yes	4.0	
42	Uri-1 (H)	(4 * 120)	Yes	6.0	
43	Uri-2 (H)	(4 * 60)	Yes	5.0	

Constituents are requested to share the details at the earliest.

Members are requested to ensure implementation of FGMO as per IEGC 2023 at generating stations in their respective control area and share the present status.

Memebers are requested to analyse the frequency response of their respective control area and share the FRC/FRP analysis of generating stations along with unit wise 01 sec data as per timeline for ensuring IEGC compliance.

Members may like to discuss.

B.18. Mock trial run and testing of black start facilities at generating stations in Northern Region

As per Indian Electricity Grid Code (IEGC) clause 34.3

"*Detailed procedures for restoration post partial and total blackout of each user system within a region shall be prepared by the concerned user in coordination with the concerned SLDC, RLDC or NLDC, as the case may be. The concerned user shall review the procedure every year and update the same. The user shall carry out a mock trial run of the procedure for different sub-systems including black-start of generating units along with grid forming capability of inverter based generating station and VSC based HVDC black-start support at least once a year under intimation to the concerned SLDC and RLDC. Diesel generator sets and other standalone auxiliary supply source to be used for black start shall be tested on a weekly basis and the user shall send the test reports to the concerned SLDC, RLDC and NLDC on a quarterly basis*".

Hydro and gas-based plants are capable of self-black-start. Conducting periodic mock black start exercises are extremely important to ensure the healthiness of black start facilities and also to build awareness as well as confidence among the system operators.

In view of above, regional entity generating stations shall conduct the dead bus charging of their units on rotation basis as per availability of schedule under intimation to the NRLDC. Testing of Diesel generator sets and other standalone auxiliary supply source to be used for black start shall also be done on a weekly basis. SLDC shall also ensure the same in their respective control area. This will ensure the healthiness of blackstart facility at generating stations. Further, NRLDC shall coordinate with the ISGS and states to conduct the mock black start exercise of subsystems.

Therefore, regional entity generating stations and SLDCs were requested to share the annual schedule plan for conducting dead bus charging / mock black start exercise of generating stations / sub-systems during 2024-25 in the format attached as **Annexure-B.IX**. Constituents were also requested to share the test report of diesel generators / auxiliary supply on a quarterly basis. In this regard, a communication has already been sent to constituents through NRLDC letter dated 24.04.2024.

Details received from AD Hydro HEP, Tehri HEP, Karcham Wangtoo HEP, Koteshwar HEP, SJVN, NHPC, Budhil, Auraiya GPS, Singoli Bhatwari HEP, Koldam HEP, Dadri GPS, Delhi, Punjab and Uttarakhand.

Mock black start exercises conducted during 2024-25 till date is as follows:

a) **GTPS (IPGCL) on 10.04.2024**
b) **Ranjit Sagar Dam(RSD) HEP on 07.05.2024**
c) **Kishenganga HEP on 09.11.2024**
d) **Tehri HEP on 13.11.2024**
e) **Koteshwar HEP on 27.11.2024**

The following actions are requested by ISGS and SLDCs:

- To share the tentative schedule of mock black start exercise of generating stations in their respective control area.
- SLDCs are requested to share the tentative schedule plan of mock black start exercise of generating stations in their respective control area.

- To conduct dead bus charging after self-starting the generating station if schedule with load is not available.
- To share the test report of mock black start exercise conducted along with weekly DG testing on monthly/quarterly basis.

Members may like to discuss.

B.19. Mock testing of System Protection Schemes (SPS) in Northern Region

As per IEGC clause 16.2

''For the operational SPS, RLDC or NLDC, as the case may be, in consultation with the concerned RPC(s) shall perform regular load flow and dynamic studies and mock testing for reviewing SPS parameters & functions, at least once in a year. RLDC or NLDC shall share the report of such studies and mock testing including any short comings to respective RPC(s). The data for such studies shall be provided by CTU to the concerned RPC, RLDC and NLDC.''

As per IEGC clause 16.3

''The users and SLDCs shall report about the operation of SPS immediately and detailed report shall be submitted within three days of operation to the concerned RPC and RLDC in the format specified by the respective RPCs.''

There are 53 numbers of System Protection Scheme (SPS) approved in Northern Region out of which 05 number of SPS are under implementation stage. These SPS are implemented at major generation complexes, important evacuating transmission lines and ICTs which are N-1 non-complaint. Details of SPS in Northern Region is available on NRLDC website at link https://nrldc.in/download/nr-sps-2024/?wpdmdl=13255&lang=en .

SPS is designed to detect abnormal system conditions and take predetermined, corrective action to preserve system integrity and provide acceptable system performance. Therefore, correct operation of SPS as per designed logic is important to serve its purpose. To ensure this, mock testing of SPS needs to be conducted at a regular period. Clause 16.2 of IEGC 2023 also mandates the mock testing of SPS for reviewing SPS parameters & functions, at least once a year.

In view of the above, concerned constituents / utility were requested to share the tentative schedule plan for conducting mock testing of SPS in their respective control area during 2024-25 in format attached as **Annexure-B.X.** In this regard, communication has already been sent to constituents through NRLDC letter dated 01.05.2024. Update in this regard received only from UP and Uttarakhand.

Details only received from Uttarakhand, Rajasthan & UP.

Members are requested to conduct the mock testing of SPS in their respective control area, share the tentative schedule of mock testing of SPS and share the report of the same.

Members may like to discuss.

B.20. Availability and Standardization of recording instrument (Disturbance recorder and Station Event Logger) and status of work regarding undertaking submitted during First Time Charging of elements:

As per IEGC clause 17

1) *All users shall keep the recording instruments (disturbance recorder and event logger) in proper working condition.*
2) *The disturbance recorders shall have time synchronization and a standard format for recording analogue and digital signals.*

IEGC clause 37.2 (c) also mandates the submission of Disturbance Recorder (DR), station Event Logger (EL), Data Acquisition System (DAS) within 24 hrs of the event.

Data of recording instruments (DR/EL) are very helpful in grid event analysis and also is being used in availability verification of transmission lines. Complete and conclusive analysis of any grid event is not possible without these recording instruments and thus their standardization is very important.

Therefore, availability of disturbance recorder with standardization, time sync and correct nomenclature and station event logger need to be ensured by users at the station of their respective control area.

In view of the above, all the constituents are requested to share the details w.r.t. availability and standardization of disturbance recorder and event logger at the station of their respective control area in format attached as **Annexure-B.XI.**

Details were received from Rajasthan, UP, Uttarakhand & Haryana only. Details received is attached as **Annexure-B.XI**

Members are requested to share the share the details w.r.t. availability and standardization of disturbance recorder and event logger at the station of their respective control area. Members are also requested to submit the status of work regarding undertaking submitted during First Time Charging of elements.

Members may like to discuss.

B.21. Revision of document for Reactive Power Management of Northern Region:

NRLDC has been issuing 'Reactive Power document of Northern Region' on annual basis. Reactive Power Management document for Northern region was last revised on 31st Dec 2023 & updated document link is as below:

https://nrldc.in/download/nr_reactive-powermanagement_2024/?wpdmdl=13136&lang=en

The document is password protected and password was already informed to all the NR constituents through letter dated 10th Dec 2024.

In view of new addition/modification of transmission & generation element in NR grid since Dec'23, the document is being reviewed for update.

Constituents are requested to provide feedback, suggestion and updated information by 16th Dec 2024.

Status of action taken on decision of 225th OCC meeting of NRPC

S.N.	Agenda	Decision of 225th OCC meeting of NRPC	Status of action taken
1	A.12. Procurement of cold spare transformers and reactor for Northern Region (Agenda by POWERGRID NR-1)	Forum asked Powergrid to submit a consolidated, capacity-wise list of the total number of transformers required as spares on a regional basis. The list should include the current shortfall in ICTs, the number of ICTs allocated States/UT's of NR as regional spares, and the expected timeline for their return.	Powergrid has submitted an agenda in this regard.

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 — Nov-2024
◎ HARYANA — Sep-2024
◎ HP — Sep-2024
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Sep-2024
◎ RAJASTHAN — Sep-2024
◎ UP — Oct-2024
◎ UTTARAKHAND — Nov-2024
All States/UTs are requested to update status on monthly basis.</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">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 — Sep-2024
◎ HARYANA — Sep-2024
◎ HP — Oct-2024
◎ J&K and LADAKH — Not Available
◎ PUNJAB — Sep-2024
◎ RAJASTHAN — Sep-2024
◎ UP — Oct-2024
◎ UTTARAKHAND — Sep-2024
◎ BBMB — Jun-2024
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>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 — Increased
◎ PUNJAB — Increased
◎ RAJASTHAN — Increased
◎ UP — Increased</td></tr>
</table>

			◎	UTTARAKHAND	Increased
			◎	BBMB	Increased
4	Status of Automatic Demand Management System in NR states/UT's	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:	The status of ADMS implementation in NR is enclosed in **Annexure-A.I.II.**		
			◎	DELHI	Scheme Implemented but operated in manual mode.
			◎	HARYANA	Scheme not implemented
			◎	HP	Scheme not implemented
			◎	PUNJAB	Scheme not implemented
			◎	RAJASTHAN	Under implementation.
			◎	UP	Scheme implemented by NPCIL only
			◎	UTTARAKHAND	Scheme not implemented
5	Status of availability of ERS towers in NR	As per the decesion of 68th NRPC and 211th OCC meeting, ERS availability monitoring is being taken as rolling/follow-up agenda in OCC meetings for regular monitoring of ERS under different utilities in Northern region.	As per the information received from different utilities in Northern region, updated status of availability of ERS towers in Northern Region attached as **Annexure-A.I.III.**		
6	Submission of breakup of Energy Consumption by the states	All states/UTs are requested to submit the requisite data as per the billed data information in the format given as under:	Status of the information submission (month) from states / utilities is as under:		
				State / UT	Upto
			◎	CHANDIGARH	Not Submitted
			◎	DELHI	Jun-24
			◎	HARYANA	Oct-24
			◎	HP	Sep-24
			◎	J&K and LADAKH	JPDCL- Mar'24 KPDCL- Not Submitted
			◎	PUNJAB	Sep-24
			◎	RAJASTHAN	Sep-24
			◎	UP	Jun-24
			◎	UTTARAKHAND	Aug-24
			Chandigarh is requested to submit the requisite data w.e.f. April 2018 as per the billed data information in the given format		
7	Status of FGD installation vis-à-vis installation plan at identified TPS	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	Status of the information submission (month) from states / utilities is as under:		
			◎	HARYANA	Jun-2024
			◎	PUNJAB	Jun-2024
			◎	RAJASTHAN	Nov-2024
			◎	UP	Jan-2024
			◎	NTPC	Feb-2023
			FGD status details are enclosed as **Annexure-A.I.IV.**		

Category→	Consumption by Domestic Loads	Consumption by Commercial Loads	Consumption by Agricultural Loads	Consumption by Industrial Loads	Traction supply load	Miscellaneous / Others
<Month>						

		basis is monitored in OCC meetings.	All States/utilities are requested to update status of FGD installation progress on monthly basis.
8	Information about variable charges of all generating units in the Region	The variable charges detail for different generating units are available on the MERIT Order Portal.	All states/UTs are requested to submit daily data on MERIT Order Portal timely.

9	Reactive compensation at 220 kV/ 400 kV level at 8 substations			
	State / Utility	Substation	Reactor	Status
i	DTL	Peeragarhi	1x50 MVAr at 220 kV	1x50 MVAr Reactor at Peeragarhi has been commissioned on dated 18.09.2023
ii	DTL	Harsh Vihar	2x50 MVAr at 220 kV	2x50 MVAR Reactor at Harsh Vihar has been commissioned on dated 31th March 2023.
iii	DTL	Mundka	1x125 MVAr at 400 kV & 1x25 MVAr at 220 kV	Bay work completed on 25.03.2023. Reactor part tender is dropped and at present same is under revision.
iv	DTL	Bamnauli	2x25 MVAr at 220 kV	Bay work completed on 25.03.2023. Reactor part tender is dropped and at present same is under revision.
v	DTL	Indraprastha	2x25 MVAr at 220 kV	Bay work completed on 07.11.2023. Reactor part tender is dropped and at present same is under revision.
vi	DTL	Electric Lane	1x50 MVAr at 220 kV	Under Re-tendering due to Single Bid
vii	PTCUL	Kashipur	1x125 MVAR at 400 kV	SLDC informed that PTCUL has intimated that bid extension has been done till 18.07.2024. In 220th OCC meeting, PTCUL was suggested to seek assistance from Powergrid in
viii	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. 07.04.2022 to M/s Kanohar Electricals Ltd. Schedule time is 18 months. 01 No. of 125 MVAR reactor is under testing which is expected to done by end of May 2024. Tentaive charging plan is to be intimated by Rajasthan SLDC.

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.	Mar'25	02 No. of bays shall be utilized for LILO-II of 220kV Jatwal-Bishnah Transmission Line, the work of which is delayed due to persisting RoW issues. expected date of completion is Mar 2025 subject to availability of funds and resolving of RoW issues), Updated in 220th 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	Mar'25	02 No. of bays are to be utilized for connecting 220kV New Wanpoh-Alusteng D/c Line. RoW issues persisting; At present new-wampoh-mirbazar 5km and harwan-alstung 16km have been completed, expected date of completion is Mar 2025 subject to availability of funds and resolving of RoW issues), Updated in 214th 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	Mar'25	Under construction.Updated in 222nd 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	Utilized: 7	• 220 kV D/C Shahajahanpur (PG) - Gola line	Commissioned	Energization date: 26.10.2023 updated by UPPTCL in 215th OCC
				• 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	• 220 kV Hamirpur-Dehan D/c line	Commissioned	HPPTCL has commissioned the Planned 220kV Dehan-Hamirpur TL utilizing 2 No. 220kV Bays.Commisioned date: 09.06.2022. Updated in 198th OCC by HPPTCL
				• Network to be planned for 4 bays	-	HPPTCL to update the status.
8	Sikar 400/220kV, 1x 315 MVA S/s	Commissioned: 8 Total: 8	Utilized: 6 Unutilized: 2	• LILO of 220 kV Sikar (220 kV GSS)-Dhod S/c line at Sikar (PG)	Commissioned	LILO of 220 kV S/C Sikar-Dhod line at 400 kV GSS PGCIL, Sikar has been charged on dt. 31.03.2022
				• Network to be planned for 2 bays.	-	Against the 3rd ICT at 400 kV GSS Sikar, only 2 bays were constructed and same has been utilized by RVPN by constructing LILO of 220 kV S/C Sikar – Dhod line as updated by RVPNL in 195th OCC
9	Bhiwani 400/220kV S/s	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 4	• 220 kV D/C line Bhiwani (PG) – Bhiwani (HVPNL) line	Commissioned	Updated in 202nd OCC by HVPNL
				• 220 kV Bhiwani (PG) - Isherwal (HVPNL) D/c line.	Dec'24	Issue related to ROW as intimated in 218th OCC by HVPNL. **Status:** Work was stalled since 29.07.2021 due to ROW issues and farmers agitation and further restarted on 9.10.2023 with the help of district administration. Now, work was again stalled since30.11.2023 due to severe ROW issues. Expected to be completed by 31.12.2024. Foundation 209/212. Erection 193/212. Stinging 37.8/50.3 km
				• 220 kV Bhiwani (PG) - Dadhibana (HVPNL) D/c line.	Oct'25	Line work awarded to M/s R S Infra Projects Pvt. Ltd. Noida, Uttar Pardesh on dated 09.03.2024. Work of route plan and route alignment has been started by the firm as intimated in 218th 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	Dec'24	Work in progress. Updated in 220th OCC by HVPNL.
11	400/220kV Tughlakabad GIS	Commissioned: 6 Under Implementation: 4	Utilized: 6 Unutilized: 0	• RK Puram – Tughlakabad (UG Cable) 220kV D/c line – March 2023.	Commissioned	Updated in 216th OCC by DTL
				• Masjid Mor – Tughlakabad 220kV D/c line.	Commissioned	Updated in 216th OCC by DTL

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
12	400/220kV Kala Amb GIS (TBCB)	Commissioned: 6 Total: 6	Utilized: 2 Unutilized: 2 Under Implementation:2	• HPPTCL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s	Commissioned	Energization date: 31.05.2024 updated by HPPTCL in 220th OCC
				• HPPTCL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Giri S/s	-	Tendering process is yet to be started.Updated in 219th OCC by HPPTCL
				• Network to be planned for 2 bays	-	HPPTCL to update the status.
13	400/220kV Kadarpur Sub-station	Commissioned: 8 Total: 8	Utilized: 0 Unutilized: 8	• D/C line Kadarpur - Sec-56 Gurugram.	Not awarded yet	Initial proposal of LILO of 220kV Pali-Sector 56 Line and Pali-Sector 52 line was descoped due to forest issue. Proposal to evacuate power from 220kV D/C Pali-Sector 56 line to Sector 56 and 52 with bunching of lines is under consideration. Updated in 218th OCC by HVPNL
				• S/C line Kadarpur - Sec-52 Gurugram	Not awarded yet	Initial proposal of LILO of 220kV Pali-Sector 56 Line and Pali-Sector 52 line was descoped due to forest issue. Proposl to evacuate power from 220kV D/C Pali-Sector 56 line to Sector 56 and 52 with bunching of lines is under consideration. Updated in 218th OCC by HVPNL
				• S/C line Kadarpur - Pali	Not awarded yet	Initial proposal of LILO of 220kV Pali-Sector 56 Line and Pali-Sector 52 line was descoped due to forest issue. Proposl to evacuate power from 220kV D/C Pali-Sector 56 line to Sector 56 and 52 with bunching of lines is under consideration. Updated in 218th OCC by HVPNL
14	400/220kV Sohna Road Sub-station	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• LILO of both circuits of 220kV D/c Sohna-Rangla Rajpur at Roj Ka Meo line at 400kV Sohna Road	Dec'24	Updated in 216th OCC by HVPNL
				• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road	-	The matter is subjudice in Hon'ble Punjab & Haryana High court, Chandigarh Updated in 205th OCC by HVPNL. **Status:-** Earlier 02 nos 220 kV line bays were to be utilized for the 220 kV GIS S/Stn. Sec-77, Gurugram but due to denotification of land of the 220 kV GIS S/Stn. Sec-77 the said substation is now going to be dismantled and a new substation is proposed at Sec-75A, Gurugram. Now, these 02 no. 220 kV line bays may be utilized at 220 kV GIS S/Stn Sec-75A, Gurugram.
15	400/220kV Prithla Sub-station	Commissioned: 8 Aprroved: 2 Total: 10	Utilized: 4 Unutilized: 4 Under Implementation:2	• 220kV D/C line from Prithla to Harfali with LILO of one circuit at 220kV Meerpur Kurali	Mar'25	Contract awarded on 08.08.23 to M/s Skipper with completion in March 25.Updated in 218th OCC by HVPNL
				• LILO of both ckt of 220kV D/c Ranga Rajpur – Palwal line	Commissioned	Energization date: 31.12.2021. Updated in 198th OCC by HVPNL
				• 220kV D/C for Sector78, Faridabad	31.01.2025	Issue related to ROW and Pending crossing approval from Northern Railways and DFCCIL. as intimated in 223rd OCC by HVPNL.
				• Prithla - Sector 89 Faridabad 220kV D/c line	Jul'25	Work awarded to M/s Man Structurals Pvt Ltd. JV M/s Aquarian Enterprises on 09.01.2024. Contractual date: 06.05.2025 and Tentative date of completion :06.05.2025 Route has been approved and further work is in progress.Updated in 218th OCC by HVPNL
16	400/220kV Sonepat Sub-station	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 2 Unutilized: 4 Under Implementation:2	• LILO of both circuits of 220kV Samalkha - Mohana line at Sonepat	31.12.2024	Updated in 224th OCC by HVPNL. **Status:** The stringing work between TL No. 19 & 20, TL No. 22 & 23 and TL No. 22 & 24 is pending for want of necessary consent from the forest department. The case has already been uploaded on Parivesh portal and is currently pending at the O/o AIGF, Forest Dept. Panchkula.
				• Sonepat - HSIISC Rai 220kV D/c line	Commissioned	Energization date: 31.05.2024 updated by HVPNL in 220th OCC
				• Sonepat - Kharkhoda Pocket A 220kV D/c line	08.03.2025	Updated in 212th OCC by HVPNL. **Status:** Work order has been issued to M/s R.S Infra on dated 09.08.2023 by O/o CE/PD&C, Panchkula for construction of line. Both bays are under construction and erection of electrical equipment is under progress. Tetative date of completion of both bays at PGCIL end is end of July 2024.
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 is under progres. Stub Setting: 14/2017. Permission for Highway is awaited from concerned department as updated in 218th OCC by RVPNL.
18	400/220kV Kotputli Sub-station	Commissioned: 6 Total: 6	Utilized: 4 Unutilized: 2	• Kotputli - Pathreda 220kV D/c line	-	Date of bid opening has been extended up to 30.04.2024 as updated in 218th OCC by RVPNL.
19	400/220kV Jallandhar Sub-station	Commissioned: 10 Total: 10	Utilized: 8 Unutilized: 2	• Network to be planned for 2 bays	Nov'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. 6 months more are needed due to ROW issues as updated by PSTCL in 220th OCC

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
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 commissioned 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	Commissioned	• Lucknow -Kanduni, 220 kV D/C line work energized on 05.10.2023. Updated in 212th OCC by UPPTCL. _____ • 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	Commissioned	• Gorakhpur(PG)- Maharajganj, 220 kV D/C line energized on 27.09.2023 updated by UPPTCL in 212th 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	Commissioned	Ckt-1 commissioned at 16:13hrs on dated 06.08.24 & Ckt-2 commissioned at 20:10 hrs on dated 05.08.24. Updated in 223rd OCC by HVPNL
25	400/220kV Pachkula Sub-station	Commissioned: 8 Under tender:2 Total: 10 Out of these 10 nos. 220kV	Utilized: 2 Unutilized: 4 Under Implementation:2	• Panchkula – Pinjore 220kV D/c line	Commissioned	Updated in 218th OCC by HVPNL
				• Panchkula – Sector-32 220kV D/c line	Commissioned	Energization date: 24.05.2024 updated by HVPNL in 220th OCC
				• Panchkula – Raiwali 220kV D/c line	Commissioned	Updated in 194th OCC by HVPNL
				• Panchkula – Sadhaura 220kV D/c line: Sep'23	Mar'25	Updated in 222nd OCC by HVPNL
26	400/220kV Amritsar S/s	Commissioned:7 Approved in 50th NRPC- 1 no. Total: 8	Utilized: 6 Under Implementation:2	• Amritsar – Patti 220kV S/c line	31.08.2024	Issue in connectivity agreement with CTU. CTU asked PSTCL to approach CEA and thereafter CEA may plan a meeting with PSTCL and CTU to resolve the issue. Updated in 225th OCC by PSTCL.
				• Amritsar – Rashiana 220kV S/c line (2 bays shall be required for above lines. However, 1 unutilized bay shall be used for Patti and requirement of one additional bay approved for Rashiana by NRPC)	31.08.2024	Issue in connectivity agreement with CTU. CTU asked PSTCL to approach CEA and thereafter CEA may plan a meeting with PSTCL and CTU to resolve the issue. Updated in 225th OCC by PSTCL.
27	400/220kV Bagpat S/s	Commissioned: 8 Total: 8	Utilized:6 Unutilized: 2	• Bagpat - Modipuram 220kV D/c line	Commissioned	Updated in 201st OCC by UPPTCL
28	400/220kV Bahardurgarh S/s	Commissioned: 4 Approved: 4 Total: 8	Utilized:2 Unutilized: 2	• LILO of 220 kV Nunamajra- Daultabad S/c line at 400 kV Bahadurgarh PGCIL	Mar'25	Updated in 220th OCC by HVPNL. **Status:** NIT has been floated vide NIT No. EPC-D-96 dated 15.10.23 to be opened on 22.12.23. • Now, the tender has been dropped and likely to be refloated by 31.07.2024.
				• Bahadurgarh - METL 220kV D/c line (Deposit work of M/s METL)	Mar'25	Updated in 220th OCC by HVPNL. **Status:** • Revised BOQ forwarded from Design wing to contract wing. • Tender has floated vide NIT No. EPC-D-100 dated 04.01.2024 with tender opening date of 26.02.2024. • Tender has been opened on 26.03.24 and 03 nos. bids has been received. The work is likely to be awarded by the 31.07.2024.
				• Bahadurgarh - Kharkhoda Pocket B 220kV D/c line	08.03.2025	Updated in 220th OCC by HVPNL. **Status:** Contract awarded on 09.08.23 to M/s R S Infra Noida. Work has been started.
29	400/220kV Jaipur (South) S/s	Commissioned: 4 Total: 4	Utilized:2 Unutilized: 2	• LILO of 220 kV S/C Dausa – Sawai Madhopur line at 400 kV GSS Jaipur South (PG)	06.10.2025	Work order has been issued on 06.10.2023, work under progress as updated by RVPNL in 215th 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	• 220 kV D/C Kankroli(PG) - Nathdwara line	-	Standard bid document has been finalized on 13.08.2024 and bid is under preparation as updated by RVPN in 222nd OCC.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
32	400/220kV, Manesar	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 2 bays	-	Status:- 2nos bays are being utilised for 220 kV D/C Panchgaon (PGCIL)-Panchgaon Ckt-I & 220 kV D/C Panchagon (PGCIL)-Panchgaon Ckt-II, charged on dated 05.09.2022 & 20.10.2022 respectively. The 2nos bays may be utilised by HVPNL in future.
33	400/220kV, Saharanpur	Commissioned: 6 Under Implementation:2 Total: 8	Utilized: 6 Unutilized: 0 Under Implementation:2	• Network to be planned for 2 bays	Commissioned	Saharanpur(PG)-Devband D/c line (Energization date: 20.04.2023) updated by UPPTCL in 207th OCC
34	400/220kV, Wagoora	Commissioned: 10 Total: 10	Utilized: 6 Unutilized: 4	• Network to be planned for 4 bays	-	PDD, J&K to update the status.
35	400/220kV, Ludhiana	Commissioned: 9 Total: 9	Utilized: 8 Unutilized: 1	• Network to be planned for 1 bay	Commissioned	Direct circuit from 220 kV Lalton Kalan to Dhandari Kalan to be diverted to 400 kV PGCIL Ludhiana. Work completed , final agrrement is expected to be signed by May'24. Updated in 218th OCC by PSTCL.
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	Commissioned	Stringing of 2nd Circuit of Chamera Pool-Karian Tansmission line has been completed & terminal bay at 400/220 kV chamera pooling substation (PGCIL) is commissioned on 20.01.2024. Updated in 217th 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'25	2 Nos. bays for 400 kV PGCIL Patiala - 220 kV Bhadson (D/C) line being planned. Tender is yet to be awarded. Timeline one year communicated by PSTCL in 220th OCC meeting

Status of ADMS implementation in NR:

Sl. No.	State / UT	Status	Remarks
1	DELHI	Scheme Implemented but operated in manual mode.	A committee has been constituted under the chairmanship of GM, SLDC Delhi to formulate the logic for implementation of ADMS. Delhi SLDC informed that two meetings have been held by the committee and based on the delibration in those meetings, SoP has been formed by the committee. Delhi SLDC has shared the logic for implementation of ADMS with NRLDC for their observation and upon examination of same NRLDC has submitted its views/comments to Delhi SLDC. In 222nd OCC meeting Delhi SLDC intimated that they would be shortly having a meeting with its Discoms and NRLDC views would be delibrated in the said meeting. Delhi SLDC intimated that they have shared revised SoP with NRPC and NRLDC after incorporating the views of NRLDC In 225th OCC meeting NRPC representative apprised forum that revised Standard Operating Procedure (SOP) of Automatic Demand ManagementScheme (ADMS) by the DISCOMs in NCT of Delhi has been discussed in 51st TCC and 76th NRPC meeting.
2	HARYANA	Scheme not implemented	Haryana SLDC intimated that as per Joint Roadmap of implementation of ADMS in Haryana supplied to NRPC vide memo dated 17.10.2023 (Annexure-II), the implementation plan was proposed to be carried out in two parts, as mentioned below: PART-I: Control with Transmission Utility PART-II: Control with Distribution Utility It is pertinent to mention that as part of upcoming SCADA-EMS system i.e. upgradation of SCADA-EMS system, a feature in the name of LSS (Load Shedding Software)/ ADMS is part of the Technical Specification of project to be delivered. Therefore, the functionalities of ADMS application will be covered under 'Part-I: Control with Transmission Utility' will already be covered using the RTUs available at select substations along with the ADMS software being delivered by M/s GE under SCADA upgradation project. Hence, there is no need to acquire a separate ADMS application & associated hardware for data centre for implementation of PART-I. Further for Part -II a committee has been constituted for further finalization of the ADMS module with control with Discoms is under discussions for preparation of DPR.
3	HP	Scheme not implemented	HP SLDC imentioned that HPSEB had intimated that initially 142 Nos. of feeders were identified for operation under ADMS functionality but most of these feeders were from same sub-station. Therefore, now they have increased the no. of sub-station and identified the non-critical feeders. Load relief to be given through these feeders is under finalization. The revised feeder list to be shared by HPSEBL with the SLDC within one month.
4	PUNJAB	Scheme not implemented	i. A committee comprising of following officers of PSPCL & PSTCL has been constituted to finalize the logic regarding implementation of Automatic Demand Management System in Punjab Control Area. A meeting in this regard was held on dated 26-02-2024 at PSLDC Complex, Patiala. The committee deliberated various loading scenarios and proposed the following logic for the management of demand: 1. If the frequency sustains below 49.90 Hz for duration of 3 minutes, the Automatic Demand Management System will initiate a 50% reduction in the Over Drawl. 2. In case the frequency falls further below 49.85 Hz, the Over Drawl will be reduced to zero. 3. The software at the SLDC end for ADMS shall be available with ULDC phase –III SCADA system which is under implementation. ii. In 222nd OCC, MS NRPC asked Punjab to co-ordiante with Powergrid for integration of their propsoed logic with the ULDC phase-III SCADA system for timely implementation.

5	RAJASTHAN	Under implementation	In 225th OCC meeting, RVPN intimated that pilot testing has been completed on 16th October 2024. Further, 160 nos. of CBs have been mapped to ADMS, out of which 60 nos. have been tested under overdrawl condition. Remaining CB's are being contiously mapped in phased manner which is expected to be completed by end of December 2024.
6	UP	Scheme implemented by NPCIL only	i. A meeting regarding ADMS was held on 15.01.2023 with the UPPCL under the chairmanship of MD UPPTCL ii. A committee formed for identification of load at 33 kV level under the chairmanship of Director (Distribution), UPPCL. iii. Another committee under the chairmanship of Director UPSLDC shall identify the technical and operational requirement for ADMS implementation iv. The software at the SLDC end for ADMS shall be available with ULDC phase –III SCADA system which is under implementation and likely to be commissioned by March 2025. v. In order to operate identified 33 kV feeders under ADMS scheme, integration of 132 kV substations with SCADA system is under implementation in the Reliable Communication Scheme and expected date of completion of the scheme is October 2024. vi. MS, NRPC apprised forum that a letter has been written to Director, SLDC for co-odinatng with Director (Distribution), UPPCL for expediting the finalization of feeder list at 33kV for ADMS implementation.
7	UTTARAKHAND	Scheme not implemented	i. UPCL has prepared a system architecture in which all the non-monitored sub-stions have been selected and 11kV feeders have been considered for ADMS operation. For the scheme, discom has also done group-wise selection of feeders and quantum of MW relief to be given for automatic demand response at 11kV level has also been decided. UPCL has awarded the tender for implementation of the aforementioned scheme to M/s Metergy Pvt.Ltd. ii. As per the status report submitted by M/s Metergy Pvt.Ltd, the survey work of 30 nos. incomer sites have been completed and order has been placed by UPCL for hardware equipments. iii. Uttarakhand SLDC informed that feeder list at 11kV level has been finalized and logic of ADMS implementation is under finalization. iv. Uttarakhand has intimated that It is bring to your notice that installation MFT(Multi Function Transducers) at various interstate points at PTCUL Substations under ADRS Project of UPCL is in progress.

Annexure-A.I.III.

Status of availability of ERS towers in NR

Sl. No.	Transmission Utility	Voltage Level (220kV/400kV/765kV/ 500 kV HVDC etc.)	Length of the transmission lines owned by the Utility (Ckt. Kms.)	Number of ERS Sets (towers) available (Nos.)	ERS Set (towers) required as per the Govt. norms.	Location	Remarks
1	PTCUL	400kV	418.394	NIL	1		Tender has been opened and contract activities under process
		220kV	1045.135	NIL	1		
2	Powergrid NR-1	220 KV	1842.88	NIL	1		
		400 KV	11074.26	12 Towers	3	All 400kV ERS at Ballabhgarh	make-Lindsey
		765 KV	4721.85	15 Towers	1	All 765kV ERS at Meerut	Make-SBB
		500 KV HVDC	653.88	NIL	1		
		800 KV HVDC	416.58	NIL	1		
3	Powergrid NR-2	66 KV	37.56	Nil	1		ERS tower available for 400KV rating can be used in place of lower as well as higher voltage Towers. In case used for 765KV Line, No of towers can be erected will reduce due to increase in Tower Hight.
		132 KV	262.7	Nil	1		
		220 KV	2152	Nil	1		
		400 KV	8097.3	02 Set (32 Towers)	2	Kishenpur & Jalandhar	
		765 KV	337.5	Nil	1		
4	Powergrid NR-3	800KV HVDC	2205	NIL	1		400KV ERS will be also be used in other voltage level lines
		500KV HVDC	2566	NIL	1		
		765KV	4396	NIL	1		
		400KV	12254	26 Towers	3	Kanpur	
		220KV	1541	NIL	1		
		132KV	207	NIL	1		
5	PARBATI KOLDAM TRANSMISSION COMPANY LIMITED	400kV	457	NIL	1		Procurement under process.
6	PATRAN TRANSMISSION COMPANY LTD	400kV	0.4	NIL	1	It is kept in Bhopal and on need basis is moved across region	Not available, will tie up based on the requirements in future. However the parent company IndiGrid owns one set of ERS for all five regions.
7	NRSS-XXIX TRANSMISSION LTD	400kV	853	NIL	1		
8	GURGAON PALWAL TRANSMISSION LTD	400kV	272	NIL	1		
9	RAPP Transmission Company Limited.	400kV	402	NIL	1		
10	NRSS XXXVI Transmission Limited	400kV	301.924	NIL	1		Element I - Operational comprising of 3 kms. Element II - Work Under Progress comprising of 221.924 kms. Element II - Work Under Progress comprising of 77 kms.
11	HPPTCL	220 kV	659	NIL	1		
		400 kV	75.7	NIL	1		
12	RVPN	132 kV	18969.958	1	4	01 No. ERS available at 220 kV GSS Heerapura, Jaipur	ERS proposed : 01 Set at 400 kV GSS, Jodhpur. 01 set at 400 kV GSS Bikaner
		220 kV	16227.979		3		
		400 kV	6899.386		2		
		765 kV	425.498		1		
13	DTL	220kV	915.498	NIL	1	400kV Bamnauli Sub station	ERS tower available for 400KV rating can also be used for lower voltage lines as well
		400kV	249.19	02 Sets (32 towers)	1		
14	JKPTCL						JKPTCL, Jammu: being procured
15	HVPN						JKPTCL, Kashmir:10 tower procured (out of which 3 on loan to JKPTCL, Jammu)

Sl. No.	Transmission Utility	Voltage Level (220kV/400kV/765kV/ 500 kV HVDC etc.)	Length of the transmission lines owned by the Utility (Ckt. Kms.)	Number of ERS Sets (towers) available (Nos.)	ERS Set (towers) required as per the Govt. norms.	Location	Remarks
16	PSTCL	400 kV	1666.43	2	2		
		220 kV	7921.991				
17	UPPTCL 1- Meerut	132KV	27508.321	24 Nos(15 Running+9 Angle)		400 kV S/s Gr. Noida	ERS will be also be used in other voltage level lines.
		220KV	14973.453				
		400KV	6922.828				
	UPPTCL 2-Prayagraj	765KV	839.37	24 Towers		220 kv S/s phulpur	ERS will also be used in other voltage lines.
		400KV	1804.257				
		220KV	2578.932				
		132KV	4714.768				
18	POWERLINK						
19	POWERGRID HIMACHAL TRANSMISSION LTD						
20	Powergrid Ajmer Phagi Transmission Limited						
21	Powergrid Fatehgarh Transmission Limited						
22	POWERGRID KALA AMB TRANSMISSION LTD						
23	Powergrid Unchahar Transmission Ltd						
24	Powergrid Khetri Transmission Limited						
25	POWERGRID VARANASI TRANSMISSION SYSTEM LTD						
26	ADANI TRANSMISSION INDIA LIMITED		2090	1 Set (12 towers)	1 set (12 towers)	Sami (Gujarat)	Make-Lindsey ERS set available for 400KV & 500KV rating can be used for lower as well as higher voltage Towers. In case used for 765KV Line, No of towers can reduce due to increase in Tower Height & nos of conductors.
27	BIKANER KHETRI TRANSMISSION LIMITED		482				
28	FATEHGARH BHADLA TRANSMISSION LIMITED	500 kV HVDC 400 kV HVAC	291				
29	NRSS-XXXI(B) TRANSMISSION LTD	400 kV	577.74	Not Available	Not Available		In the advance stage of process of finalising arrangement for providing ERS on need basis with other transmission utility (M/s INDIGRID).
30	ARAVALI POWER COMPANY PVT LTD	765 kv HVAC					

*The transmission Utility with line length less than 500 ckt kms (of 400 KV lines) may be given option either to procure ERS or have agreement with other transmission utilities for providing ERS on mutually agreed terms, when need arises. (As per MoP directions)

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 (10.01.2024)
ANPARA TPS
HARDUAGANJ TPS
OBRA TPS
PARICHHA TPS

PSPCL (18.06.2024)
GGSSTP, Ropar
GH TPS (LEH.MOH.)
RRVUNL (20.11.2024)
CHHABRA SCPP
CHHABRA TPP
KALISINDH TPS
KOTA TPS
SURATGARH SCTPS
SURATGARH TPS

Updated status of FGD related data submission

Lalitpur Power Gen. Co. Ltd. (10.01.2024)
Lalitpur TPS
Lanco Anpara Power Ltd. (01.01.2024)
ANPARA-C TPS

HGPCL (22.11.2024)
PANIPAT TPS
RAJIV GANDHI TPS
YAMUNA NAGAR TPS

Adani Power Ltd. (18.02.2022)
KAWAI TPS

Rosa Power Supply Company (01.01.2024)
Rosa TPP Phase-I
Prayagraj Power Generation Company Ltd. (05.01.2024)
Prayagraj TPP
APCPL (01.05.2024)
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#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: 31-12-2025), PANIPAT TPS U#7 (Target: 31-12-2025), PANIPAT TPS U#8 (Target: 31-12-2025), RAJIV GANDHI TPS U#1 (Target: 31-08-2027), RAJIV GANDHI TPS U#2 (Target: 31-08-2027), YAMUNA NAGAR TPS U#1 (Target: 31-08-2027), YAMUNA NAGAR TPS U#2 (Target: 31-08-2027)

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: 31-12-2025), ANPARA C TPS U#2 (Target: 31-12-2025)
Prayagraj Power Generation Company Ltd.	PRAYAGRAJ TPP U#1 (Target: 31-12-2026), PRAYAGRAJ TPP U#2 (Target: 31-12-2026), PRAYAGRAJ TPP U#3 (Target: 31-12-2026)
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: 30-11-2025), KOTA TPS U#6 (Target: 30-11-2025), KOTA TPS U#7 (Target: 30-11-2025), 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: 31-12-2025), ANPARA TPS U#2 (Target: 31-12-2025), ANPARA TPS U#3 (Target: 31-12-2025), ANPARA TPS U#4 (Target: 31-12-2025), ANPARA TPS U#5 (Target: 31-12-2025), ANPARA TPS U#6 (Target: 31-12-2025), ANPARA TPS U#7 (Target: 31-12-2025), HARDUAGANJ TPS U#8 (Target: 31-12-2026), HARDUAGANJ TPS U#9 (Target: 31-12-2026), OBRA TPS U#9 (Target: 31-12-2026), OBRA TPS U#10 (Target: 31-12-2026), OBRA TPS U#11 (Target: 31-12-2026), OBRA TPS U#12 (Target: 31-12-2026), OBRA TPS U#13 (Target: 31-12-2026), PARICHHA TPS U#3 (Target: 31-12-2026), PARICHHA TPS U#4 (Target: 31-12-2026), PARICHHA TPS U#5 (Target: 31-12-2026), PARICHHA TPS U#6 (Target: 31-12-2026)

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	NAPS IS	UP	Implemented	Yes (08-10-2021)	Yes	Yes	-
2	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.
3	Delhi IS	Delhi	Implemented				
4	Pathankot-RSD IS	Punjab	Implemented				

Under Implementation/ Newly Proposed/Under Discussion

Sl. No.	Islanding Scheme	SLDC	Status	Details of progress	DPR for PSDF funding (Required / Not 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. In the 225th OCC meeting, UPPTCL representative apprised that Unchahar-Lucknow Islanding scheme has been successfully implemented and same is visible at SCADA of UPSLDC also (except 03 Substation: Namely 132 kV S/s tripula, 132 kV S/s bachhrawan and 132 kV S/s Hussainganj.) The data of above 03 substation is not available at UPSLDC due to lack of OPGW. The work of laying OPGW cable is under progress and same shall be completed by the end of November.		-		-	-	-	-	-	-	-	-
2	Agra IS	UP	Under Implementation	Scheme has been approved in 71th NRPC meeting held on 29.01.2024. In 225th OCC, UPPTCL representative apprised forum that management is of view that procurement of UFRs for the Lalitpur-Agra islanding scheme should be explored through PSDF funding. A proposal for the same has been prepared and will be submitted to the PSDF Secretariat within the next two weeks.		-		-	-	-	-	-	-	-	-
3	Jodhpur-Barmer-Rajwest IS	Rajasthan	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. In 225th OCC, RRVPNL representative mentioned logic for they have revised their DPR for JodhpurBarmer-Rajwest IS and, instead of using cloud storage, they will be opting for network-attached storage. As a result, there is a price variation, and they will need to obtain approval from their management once again and thereafter they would submit the proposal for PSDF funding.	-	-		-	-	-	-	-	-	-	-
4	Suratgarh IS	Rajasthan	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. In 225th OCC, RRVPNL representative mentioned DPR for implementation of Suratgarh islanding scheme would be submitted after finalization of DPR for JodhpurBarmer-Rajwest islanding scheme.	-	-		-	-	-	-	-	-	-	-
5	Patiala-Nabha Power Rajpura IS	Punjab	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. In 225th OCC, Punjab SLDC apprised forum that during a meeting with the PSDF Secretariat on 22nd October 2024, they had given a presentation on the DPR submitted to the PSDF Secretariat, and the minutes of the meeting are awaited.		-		-	-	-	-	-	-	-	-
6	Kullu-Manali-Mandi IS	HP	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. In 225th OCC, HPSLDC representative informed that proposed UFR scheme for Kullu-Manali islanding scheme has been recommended by the Appraisal Committee of the State PSDF for approval of Hon'ble HPERC. The islanding scheme would now be taken up in the Monitoring committee for State PSDF funding approval. Meeting of Monitoring committee is yet to be convened.		-		-	-	-	-	-	-	-	-
7	Shimla-Solan IS	HP	Under Implementation	Scheme has been approved in 60th NRPC meeting held on 30.11.2022. a separate meeting was conducted by NRPC Sectt. with HPSLDC, HPSEBL and M/s GE on 18.09.2024, wherein HPSEBL informed that payment to M/s GE would be made within two months and subsequently work regarding the implementation in revised setting of Bhaba HEP would be completed by M/s GE within one month. In the meeting, HPSLDC also informed that they had sent a letter to all concerned generators requesting them to lower the UFR settings of their generators to below 47.5 Hz.											

											Approved Planned Outage-1			Actual Planned Outage-1		
Capacity (MW) 30-11-2023	Name of Station	UNIT_NM	STN_TYPE_ID	SECTOR	REGION_NM	ST_NM	SH_NM	IPP	FUEL_NM	Capacity (MW) 31-03-2025	Start Date	End Date	Reason	Start Date	End Date	Reason for any deviation
250	PRAGATI CCGT-III	1	T	STATE SECTOR	Northern	Delhi	PPCL	FALSE	NATURAL GAS	250	1-Nov-24	17-Nov-24	Mark VI upgradation			
250	PRAGATI CCGT-III	3	T	STATE SECTOR	Northern	Delhi	PPCL	FALSE	NATURAL GAS	250	1-Nov-24	20-Nov-24	Hot Gas path inspection			
250	PRAGATI CCGT-III	4	T	STATE SECTOR	Northern	Delhi	PPCL	FALSE	NATURAL GAS	250	2-Oct-24	1-Nov-24	Boiler Inspection			
660	KAWAI TPS	2	T	IPP SECTOR	Northern	Rajasthan	APL	FALSE	COAL	660	1-Nov-24	25-Nov-24	AOH			
250	HARDUAGANJ TPS	8	T	STATE SECTOR	Northern	Uttar Pradesh	UPRVUNL	FALSE	COAL	250	15-Oct-24	28-Nov-24	COH			
500	RIHAND STPS	2	T	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	FALSE	COAL-P	500	1-Oct-24	14-Nov-24	COH			
210	UNCHAHAR TPS	4	T	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	FALSE	COAL	210	1-Oct-24	4-Nov-24	AOH			
490	DADRI (NCTPP)	6	T	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	FALSE	COAL	490	7-Oct-24	20-Nov-24	Boiler Overhauling			
135	JALIPA KAPURDI TPP	2	T	IPP SECTOR	Northern	Rajasthan	JSWBL	FALSE	LIGNITE	135	13-Nov-24	20-Nov-24	Boiler Inspection			
111.19	AURAIYA CCPP	3	T	CENTRAL SECTOR	Northern	Uttar Pradesh	NTPC Ltd.	FALSE	NATURAL GAS	111.19	19-Nov-24	19-Nov-24	Boiler License Renewal			

सत्यमेव जयते

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

विषय: भार प्रेषण केंद्रों के लिए कार्यबल पर्याप्तता दिशानिर्देशों का अनुपालन-संबंधी।

Subject: Compliance of "Workforce adequacy guidelines for Load Despatch Centres"-reg.

This is with reference to D. O. letter dated 25.11.2024 received from Joint Secretary, Ministry of Power, Govt. of India attached therewith "**Workforce adequacy guidelines for Load Despatch Centres**" (Copy attached). There guidelines will serve as a benchmark for enhancing the Load Despatch Centres by ensuring they are equipped with sufficient skilled human resources.

2. As per these guidelines, States are required to identify exiting staffing gaps within the SLDCs and to formulate a phased staffing plan to address these gaps in order to ensure smooth grid operations. These guidelines also mandate training and certification of all System Operators at SLDCs in line with the Government of India's standards.

3. In view of above, all SLDC's of NR are requested to take necessary action for compliance/implement these guidelines which will play a significant role in enhancing the operation capacity of SLDCs.

संलग्नक: यथोपरि

Signed by Dharmendra Kumar Meena
Date: 02-12-2024 14:22:21

(डी. के. मीना)
निदेशक **(प्रचालन)**

सेवा में,

Chief Engineer/General Manager of respective SLDC's of NR

सूचनार्थ:

General Manager, NRLDC

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

PIYUSH SINGH, IAS
संयुक्त सचिव
JOINT SECRETARY

Tel : 011-23714367
Email: singhp7@nic.in

सत्यमेव जयते

भारत सरकार
GOVERNMENT OF INDIA
विद्युत मंत्रालय
MINISTRY OF POWER
श्रम शक्ति भवन, रफी मार्ग
SHRAM SHAKTI BHAWAN, RAFI MARG

नई दिल्ली - 110001
NEW DELHI - 110001

DO. No. 22-1306/4/2022-OM

25th November, 2024

Respected Sir / Madam,

Please refer to Ministry of Power's letter of even number dated the October 30, 2024 circulating therewith **'Workforce Adequacy Guidelines for Load Despatch Centres'** (copy enclosed) for compliance by the States/UTs. These Guidelines will serve as a benchmark for enhancing the Load Despatch Centres by ensuring they are equipped with sufficient skilled human resources.

2. In terms of these guidelines, States are required to identify existing staffing gap within their SLDCs and to formulate a phased staffing plan to address these gaps in order to ensure smooth grid operations. These Guidelines also mandates training and certification of all System Operators at SLDCs in line with the Government of India's standards. This will help build necessary technical expertise in grid operations, renewable energy integration and cyber security etc.

3. The need for priority action by the States/UTs to comply with these Staffing Guidelines was emphasized by Hon'ble Minister of Power and Housing & Urban Affairs in the Power Ministers' Conference held at New Delhi on November 12, 2024. The same was acknowledged by the States/UTs.

4. I would be grateful if you could kindly issue necessary instructions for compliance of the Workforce Adequacy Guidelines in order to strengthen SLDC in your States. Your cooperation in implementing these guidelines will play a significant role in enhancing the operational capacity of SLDCs and contribute to a more reliable and resilient power grid.

With Regards,

Yours sincerely

(Piyush Singh)

Secretaries/ Principal Secretaries (Energy/Power) of All States/UTs

Copy for information to:

CMD, Grid India.

RIGHT TO INFORMATION

स्वच्छ भारत
एक कदम स्वच्छता की ओर

Workforce Adequacy Guidelines for Load Despatch Centres

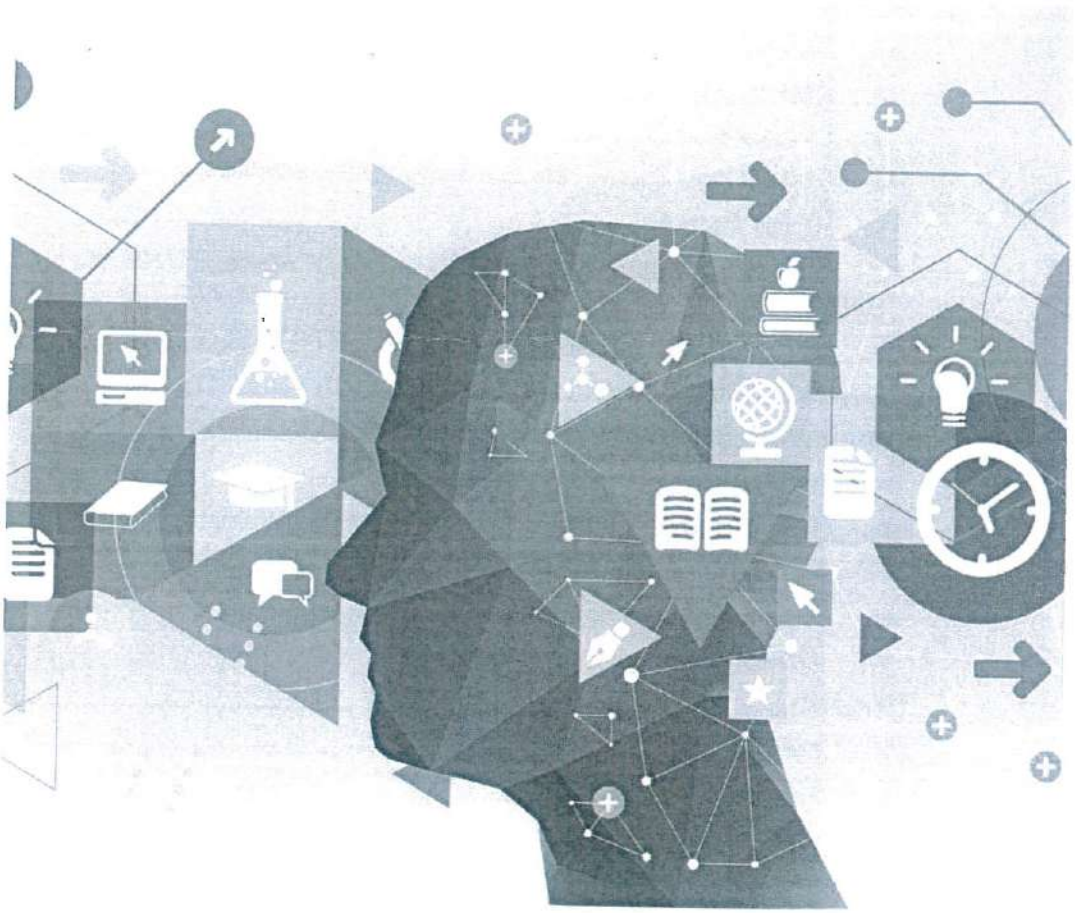


Table of Contents

Introduction

The Electricity Act 2003 designates the Load Despatch Centres (LDCs) as apex bodies to ensure integrated, secure, reliable, economic, and efficient operation of power system under their jurisdiction. The LDCs would play an important role in facilitating the energy transition towards a sustainable and decarbonised electricity grid. Human Capital is the most important Asset in in any organizational setup. Human Resource adequacy has a direct effect on performance and efficiency of all functions and activities. Since LDCs carry out mission critical activities on a 24X7 basis, the availability of adequate human resources in the Load Despatch Centres play a very critical role for reliable and efficient power supply. These guidelines have been formulated to provide a benchmark for strengthening the State Load Despatch Centres by ensuring adequacy of skilled human resources.

The Committee on 'Manpower, Certification, and Incentives for System Operation and Ring-fencing Load Despatch Centres' 2008, estimated a total requirement of 60-70 persons in each Load Despatch Centre. However, it has been more than 14 years since the report was published and the landscape of Indian Power Sector has undergone major transformations since then.

The report on 'Capacity Building of Indian Load Despatchers'(CABIL) endorsed by the Forum of Regulators in 2018 elaborated the manifold expansion in the roles and responsibilities of the load despatch centres in India. The load despatch centres were placed in three groups viz Group-A (Large LDCs), Medium LDCs and Emerging LDCs. The total number of executives (including Supervisors, excluding staff for Sub-LDCs, Physical Security and REMC) in Group-A (Large LDCs) recommended in the report was in the range of 100 – 150 nos. The report further recommends additional 25 personnel for Renewable Energy Management Centres (REMCs).

Categorization of Load Despatch Centres

Considering the diversity of power system profile of different states in terms of their peak demand met, energy consumption and installed capacity of Renewable Energy Sources, all SLDCs have been categorised. Their Human Capital requirements are different as well. The thirty-five SLDCs have been grouped into three categories – Large SLDCs, Medium SLDCs, Emerging SLDCs. NLDC and RLDCs have been considered in the category of large LDCs for the purpose of estimating workforce requirement.

Table 1- Categorisation of SLDCs

S. No.	Large SLDCs	Medium SLDCs	Emerging SLDCs
1	Andhra Pradesh	Assam	Arunachal Pradesh
2	Gujarat	Bihar	Chandigarh
3	Haryana	Chhattisgarh	Dadra and Nagar Haveli /Daman & Diu
4	Karnataka	Damodar Valley Corporation	Goa
5	Maharashtra	Delhi	Manipur
6	Madhya Pradesh	Himachal Pradesh	Meghalaya
7	Punjab	Jammu & Kashmir and Ladakh	Mizoram
8	Rajasthan	Jharkhand	Nagaland
9	Tamil Nadu	Kerala	Puducherry
10	Telangana	Odisha	Sikkim
11	Uttar Pradesh	Uttarakhand	Tripura
12	West Bengal		Andaman & Nicobar*
13			Lakshadweep**

* As of now, LDC functions of A& N are being managed by the Energy Management Centre (EMC) at Port Blair. Considering the power system profiles such as Peak Demand Met, Energy Consumption and Installed Capacity of Renewable Energy Sources, A&N can be categorize under Emerging LDC.

** Managed by Electricity Department, Lakshadweep

The functions discharged by LDCs can be broadly classified into following categories - System Operation (SO), Market Operation (MO), Logistics, and

Support services. The System Operation function covers operational planning (including assessments, studies, crew management), real-time operation (including scheduling, forecasting, outage planning and reporting) and post despatch analysis (including reporting, MIS, feedback and analytics). The market operation function covers open access administration, day ahead market, real-time market, energy accounting and settlement activities, regulatory functions etc. Logistics covers decision support, Information technology. Cyber Security has emerged as an important function and requires dedicated specialized personnel. Support Services include human resource management, contract services, finance and account, establishment, administration are support services.

There are thirteen Renewable Energy Management Centre (REMC) in India which include the REMCs in Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Telangana, Tamil Nadu, Karnataka and Andhra Pradesh which are collocated with SLDCs. The REMCs are also envisaged for UT Ladakh and 3 more locations (under discussion stage). The REMC takes care of the forecasting, scheduling and real-time monitoring renewable energy resources. REMCs at all regions require dedicated, specialized employees.

Imperatives

In the past decade, due to rapid developments / interventions in the sector, through reforms, policy initiatives, changing corporate landscape and LDCs' own evolving roles in the Power Sector, several imperatives have emerged. Additional HR will be required to meet challenges related to exponential increase in electrical energy demand, growth in the economy and changes in technology, regulations, market design, administration and management of the power system. These imperatives will impact functions and require additional resources including Human Resources. Some of these are enumerated below:

1. Grid management has transitioned from supervisory role to sophisticated controls & faster Electricity Market administration such as Automatic Generation Control, System Integrity Protection Systems, Real Time

Market, Advance metering Architecture/Smart Grid. There is now an increased thrust on optimization – Economic Dispatch, Energy Optimization, Asset Optimization and Demand Optimization.

2. In addition to the round-the-clock System Operation, the Load Despatch Centres are expected to contribute in Market Operation, research & analysis, support / advocacy in regulatory affairs, Data dissemination (system data acquisition, Communication, IT systems) and other establishment services to carry out the various functions with suitably skilled workforce.

3. There have been dynamic changes in the electricity consumption patterns, in addition to this, System Operation is facing another major challenge of integration of Renewable resources, such as Solar & wind, in line with India's commitment to Climate change & NDC targets. This brings in new challenges in respect of its variability, intermittency and technological aspects associated with Power electronic devices. Further, constraints in terms of flexibility of conventional resources also contribute towards these challenges.

4. LDCs have undertaken several new work domains to improve reliability, security and economy, these include:- Load forecasting, RE forecasting, fuel security assessment, production cost optimization studies, generation outage planning, transmission outage planning, assessment of Transfer Capability, Reactive Power studies, Short circuit and transient stability studies, small signal stability studies, Electromagnetic transient studies, Mock black start drills, Activation of back up control centre, preparations for special events like festivals, natural calamities like cyclone, floods etc. and documentation of procedures (operating, restoration).

5. With advent of new players such as distributed generation, storage, electric vehicles, aggregators etc., there is a need for renewed thrust in areas such as Market Design, Open Access Administration, Day Ahead

Market, Real Time Market, Ancillary Services Market, Metering, Accounting, Settlement & Pool Accounts, Tax reconciliation & LDC fees and charges etc. With introduction of ancillary services, forecasting scheduling & deviation settlement regulations for RES, demand for market-based instruments (balancing & flexibility services viz. AGC, fast response tertiary regulation, ramping, load following etc.) is likely to arise on a significant scale. Hence, adequate personnel will be required to meet these challenges and carry out these evolving activities.

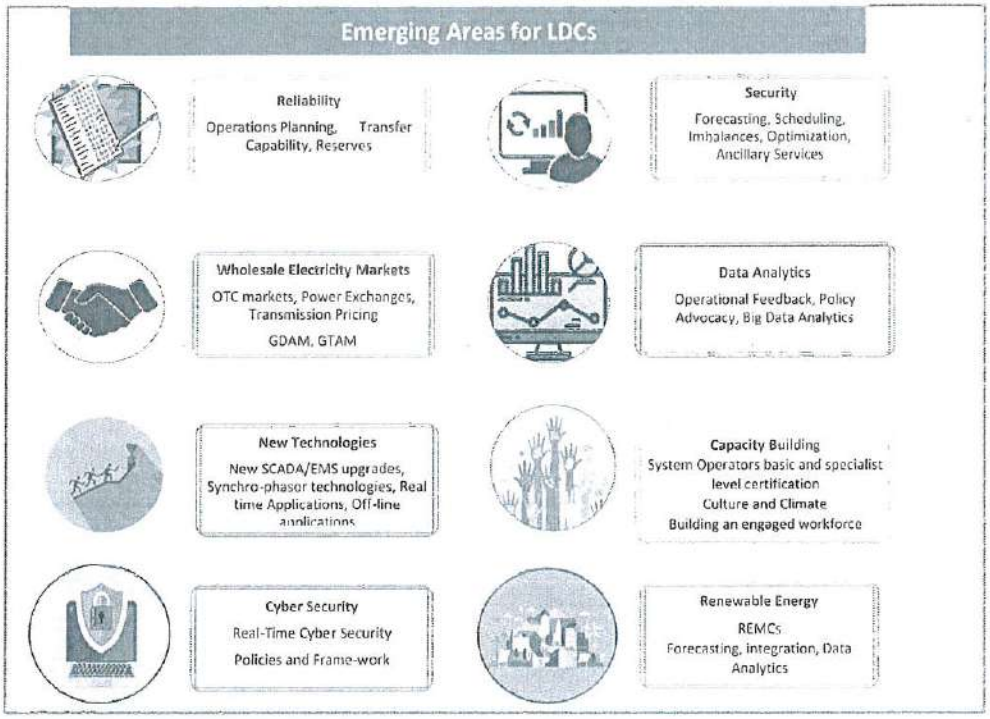
6. On technology front, focus areas essential for building and strengthening of technical infrastructure in LDCs are Engineering of new SCADA/EMS upgrades, Synchro-phasor technologies, Real time Applications, Off-line applications, Big Data Analytics tools, Website development, upgrading and maintaining Cyber security, etc.

7. Cyber Security is a new emerging area, where keeping updated, timely assessment of threats and facilitating collaboration on devising policies and strategies to strengthen Cyber Security efforts across Power Systems is important

8. Furthermore, for efficient running of the LDCs HR functions, Finance functions, Planning, Vigilance, etc. deployment of matching additional HR Resources would be a necessity.

9. There should be a sufficient number of power system operators to ensure that the grid can be operated safely and efficiently at all times, and that operators are not overworked. There is a need for some type of rotation of staff for scheduling, continuity of service and stress reduction of the power system operators, hence, a minimum tenure and reserve shift are important.

Figure 1- Emerging Areas for LDCs



Methodology adopted for working out HR Requirement

1. Based on existing functions and envisaged future functions, an organigram was prepared for LDCs.

2. Comprehensive list of existing and anticipated activities based on present area of operations and anticipated requirements was prepared.

3. Working out FTE (Full Time Equivalent) requirement for each activity- This was done based on daily time-required estimate for completion of each activity. FTEs have been estimated in particular function in increments of 0.25.

4. While estimating FTE Requirement, degree of automation and outsourcing which is present and/ or anticipated is also accounted for. Certain activities such as housekeeping, security etc. are envisaged to

be outsourced completely, with only supervisory function remaining with the LDCs.

5. In critical functions such as Real-Time System operation, it is essential to plan for contingencies and build reserves, a requirement underscored by COVID-19 Pandemic. Hence, in a major change of approach, a reserve shift has been considered, making it 5 shifts in total for Real –Time Grid Management.

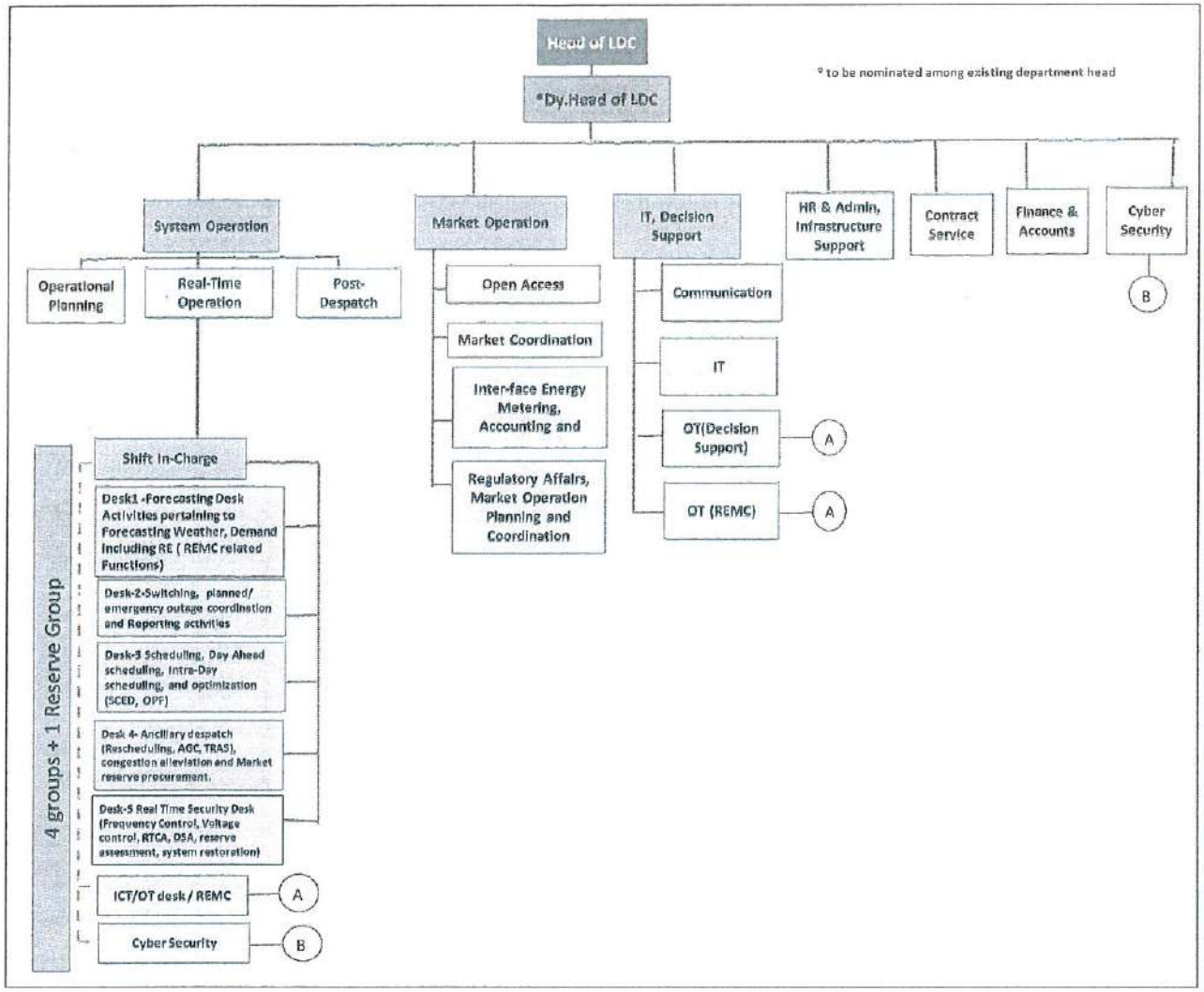
6. The number of activities performed in Large, Medium and emerging LDCs remain more or less the same, the volume and extent of the activities being carried out differs based on the size of the LDC, hence, the number of personnel differs at each LDC. There are certain statutory activities which will remain the same irrespective of the size of the LDCs and therefore, a minimum number of workforce allocation will be required at each LDC.

DEPARTMENT CATEGORISATION - NLDC, RLDCs & SLDCs

FTEs allocation has been done to these 7 Functions: i. System Operation,ii. Market Operation iii. Logistics iv. Cyber Security v. Contract Services vi. Finance and Accounts vii HR, Admin & Infrastructure Services. These numbers do not include workmen or staff requirement for non-core functions such as general upkeep of the premises, security, assistants etc. and do not include workmen, these requirements are different for every LDCs based on their local. Regional requirement and ongoing legacy.

Further, it is not envisaged that these numbers are achieved immediately, as culture and socialisation of employees is important it is important that there is a gradual scaling or workforce at every LDCs.

Figure 2- Typical Organogram for an LDC



1. System Operation

System Operation in each LDCs has been organized under three divisions- i. Operational Planning or Pre-Despatch; ii. Real-Time Operation- to be operated in Shifts, with respective Shift-In charges and with one offline In-charge, iii. Post-Despatch

a. Functions, roles and responsibilities of **Operational Planning** are as follows:-

i. Primary Frequency Response Testing
ii. Primary/secondary/tertiary reserve capacity assessment
iii. Validation of standards conformity test reports submitted by RE developers through in-house simulations
iv. Enforcement and Compliance of various standards and regulations under RE
v. Network model validation for simulation studies
vi. Fuel adequacy assessment
vii. Protection coordination, resilience coordination
viii. Enhanced coordination with stakeholders for system reliability for high impact low probability events (Lights off, cyclone, Solar Eclipse etc.
ix. Increasing number of Power System Elements- especially Renewables, EVs, Solar Roof-top
x. Studies such as Steady State Studies, Dynamic Studies, Optimisation Studies. Forecasting, Fuel Security Assessment and Generation & Network Outage Planning.
xi. Disaster Management Coordination
xii. Transnational Coordination, resilience coordination Mock black-start drills, contingency plans, Preparation for Special Events
xiii. Augmentation in Back-Up control centre operations- As a part of the initiatives to enhance resiliency of control centre operations, back-up control centres and disaster recovery systems are being implemented in some of the LDCs. Dedicated HR is required for satisfactory operation of these centres to enable them to cater for emergency situations.
xiv. Resource Crew Management, documentation

Some of the key additional functions also include Carrying out data intensive research consultation / collaboration with other grid operators, multilateral agencies, academia and other statutory bodies in India. Strengthening capabilities in system simulation, optimization, forecasting, model validation, data management, situational awareness, synchrophasor applications, dynamic security assessment and other decision support technologies, harmonization of operating procedure.

b. Functions, roles and responsibilities of **Real-Time Grid Operation** are as follows :

Real-Time operation is at the heart of any LDC. Therefore, adequate deployment of trained and certified personnel is required. Each control room must operate in five shift groups with 3-8 Nos. per shift. There would be total 5 shift groups. The fifth group is recommended to factor leave reserves and training needs of real-time operations personnel. This is in line with the international best practices. COVID-19 Pandemic has underscored the importance of Reserve Shifts. This fifth reserve group will ensure continuity of operation even in cases where entire groups have been quarantined Thus, the HR budget for real-time operations takes into account round-the clock operations, entitled leaves, public holidays, festivals, business travel, training, special assignments etc. making a total of 15 – 40 Nos. overall for control room shift operation.

These functions in each shift group have been segregated into desks, each desk will perform specific duties. Shifts will be headed by Shift In-charges, with an overall in-charge in offline (General Shift), to oversee and coordinate. The Desks are as follows:-

i. Desk 1- Forecasting Desk – Activities pertaining to Forecasting Weather, Demand including RE (REMC related Functions)

ii. Desk-2-Switching, planned/emergency outage coordination and Reporting activities

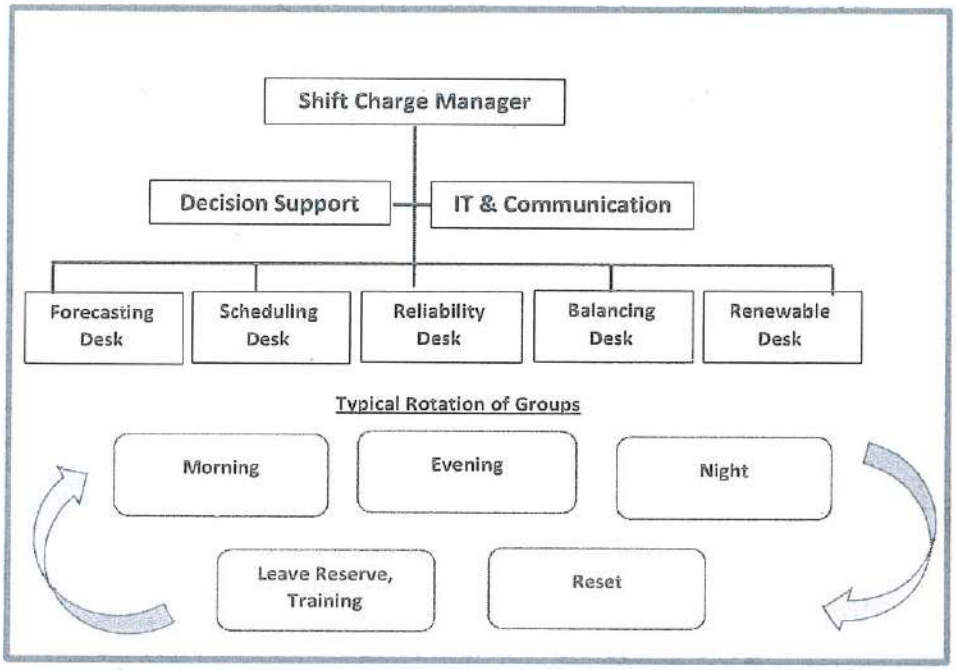
iii. Desk-3 Scheduling- Day Ahead scheduling, Intra-Day scheduling, and optimization (SCED, OPF)- for activities and functions pertaining to Security Constrained Economic Despatch and Optimal Power Flow.

iv. Desk 4- Ancillary despatch (Rescheduling, AGC, TRAS), congestion alleviation and market reserve procurement. This require dedicated persons in real-

time for reserve assessment, reserve procurement from DAM/RTM and despatch and coordination with the ancillary service providers.

v. Desk-5 Real Time Security Desk (Frequency Control, Voltage control, RTCA, DSA, reserve assessment, system restoration).

Figure 3- Organogram of Real-time shift operation



c. Functions, roles and responsibilities of **Post Despatch** are as follows: -

i. System performance assessment.

ii. MIS and Reporting, Grid standards, code compliance monitoring and reporting.

iii. Low Frequency Oscillation Display and Analysis Evaluating Primary Response- Inertia and frequency response Ramp performance assessment AGC response assessment Network availability verification Grid incident/ disturbance analysis, reporting and documentation.

iv. Operation feedback compilation.

v. Simulation of events and learning, Data analytics and research.

2. Market Operation

Market Operation function is an evolving Dynamic Function, which is changing due to various regulatory initiatives and reforms. Market Operation has been organized under 4 divisions - Open Access, Market Coordination, Inter-face Energy Metering, Accounting and Settlement, Regulatory Affairs. Functions and activities related to Electricity markets are limited in medium and emerging LDCs, hence, comparatively the staffing requirements are lower in these LDCs. Functions, roles and responsibilities which have been added to Market Operation include: -

a. Open Access Administration:

i. Administration of Electricity Market through National Open Access Registry (NOAR) Short term open access - bilateral / e-bidding Open Access Short term open access - collective / DAM, RTM, billing, collection, disbursement, reconciliation
ii. Day Ahead Market, proposed GDAM, MBED, Market coupling
iii. Real Time Market
iv. Accounting and settlement of Secondary/Tertiary Reserve and Ancillary Services
v. Ancillary Services Market
vi. forecasting scheduling & deviation settlement regulations for RES
vii. Market based instruments (balancing & flexibility services viz. AGC, fast response tertiary regulation, ramping, load following etc.)
viii. DSM Amendment Regulations

b. Market Coordination:

i. Grid Access- User registration, fees and charge sharing

ii. Market Participants Coordination, allocations, Energy contracts, losses, regulation of power supply, Day Ahead Ancillary Requirement

iii. Finalisation of inter-change schedule

c. **Inter-face Energy Metering, Accounting and Settlement:**

i. Energy meter placement and integration, FTC clearance

ii. Meter data collection, AMR

iii. Energy meter data validation including with SCADA

iv. Energy meter data processing

v. Energy accounting (active & reactive) including trans-national accounting, Congestion Account

vi. Congestion, Ancillary (SRAS, TRAS...) account

vii. SCED account

viii. Transmission charge computation

ix. Pool account operation including reconciliation (Finance Executive)

x. Transnational exchanges Settlement and Reconciliation

d. **Regulatory Affairs, Market Operation Planning and Coordination**

i. Market analytics,

ii. Market design feedback

iii. Audit / Stakeholder coordination

iv. Physical Grid access administration-Connectivity, long/medium term access

v. Power purchase agreement, database

vi. Regulatory compliance verification coordination, first time charging coordination, Performance test, COD verification

vii. Filing petitions and replies

viii. Coordination with legal, regulatory institutions, law firms

3. Logistics

Logistics functions have been organised in 4 divisions which are:- i. Operation Technology; ii. Renewable Energy Management Centres; iii. Information Technology; iv. Communication.

Real-Time SCADA/ IT Support Desk - With automation of the scheduling process and introduction of ancillary despatch, AGC control system, dynamic security assessment, the real-time supervision of the communication and the information technology systems has become critical. This desk would oversee the decision support systems and the data and speech communication in real-time.

b. Functions, roles and responsibilities of **Operation Technology Logistics** are as follows:

i. Engineering of upgrades of SCADA/ EMS, R&M, Integration of PMU and RTU,
ii. Development & Maintenance-SCADA database, SCADA Display, ICCP,
iii. Synchro-Phasor Technologies- Database and display development & maintenance
iv. Real-Time Software Application - SCED, AGC, RRAS, State Estimation
v. Decision Support-State Estimation, EMS, Dynamic security assessment, Optimal Power Flow
vi. Dispatcher training simulator maintenance
vii. Local and remote back up control centre (incl REMC) maintenance
viii. Power Supply System - UPS/DG Set, Control Room Air Conditioning
ix. AMC coordination, certification, verification
x. Support for real-time ICT/OT desk / REMC Support

c. Functions, roles and responsibilities of **Information Technology - Logistics** are as follows:

Advanced digitization and automation requirements without compromising cyber security and hygiene. Effective redundancy and disaster recovery mechanism which is seamless and wide-spread. The thrust would be towards timely execution of the Technology roadmap that has been evolved through a wide consultation.

i. IT systems infrastructure, networking, hardware engineering design and maintenance

ii. -JanIT systems- Application software maintenance

iii. Information access control and security (Implementation of CISO,

iv. CERT-GO Advisories)

v. Information interface (Internal, external)

vi. Database administration and maintenance

vii. Application software design and development

viii. Data analytic system

ix. Disaster recovery system

x. Data lake, warehouse and mining

d. Functions, roles and responsibilities of **Communication Logistics** are as follows:

i. Voice communication (Internal and external, recording)

ii. Data communication - (PLCC, Leased line, Optic fibre, GPRS, VSAT, Satellite), Wi-Fi

iii. Remote Conferencing and Meeting Facilities- Audio-Visual

iv. Communication Network Availability Verification

4. **Renewable Energy Management Centres(REMCs)**

The REMCs in the southern, western, northern region and the national REMC in New Delhi began operations in February 2020 are being managed by GRID - INDIA. They require dedicated human resource for maintaining the IT systems, overseeing the operations, and other related IT, OT and forecasting aspects.

Functions, roles and responsibilities of **Renewable Energy Management Centres** are as follows:

i. RES Integration
ii. REMC database/ Display development, maintenance, Support for Real-time REMC Desk
iii. Forecast Service Provider, Weather Service Provider coordination in REMC
iv. Availability and Performance Verification

5. **Cyber Security**

Cyber Security is a major focus area in view of changing Information Technology Landscape globally. A real-time 24X7 desk to coordinate activities and functions pertaining to Cyber Security in LDCs. RLDCs and NLDC are under the same corporate structure, a few cyber security functions have been centralised at GRID-INDIA, at the corporate level.

Functions, roles and responsibilities of **Cyber Security** are as follows:

i. Roles and responsibilities of CISO, Alternate CISO, and various requirement to coordinate with the statutory bodies and monitoring and ensuring cyber security initiatives and compliances within the LDC
ii. Coordination and enactment of cyber security controls and compliances.

i. SOC function - works related to 24 x 7 monitoring at Security operation Centre (if established at the organizational level) and

analysis of the events thereof, . With future growth and possibility of establishment of NOC (Network Operation Centre), SOC at unit level etc. the requirement may also increase.

ii. CISO, CERT GO related coordination with stakeholders, CERT-In, NCIIPC

iii. ISMS compliance

iv. Real-time Cyber security monitoring

6. Support Functions– Contract Services, Finance and Human Resources

For efficient running of the LDCs the support functions like HR/ Admin, Finance, Planning, Vigilance, Contract service, Legal etc. play a very important role. The Work place policies keep up with necessary protective measures and implementation and provide solutions to issues between team members, avoiding risk for the company and its employees. The financial information are required to operate effectively and efficiently, keeping the overall guidelines and direction.

Functions, roles and responsibilities of **Support Functions** are as follows:

Finance & Accounts : Revenue Accounting & Reconciliation, Pool Accounts & STOA - Accounting & Reconciliation, Third party payment (CAPEX/REPAX/Opex, Admin exp.) - Accounting, Payments, MIS, Maintenance of BG, Establishment - (Salary & Employee Claims, Loans and Advances) - Payments to employees viz Salary, TA, Medical, Contingent claims, Lease payments, Tax calculation, Issuance of Form 16, Filing of quarterly and annual TDS returns, Payment to retired Employees claims, Financial Concurrence and Committee works, Banking , Payment to employees & Third party on daily basis, Bank Reconciliation, Liaoning with bank, Taxation - Deposit of monthly tax, Filing of Quarterly & Annual return, TDS reconciliation, Coordination with Income Tax Deptt. GST Returns & Compliance, internal, statutory and CAG audits etc.

HR/HRD & Admin : Performance Appraisal & Coordinating Promotion, HRD, HR Operation, Social Security and Compliances including IMS/ DPE/ MoP/ CERC etc., Recruitment, HR Operation, Social Security and Compliances including IMS/ DPE/ MoP/ CERC etc., House Keeping, Despatch, Reception & Visitor Management; Welfare, AMS, Sports, Other agencies; Ergonomics & ambience - Furniture, Lighting, Acoustics, horticulture, Public Address System etc.

Contract Service: Quotation collection, tender preparation, GeM portal, Bid processing, opening, Placing of LoA/PO, Contract closing.

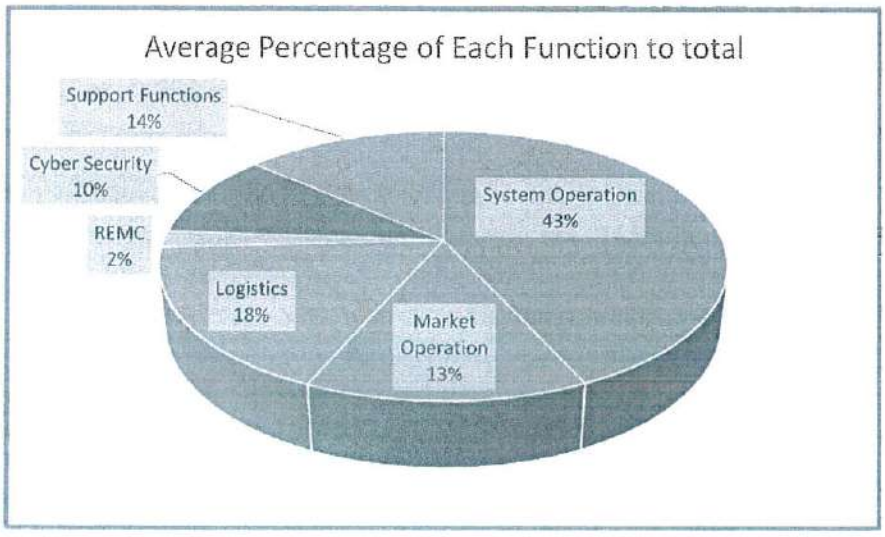
7. Summary of Function-wise Allocation of FTEs in LDCs are follows:-

Table 2- Function-wise Workforce allocation

LDCs - Workforce Staffing Norms						
SN	Function	NLDC	RLDC	Large SLDC	Medium SLDC	Emerging SLDC
System Operation						
1	System Operation - Operational Planning	18	18	18	16	9
2	Real Time Grid Operation (For SO only)	31	31	31	26	18
3	Post-Despatch	10	10	10	10	4
Sub -Total (SO)		**59**	**59**	**59**	**52**	**31**
Market Operation						
4	Open Access Administration	5	4	4	1	1
5	Market Coordination	4	4	4	3	1
6	Inter-face Energy Metering, Accounting and Settlement	10	8	8	4	1

7	Regulatory Affairs, Market Operation Planning and Coordination	7	5	5	1	1
Subtotal - MO		**26**	**21**	**21**	**9**	**4**
Logistics						
8	Logistics _Operation technology	15	14	14	8	3
9	IT Logistics	9	9	9	6	3
10	Communication Logistics	4	4	4	2	2
Subtotal - Logistics		**28**	**27**	**27**	**16**	**8**
REMC						
11	REMC Logistics	3	3	3	2	1
Cyber Security						
12	**Cyber Security**	**17**	**8**	**14**	**13**	**10**
Support Functions						
13	Contract Services	3	3	3	2	2
14	Finance and Accounts	9	9	9	5	3
15	HR & Admin	8	8	8	4	3
Subtotal -Support Functions		**20**	**20**	**20**	**11**	**8**
Grand-Total		**153**	**138**	**144**	**103**	**62**

Figure 4- Average percentage of each function



Level-Wise Requirement

In order to facilitate decision making and empower control rooms and functions to take decisions independently without any time lag and waiting for approval for all actions, it is imperative that appropriate senior level persons are deployed at every level.

Table 3- Level-wise Requirement at each LDC

Level	Percentage of total Workforce in LDCs
Top Management	1 %
Senior Management (experience of 20 years & above)	9 %
Middle Management (Experience of 15 -20 Years)	20 %
Working Executives (experience of below 15 Years)	70 %

a. Top Management:

Head of LDC- All LDCs are required to be headed by senior level executive, as they are required to interact with external stake-holder and give inputs. Hence, experienced and senior person is required who is able to communicate with all institutions such as SERCs, STUs & SLDCs and interact with head of institutions, at the level of Secretary of State Energy dept., CMD / Directors of other Power Utilities etc.

b. Senior Management:

i. They typically serve as Heads of functions (based on their seniority. Further, it is essential to keep succession planning in mind and these

senior executives shall take the roles of Head of LDCs / future Directors of similar institutions.

ii. Represent LDCs at various forums and multi-lateral agencies. They are responsible for motivating their teams, leading and coordinating efforts, and have to undertake assignments.

c. Middle Management Level

Will head each shift group and divisions, within functions in LDCs including function like HR, Finance etc. It is essential that he/she is given responsibility to ensure that there is independent real-time decision making. They are empowered to take complex actions and decisions. Thus, there is decentralization of authority and responsibility.

d. Working Level

These are working and learning levels and these employees progress through the hierarchy to take more responsibilities.

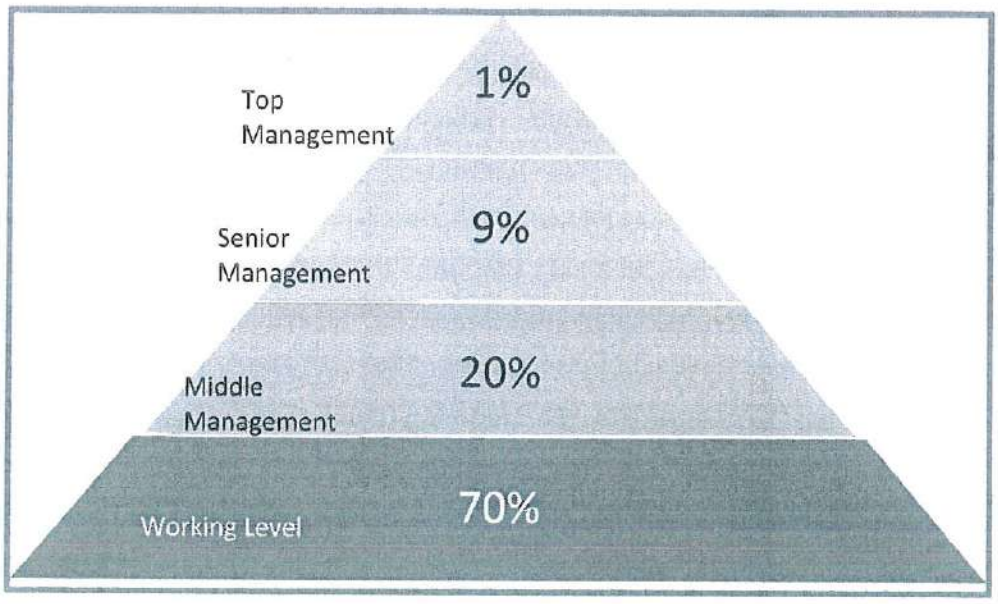


Figure 5- Level-wise distribution of Workforce

Creating Skilled and Motivated Workforce at LDCs

i. Training of System Operators

System operators need to be up-to-date with the evolving technology, policies, rules, standards, regulations, procedures and best practices. Therefore, capacity building through training and refresher programme has been implemented through National Power Training Institute (NPTI) for Load Despatchers. It is categorized into 3 levels - Basic Level, Specialist Level and Management Level. Basic Level System Operation programme is the foundation course required for all System Operators and can also be attended by those posted in other functional areas in LDCs. Basic Level Course on Cyber Security is required for those posted in IT & OT functions. The specialist courses on topics such as Reliability, Regulatory Framework in Power Sector, and Advanced course on Cyber Security are available for experienced specialist professionals employed in these respective fields in LDCs. The payment of Tuition fee for these courses is exempt for employees of SLDCs. Detailed list of Training Courses for LDC personnel is given at **Annexure-I.**

In addition to this, LDC personnel should also be encouraged to pursue online training and certification available at several national and international academic institutes and offered by Massive Online Open Courses (mooc) platforms such as LinkedIn Learning, Edx, Coursera etc. Learning has evolved from structured learning programs to individualised learning journeys where the content, pace, and assessment of the learning are tailored to the individual learner's needs and preferences. This approach allows learners to set their own learning goals. The learning journey must align to employees' career advancement as well as bridge the gaps between the present skills, knowledge and behaviours to what is required to meet future challenges and promote the mantra of 'Learning on the go'. Forum of Load Despatchers (FOLD) can also evolve its own e-learning platform, to cater to unique requirements of system operators.

ii. **Certification of System Operators & Fixed Retainer-Ship Incentives**

Presently, National Power Training Institute (NPTI) has been entrusted as Nodal Agency for Training & Certification of System Operators and various certification exams for Basic and Advance Level are being conducted by NPTI. List of training/certification programs is given at Annexure-I. As per Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2022, Ref No. CEA-PS-16/1/2021-CEI Division, dated 8th June 2023, ***"no personnel shall be engaged as Load Despatcher without certification"***. For details guidelines regarding mandatory Training & Certification of Basic and Advance Level refer Central Electricity Authority's ***"Statutory Guidelines for Training and Certification of Load Despatchers & Recognition of Training Institutes' January 2024".***

The Load Despatchers who acquire the certificate of basic level and of advance level in their respective area of specialization shall be allowed a fixed retainer-ship amount during the validity of such certificate period in line with the Central Electricity Authority's **"Statutory Guidelines for Training and Certification of Load Despatchers & Recognition of Training Institutes' January 2024.**

iii. **Short term exposure Programme for System Operators**

Power system operators should have the necessary education and training to perform their duties, and should be regularly updated on new technologies and industry developments, there should be concerted efforts to increase collaboration and communication among System Operators from LDCs. A Short-Term Exposure Programme has been envisaged to provide opportunity the system operators to learn from each other and to propagate best-practices. Rotation of System Operators would also enhance cohesive working and coordination in operations. The programme will include 2-10 days' duration rotational assignments to other LDCs. The officials from one LDC will be rotated to other LDCs in System Operation, Market Operation and Logistics functions. Detailed modalities of the Short-Term Exposure Programme are given **as Annexure- II.**

iv. Tenure of Posting in SLDCs

Reliable and safe operation of power systems is critical to the country. Tacit knowledge gained through practical experience is essential for handling minute to minute challenges and for training new entrants. Therefore, a minimum posting for a period of three years is recommended for any official posted in SLDC. Any person posted in an LDC shall be provided training and must acquire relevant basic level certificate within six months of being posted in the LDC.

v. Creating a Progressive Culture

LDCs play a critical role in ensuring the reliability and efficiency of the electric power grid. Organizational culture, the values, beliefs, and practices that shape how an organization functions.

There have been immense transformations in the power sector resulting into an increase in the scope, volume and complexities of all the functions. LDC's external business environment has always been fast-evolving, requiring continuous knowledge upgradation and inherently challenging. The years ahead will bring additional challenges, both anticipated and uncertain. LDC's success in meeting them will depend largely on an engaged, highly skilled and motivated workforce.

In order to build competence and ensure that LDCs are able to deliver high levels of performance, due importance must be given to developing a progressive culture and creating an ecosystem that values employees and empowers them.

A strong organizational culture can help establish trust with stakeholders, by promoting transparency and consistency, LDCs can demonstrate its commitment to fair and impartial decision-making internally and externally.

When employees feel that they are valued and respected, they are more likely to be committed to the organization and motivated to perform at their best.

A positive organizational culture can improve communication and collaboration among employees, which can help ensure that the grid is operated in a safe and efficient manner. It can help in building teamwork and trust among employees, resulting in better coordination and better outcomes.

An LDC's culture plays an important role in encouraging innovation, improving communication, attracting and retaining talents and maintaining safety and compliance. A strong, positive culture can help the LDCs operate more effectively and efficiently, and ultimately better serve the nation.

LDCs must create and provide opportunities to their employees for continuous professional development, employees must be given exposure and networking opportunities to interact and network. LDCs must participate in national and international for a such as FOLD, NPSC etc. Mentorship must be provided to the new joinees in the organization in order to assimilate and socialize them to the culture. Reward and recognition mechanisms must be designed to recognize high performance individuals, motivate and reward them.

Behavioral Training on topics such as communication skills, leadership skills and skill based training on topics such as Data Analysis. It is important to develop strong values and ethics in the organization to develop high performance culture which empowers every employee.

Apart from Training and Certification, clearly defined procedures and protocols for handling different types of situations help create clearly defined goals for System Operators and enables them to do carry out their functions effectively. Established performance parameters for organisations, departments and individuals such as Key Performance

Indicators (KPIs), Annual Appraisal for System Operators help peomote accountability and excellence. These create a positive work environment, where everyone is aware of their goals, roles and responsibilities and is responsible for outcomes.

Tools and processes must be established to ensure that there is communication and collaboration among all System Operators, especially among different shift groups, off-line studies, post-despatch functions. Special measures such as peer-to-peer learning sessions mjust be organised to ensure this.

Conclusion

Given the strategic and unique nature of LDC's operations, it is important to ensure sufficient bench strength for diverse functional areas and adequate talent pool for leadership roles at senior and top management. Optimal deployment of human resources is imperative for employee satisfaction and motivation across functions, regions and levels. Deployment of additional HR coupled with their capacity building as detailed above, is vital to effectively carry out the statutory/corporate roles and responsibilities at present and in the future to the satisfaction of all its stakeholders.

List of Tables

List of Figures

List of Abbreviations

1. LDCs- Load Despatch Centres
2. VUCA- Volatile Uncertain Complex and Ambiguous
3. REMC- Renewable Energy Management Centre
4. FTE- Full Time Equivalent
5. ESCerts- Energy Saving Certificates
6. RPO- Renewable Purchase Obligation
7. HPO- Hydro Purchase Obligation
8. REC- Renewable Energy Certificate
9. PAT- Perform Achieve Trade
10. CISF- Central Industrial Security Force
11. PSDF- Power System Development Fund
12. CERC- Central Electricity Regulatory Commission
13. CEA- Central Electricity Authority
14. MoP- Ministry of Power
15. CERT-GO- Computer Emergency Response Team Grid Operator
16. IMS- Integrated Management System
17. IT- Information Technology
18. OT- Operational Technology
19. NOAR- National Open Access Registry
20. SCED- Security Constrained Economic Despatch
21. AGC- Automatic Generation Control
22. EV- Electric Vehicles
23. DAM- Day Ahead Market
24. RTM- Real Time Market
25. STATCOM- Static Synchronous Compensator
26. SVC- Static Var Compensator
27. HVDC- High Voltage Direct Current
28. UFR- Under Frequency Relays
29. ROCOF- Rate of Change of Frequency
30. SPS- Special Protection Schemes
31. RPC- Regional Power Committee
32. FOLD- Forum of Load Despatchers
33. MIS- Management Information System
34. STOA- Short Term Open Access
35. SCADA- Supervisory Control and Data Acquisition
36. ICT- Information Communication Technology
37. PMU-Phasor Measurement Unit
38. RTU-Remote Terminal Unit
39. EMS- Energy Management System
40. UPS- Uninterruptible Power Supply
41. DG- Diesel Generator
42. CISO- Chief Information Security Officer
43. PLCC-Power Line carrier Communication
44. GPRS- General Packet Radio Service
45. VSAT-Very Small Aperture Terminal
46. ISMS- Information Security Management System

References

1. Report of Committee on 'Manpower, Certification, and Incentives for System Operation and Ring-fencing Load Despatch Centres
   https://forumofld.in/wp-content/uploads/2020/09/Pradhan_Committee_Report.pdf

2. Report on 'Capacity Building of Indian Load Despatchers'(CABIL)-
   http://www.forumofregulators.gov.in/data/reports/for%20report%20cabil.pdf

3. GRID - INDIA Vision 2030 document

4. Report on the Grid Disturbance on 30th July 2012 and 31st July 2012
   https://cercind.gov.in/2012/orders/Final_Report_Grid_Disturbance.pdf

5. Ministry of Power order dated 18th March 2021, regarding establishing CERT-GO to be housed at GRID - INDIA

1. System Operator Training Programmes

SN	Name of the Training Program	Level
1	Basic Level Programme on Power System Operation	Basic
2	Power Market	Specialist
3	Regulatory Framework in Power Sector	Specialist
4	Power System Logistics	Specialist
5	Power System Reliability	Specialist
6	RE source and Grid Integration	Specialist
7	Familiarization on Despatcher Training - Simulator	-
Cyber Security (Training cum Certification)		
8	Training and Certification Program on Cyber Security	Basic
9	Training and Certification Program on Cyber Security	Intermediate
10	Training and Certification Program on Cyber Security	Advance

2. System Operator Certification

SN	Name of the Certification	Level
1	Basic Level Power System Operation Certification	Basic
2	Advance Level Power System Reliability Certification	Specialist
3	Advance Level Regulatory Framework in Power Sector Certification	Specialist
4	Advance Level Market Operation	Specialist
5	Adance Level Power System Logistics Certification	Specialist

A Short-Term Exposure Programme to facilitate rotation of System Operators, to enhance cohesion and exposure among System Operators in LDCs is being implemented for all State Load Despatch Centres, Regional Load Despatch Centres and National Load Depatch Centre. The objective of this programme is to propagate best-practices, facilitate peer-to-peer learning from each other and propagate best-practices through hands on exposure of real time working of other LDCs This will be beneficial for new and emerging SLDCs, where resource adequacy concerns for multi-tasking executives have been expressed. The planned exposure programme comprises of rotation of LDC officials to other LDCs for a duration of Two to Ten Days.

1. Modalities
    a. Rotational assignments will be done on reciprocity basis. Generally, the ratio of requirement and number of persons to be rotated will endeavoured to be kept as 1:1, however, in certain cases especially for emerging LDCs this can be relaxed.
    b. All LDCs will analyse their own requirement, work out number of officers they wish to post to other LDCs for exposure, clearly specifying periods of assignments in both cases. Each LDC can prepare an **Annual Rotation Plan** for – (i) officials they wish to rotate to other LDCs and (ii) officials they can host in their LDC, keeping in mind their Human Resource Adequacy.
    c. The host organization may design specific programme including a few class-room sessions to facilitate the learning delivery in share with the visiting organization beforehand.
    d. In order to leverage familiarity and already established sense of comfort, initially the rotation will be within the same region.
    e. The Rotation will be in the areas of System Operation, Market Operation, Logistics and REMC Functions.

f. Any short-term assignment will be for a minimum period of 2 working days but not exceeding 10 working days in total.

2. Eligibility:-
   a. All LDC officials working in System Operation, Market Operation, Logistics and REMC functions will be eligible to be rotated to other LDCs.
   b. LDC officials should have minimum 1 year or regular service in an LDC before they can be considered for the exposure programme.

3. Execution
   a. LDCs can send their Annual Rotation Plan to the Forum of Load Despatchers (FOLD) Secretariat at the beginning of the Financial year.
   b. FOLD secretariat will compile requirements and assist in devising a Region-wise rotational plan on round-robin basis so that Human Resource adequacy is maintained at all Load Despatch Centres.
   c. This programme is focused on increasing capacity building of SLDCs, therefore, the focus must be on giving exposure to SLDC officials. However, to kickstart the programme, RLDCs and NLDC will start by posting their officers out to SLDCs and host officers from other LDCs in their region. FOLD Secretariat will coordinate the liasoning with LDCs, if require. Travel arrangement including accommodation & logistics will be done by respective LDCs.

4. TA/DA including accommodation expenses will be borne by the parent organization as per their rules. Host organization will not be obligated to provide any facility to the visiting officer.

Annexure to Short Term Exposure Programme:- Requirement Detail Format

Name of the LDC _____

Total number of Job Roles identified for officers from other LDCs_____

Details of the roles identified for officers from other LDCs

Sl. No.	Department	Area of the task/ project	Proposed Assignment Details (To which the officer from LDCs will be deputed)	Proposed Period of the Assignment (Start Date & End Date)

Demand projections for items / equipment to be taken up for Production Linked Incentive (PLI) for local manufacturing

S.No.	Item/equipment name	Prospective Manufacturers	Segment (Generation/ Transmission/ Distribution)	Rating (with measuring unit)	unit price (Rs)	Components/ input material	sourcing of components/input material (country of origin)	Year-wise demand for next 10 years										Proposed MLC Trajectory (in percent) from the 1st year of manufacturing (from say 20 percent to 100 percent)			
								2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	Year-1	Year-2	Year-3	Year-4
1	Resin Impregnated Paper (RIP) (separately for different ratings)																				
2	Oil Impregnated Paper (OIP) Bushings																				
3	Smart Meters/ Advanced metering infrastructure																				
4	Ring Main Unit (RMUs)																				
5	Supervisory Control and Data Acquisition (SCADA) Systems (hardware as well as software)																				
6	Inverters for various applications.																				
7	Generator Circuit Breakers (GCBs)																				
8	Subsea Cables																				
9	Remote Terminal Units (RTUs)																				
10	XLPE insulation Compound (for XLPE cables)																				
	Any other item																				

Minimum Local Content trajectory and Demand projections for Power Sector Equipment/ Components

S.No.	name of Item/equipment / EPC package/consultancy/ services/works	Harmonized System of Nomenclature (HSN) code	Names of Manufacturers	Domestically manufactured / imported	Country of source if imported	Segment (Generation/ Transmission/ Distribution)	Rating (with measuring unit)	unit price (Rs)	Components/ input material	sourcing of components/input material (country of origin)	Minimum Local Content trajectory (In %)						Year-wise demand for next 10 years									
											2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34
												60	70	80	90	100										

Name of the Organisation: ……

Annexure-I

(1) Minimum Local Content (MLC) under the para 3 (a) of the DPIIT's PPP-MII Order dated 19-07-2024.							
Sl. No.	**Electrical Equipment for Generation, Transmission and Distribution sectors with sufficent local capacity and competition**	**Existing Minimum Local Content (%)**	**Proposed Minimum Local Content (%)**	**Rationale for change (if any) in MLC (%)**	**HSN Code**	**Demand by procurers in next 5 years (annually)**	**Supply (name of vendors/ manufacturer with their manufacturing capacity - in appropriate units)**
	(A) Common items for Transmission, Distribution and Generation Sector						
1	Power Transformers (up to 765 kV, including Generator transformers)	60					
2	Instrument Transformer (up to 765 kV)	60					
3	Transformer Oil Dry Out System (TODOS)	60					
4	Reactors up to 765 kV	60					
5	Oil Impregnated Bushing (up to 400 kV)	60					
6	Resin Insultated Paper (RIP) bushings (up to 145 kV)	50					
7	Circuit Breakers (up to 765 kV AC - Alternating Current)	60					
8	Disconnectors/Isolators (up to 765 kV AC)	60					
9	Wave trap (up to 765 kV AC)	60					
10	Oil Filled Distribution Transformers up to & Including 33 kV [Cold Rolled Grain Oriented (CRGO)/Amorphous, Aluminium/Copper wound]	60					
11	Dry Type Distribution Transformer upto and including 33 kV (CRGO/Amorphous, Aluminium/Copper wound)	60					
12	Conventional Conductor	60					
13	Accessories for Conventional conductors	60					
14	High Temperature/High Temperature Low Sag (HTLS) conductors (such as Composite core, GAP, ACSS, INVAR, AL59) and Accessories	60					
15	Optical ground wire (OPGW) – all designs	60					
16	Fiber OpticTerminal Equipment (FOTE) for OPGW	50					
17	OPGW related Hardware and Accessories	60					
18	Remote Terminal Unit (RTU)	50					
19	Power Cables and accessories up to 33 kV	60					
20	Cotrol Cable including accessories	60					
21	XLPE Cables up to 220 kV	60					
21 A	XLPE Cables (above 220 kV and upto 400 kV)	50					
22	Substation Structures	60					
23	Transmission Line Towers	60					
24	Porcelain (Disc/Long Rod) Insulators	60					
25	Bus Post Insulators (Porcelain)	60					
26	Porcelain Disc Insulators with Room Temperature Valcanisation (RTV) coating	50					
27	Porcelain Longrod Insulators with Room Temperature Valcanisation (RTV) coating	50					
28	Hardware Fittings for Porcelain Insulators	60					
29	Composite/Polymeric Long Rod Insulators	60					
30	Hardware Fittings for Polymer Insulators	60					
31	Bird Flight Diverter (BFD)	60					
32	Power Line Carrier Communication (PLCC) System (up to 800 kV)	60					
33	Gas Insulated Switchgear (up to 400 kV AC)	60					
34	Gas Insulated Switchgear (above 400 kV AC)	50					
35	Surge/Lightning Arrester (up to 765 kV AC)	60					
36	Power Capacitors	60					
37	Packaged Sub-station (6.6 kV to 33 kV)	60					
38	Ring Main Unit (RMU) (up to 33 kV)	60					
39	Medium Voltage (MV) GIS Panels (up to 33 kV)	60					
40	Automation and Control System/ Supervisory Control and data Acquisition (SCADA) System in Power System	50					
41	Control and Relay Panel (including Digital/ Numerical Relays)	50					
42	Electrical Motors 0.37 kW to 1 MW	60					
43	Energy Meters including smart meters	50					
44	Control & power cables and Accessories (up to 1.1 kV)	60					
45	Diesel Generating (DG) set	60					
46	DC system (DC Battery & Battery Charger)	60					
47	AC & DC Distribution Board	60					
48	Indoor Air Insulated Switchgear (AIS) upto 33 kV	60					
49	Poles (PCC, PSCC, Rolled Steel Joist, Rail Pole, Spun, Steel Tubular)	60					
50	Material for Grounding/earthing system	60					
51	Illumination system	60					
52	Overhead Fault Sensing Indicator (FSI)	50					
53	Power Quality Meters	50					
54	Auxiliary Relays	50					
55	Load Break Switch	50					
	B) Hydro Sector						
56	Hydro Turbine & Associated Equipment						
	a) Francis Turbine	60					
	b) Kaplan Turbine	60					
	c) PeltonTurbine	50					
57	Main Inlet Valve & Associated Equipment	60					
58	Penstock protection Valve and Associated Equipment	60					
59	Governing system & Accessories	60					
60	Generator for Hydro Project & Associated Equipment	60					
61	Static Excitation System	60					
62	Workshop Equipment	60					
63	Cooling Water System	60					
64	Compressed Air System	60					
65	Drainage/Dewatering System	60					
66	Fire Protection System	60					

67	Heating, Ventilation & Air Conditioning System (HVAC)	60					
68	Oil Handling System	60					
69	Mechnical Balance of Plant Items (BOP) Items	60					
	C) Thermal Sector						
	Boiler Auxiliaries						
70	Air Pre-Heater	60					
71	Steam Coil Air Pre Heater (SCAPH)	60					
72	Steam soot blowers [wall blowers & Long Retractable Soot Blower (LRSB)]	60					
73	Auxiliary Steam Pressure Reducing & Desuperheating (PRDS)	60					
74	Fuel oil system	60					
75	Seal air Fan	60					
76	Ducts and dampers	60					
77	Duct expansion joints	60					
78	Blowdown tanks	60					
79	Coal burners and oil burners	60					
80	Coal mills	60					
81	Gear Box of Coal Mill	50					
82	Coal feeders	60					
83	Primary Air Fans	60					
84	Forced Draft Fans	60					
85	Induced Draft Fans	60					
86	Forced Draft (FD)/Induced Draft (ID)/ Primary Air (PA) Fan Servo Motor Assembly	50					
87	Tubes (Carbon Steel)	50					
88	Steel pipes (Coarbon Steel)	50					
89	Steam drum	50					
90	Separator	50					
91	Selective Catalytic Reduction (SCR)	50					
	Electro-Static Precipitators (ESPs)						
92	Casing	60					
93	Electrodes	60					
94	Rapping System	60					
95	Hopper Heaters	60					
96	Transformer Rectifiers	60					
97	Insulators	60					
	Turbine & Auxiliaries						
98	Turbine (High Pressure/Intermediate Pressure/Low Pressure)	50					
99	Condensate Extraction Pumps	60					
100	Condenser On line Tube Cleaning System (COLTC)	60					
101	Debris filters	60					
102	Deaerator	60					
103	Drain Cooler and Flash Tank	60					
104	ECW Pump	50					
105	Plate Heat Exchanger	50					
106	Self- cleaning filters	50					
107	Condensate Polishing Units (CPUs)	60					
108	Chemical Dosing System	60					
109	Oil Filter	60					
110	Gland Steam Condenser	60					
111	Oil Purifying Centrifuge	50					
112	Water Cooled Condenser	50					
113	Boiler Feed Pumps (BFPs)	50					
	Generator and Auxillieries						
114	Generator (including Seal Oil System, Hydrogen Cooling System, Stator water cooling system)	60					
	Electrical Works						
115	Control and metering equipment	60					
	Control & Instrumentation System (C&I System)						
116	Thermocouples	50					
117	Measuring instruments [Resistance Temperature Detectors (RTDs)], Local gauges	50					
118	Actuators (Pneumatic and conventional electric)	50					
119	Interplant Communication/ Public Address (PA) system except IP based	50					
	Coal Handling Plant						
120	Conveyors	60					
121	Wagon Tippler	60					
122	Side Arm Charger	60					
123	Paddle feeder	60					
124	Crushers & Screens	60					
125	Dust suppression (dry fog & plain water) system	60					
126	Air Compressors	50					
127	Magnetic separators & metal detectors	60					
128	Coal Sampling System	60					
129	Stacker cum reclaimer	60					
130	Belt weighing & monitoring system.	60					
131	Wheel & axle assembly (without bearings) for Bottom Opening Bottom Release (BOBR) Wagons	60					
	Ash Handling System						
132	Clinker grinder	60					
133	Water jet ejectors	60					
134	Scrapper chain conveyor	60					
135	Dry fly ash vacuum extraction system	60					
136	Pressure pneumatic conveying system	60					
137	Ash water & ash slurry pumps	60					
138	Compressors, air dryers & air receivers	50					
139	Ash water recovery system	60					
	Raw Water Intake & Supply System						
140	Travelling water screens	60					
141	Raw water supply pumps	60					
142	Valves, RE joints etc.	60					

	Water Treatment System and Effluent Treatment System						
143	Clarification plant	60					
144	Filtration plant	60					
145	Ultra filtration plant	50					
146	Reverse Osmosis (RO) plant and its membrane	55					
147	De-Mineralised water plant (DM Plant)	60					
148	Chlorination plant	60					
149	Chemical dosing system	60					
150	Effluent Treatment Plant	60					
	Circulationg Water (CW) & Auxiliary Circulating Water (ACW) System						
151	CW & ACW Pumps	60					
152	Butter Fly (BF) valves, Non-return Valves (NRVs) etc.	60					
153	Rubber Expansion (RE) joints	60					
154	Air release valves	60					
	Cooling Towers (NDCT/ IDCT)-Natural-Draft and Induced Draft Cooling Tower						
155	Water Distribution System	60					
156	Spray nozzles	60					
157	Packing	60					
158	Drift eliminators	60					
159	Cooling Tower (CT) Fans (for Induced Draft Cooling Towers IDCT)	60					
160	Gear boxes, shafts & motors (for IDCT)	60					
	Air Conditioning & Ventilation System						
161	Split & window air conditioners	60					
162	Chilling/ condensing unit [upto 500 ton of refrigeration(TR)]	55					
163	Air Handling Unit (AHU) and Fresh air unit	60					
164	Cooling Towers	60					
165	Air Washing Units (AWUs), axial fans, roof extractors	60					
166	Ducts, louvers & dampers	60					
	Flue Gas Desulphurization (FGD)						
167	Spray Nozzles,	50					
168	Spray header	50					
169	Oxidation Blowers	50					
170	Limestone wet Ball Mill	50					
171	Slurry Handling Pumps for FGD system	50					
172	Booster Fans for FGD system	50					
173	Carbon Steel Ducts and Dampers for FGD	60					
174	Storage Tanks and Silos	60					
175	Process Water Pump for FGD system	50					
	E) Other Common Items						
	Fire protection and detection system						
176	Motor driven fire water pumps	60					
177	Diesel engine driven fire water pumps	60					
178	Hydrant system for the power plant.	60					
179	High velocity water spray system	60					
180	Medium velocity water spray system	60					
181	Foam protection system	60					
182	Inert gas flooding system	60					
183	Fire tenders	60					
184	Portable fire-extinguishers	60					
185	Cranes, EOT cranes, gantry crane & chain pulley blocks etc.	60					
186	Elevator	60					

Any other item

(2) Minimum Local Content percentages in Engineering Procurement & Construction (EPC)/ Turnkey project

In case the contract is awarded through the EPC route, the contractor should comply with the requirement of MLC for indidual Item as listed in Annexure-I and should purchase these items only from Class-I Local Supplier. In Addition, MLC for complete EPC project may also be prescribed as below

	(A) Package Based Works	Minimum Local Content (%)					
1	Boiler	60					
2	TG System (Water Cooled Condensor)	60					
3	Ash Handling Plant	60					
4	Coal Handling Plant	60					
5	Electro-static Precipitator (ESP)	60					
6	Circulating Water (CW) System	60					
7	Cooling Tower	60					
8	Water Treatment System	60					
9	Air Conditioning System (below 500 TR)	60					
10	Flue Gas Desusphurisation (FGD) System	60					
11	Station Control & Instrumentation (C&I)	50					
12	Hydro Power Projects (Electro-Mechanical Works)	60					
	Gas based generation						
	Overall Gas Turbine Package (on finished Product basis)						

13	< 44 MW	60					
14	44 -145 MW	50					
	Overall Combine Cycle Gas Turbine (CCGT) Package (on finished Product basis)						
15	< 44 MW	60					
16	44-145 MW	60					
17	> 150 MW	60					
	(B) Project as a whole						
1	Works and service contracts in Power Sector	60					
2	Transmission Line with Conventional conductors (ACSR, AAAC, AL-59 etc.)	60					
3	Transsmission Line with High temperature Low Sag (HTLS) conductors	60					
4	HVAC Substation Air Insulated (AIS)	60					
5	HVAC Substation Gas Insulated (GIS)	60					
6	HVDC Substation	60					
7	Distribution Sector	60					

Any other item

Name of the Organisation: ……

Annexure-I

(1) Minimum Local Content (MLC) under the para 3 (a) of the DPIIT's PPP-MII Order dated 19-07-2024.

Sl. No.	Electrical Equipment for Generation, Transmission and Distribution sectors with sufficent local capacity and competition	Existing Minimum Local Content (%)	Trajectory for MLC (%)				
			2024-25	2025-26	2026-27	2027-28	2028-29
	(A) Common items for Transmission, Distribution and Generation Sector						
1	Power Transformers (up to 765 kV, including Generator transformers)	60	70	80	90	100	
2	Instrument Transformer (up to 765 kV)	60	70	80	90	100	
3	Transformer Oil Dry Out System (TODOS)	60	70	80	90	100	
4	Reactors up to 765 kV	60	70	80	90	100	
5	Oil Impregnated Bushing (up to 400 kV)	60	70	80	90	100	
6	Resin Insultated Paper (RIP) bushings (up to 145 kV)	50	70	80	90	100	
7	Circuit Breakers (up to 765 kV AC - Alternating Current)	60	70	80	90	100	
8	Disconnectors/Isolators (up to 765 kV AC)	60	70	80	90	100	
9	Wave trap (up to 765 kV AC)	60	70	80	90	100	
10	Oil Filled Distribution Transformers up to & Including 33 kV [Cold Rolled Grain Oriented (CRGO)/Amorphous, Aluminium/Copper wound]	60	70	80	90	100	
11	Dry Type Distribution Transformer upto and including 33 kV (CRGO/Amorphous, Aluminium/Copper wound)	60	70	80	90	100	
12	Conventional Conductor	60	70	80	90	100	
13	Accessories for Conventional conductors	60	70	80	90	100	
14	High Temperature/High Temperature Low Sag (HTLS) conductors (such as Composite core, GAP, ACSS, INVAR, AL59) and Accessories	60	70	80	90	100	
15	Optical ground wire (OPGW) – all designs	60	70	80	90	100	
16	Fiber OpticTerminal Equipment (FOTE) for OPGW	50	60	70	80	90	100
17	OPGW related Hardware and Accessories	60	70	80	90	100	
18	Remote Terminal Unit (RTU)	50	60	70	80	90	100
19	Power Cables and accessories up to 33 kV	60	70	80	90	100	
20	Cotrol Cable including accessories	60	70	80	90	100	
21	XLPE Cables up to 220 kV	60	70	80	90	100	
21 A	XLPE Cables (above 220 kV and upto 400 kV)	50	60	70	80	90	100
22	Substation Structures	60	70	80	90	100	
23	Transmission Line Towers	60	70	80	90	100	
24	Porcelain (Disc/Long Rod) Insulators	60	70	80	90	100	
25	Bus Post Insulators (Porcelain)	60	70	80	90	100	
26	Porcelain Disc Insulators with Room Temperature Valcanisation (RTV) coating	50	60	70	80	90	100
27	Porcelain Longrod Insulators with Room Temperature Valcanisation (RTV) coating	50	60	70	80	90	100
28	Hardware Fittings for Porcelain Insulators	60	70	80	90	100	
29	Composite/Polymeric Long Rod Insulators	60	70	80	90	100	
30	Hardware Fittings for Polymer Insulators	60	70	80	90	100	
31	Bird Flight Diverter (BFD)	60	70	80	90	100	
32	Power Line Carrier Communication (PLCC) System (up to 800 kV)	60	70	80	90	100	
33	Gas Insulated Switchgear (up to 400 kV AC)	60	70	80	90	100	
34	Gas Insulated Switchgear (above 400 kV AC)	50	60	70	80	90	100
35	Surge/Lightning Arrester (up to 765 kV AC)	60	70	80	90	100	
36	Power Capacitors	60	70	80	90	100	
37	Packaged Sub-station (6.6 kV to 33 kV)	60	70	80	90	100	
38	Ring Main Unit (RMU) (up to 33 kV)	60	70	80	90	100	
39	Medium Voltage (MV) GIS Panels (up to 33 kV)	60	70	80	90	100	
40	Automation and Control System/ Supervisory Control and data Acquisition (SCADA) System in Power System	50	60	70	80	90	100
41	Control and Relay Panel (including Digital/ Numerical Relays)	50	60	70	80	90	100
42	Electrical Motors 0.37 kW to 1 MW	60	70	80	90	100	
43	Energy Meters including smart meters	50	60	70	80	90	100
44	Control & power cables and Accessories (up to 1.1 kV)	60	70	80	90	100	
45	Diesel Generating (DG) set	60	70	80	90	100	
46	DC system (DC Battery & Battery Charger)	60	70	80	90	100	
47	AC & DC Distribution Board	60	70	80	90	100	
48	Indoor Air Insulated Switchgear (AIS) upto 33 kV	60	70	80	90	100	
49	Poles (PCC, PSCC, Rolled Steel Joist, Rail Pole, Spun, Steel Tubular)	60	70	80	90	100	
50	Material for Grounding/earthing system	60	70	80	90	100	
51	Illumination system	60	70	80	90	100	
52	Overhead Fault Sensing Indicator (FSI)	50	60	70	80	90	100
53	Power Quality Meters	50	60	70	80	90	100
54	Auxiliary Relays	50	60	70	80	90	100
55	Load Break Switch	50	60	70	80	90	100
	B) Hydro Sector						
56	Hydro Turbine & Associated Equipment						
	a) Francis Turbine	60	70	80	90	100	
	b) Kaplan Turbine	60	70	80	90	100	
	c) PeltonTurbine	50	60	70	80	90	100
57	Main Inlet Valve & Associated Equipment	60	70	80	90	100	
58	Penstock protection Valve and Associated Equipment	60	70	80	90	100	
59	Governing system & Accessories	60	70	80	90	100	
60	Generator for Hydro Project & Associated Equipment	60	70	80	90	100	
61	Static Excitation System	60	70	80	90	100	
62	Workshop Equipment	60	70	80	90	100	
63	Cooling Water System	60	70	80	90	100	
64	Compressed Air System	60	70	80	90	100	

65	Drainage/Dewatering System	60	70	80	90	100	
66	Fire Protection System	60	70	80	90	100	
67	Heating, Ventilation & Air Conditioning System (HVAC)	60	70	80	90	100	
68	Oil Handling System	60	70	80	90	100	
69	Mechnical Balance of Plant Items (BOP) Items	60	70	80	90	100	
	C) Thermal Sector						
	Boiler Auxiliaries						
70	Air Pre-Heater	60	70	80	90	100	
71	Steam Coil Air Pre Heater (SCAPH)	60	70	80	90	100	
72	Steam soot blowers [wall blowers & Long Retractable Soot Blower (LRSB)]	60	70	80	90	100	
73	Auxiliary Steam Pressure Reducing & Desuperheating (PRDS)	60	70	80	90	100	
74	Fuel oil system	60	70	80	90	100	
75	Seal air Fan	60	70	80	90	100	
76	Ducts and dampers	60	70	80	90	100	
77	Duct expansion joints	60	70	80	90	100	
78	Blowdown tanks	60	70	80	90	100	
79	Coal burners and oil burners	60	70	80	90	100	
80	Coal mills	60	70	80	90	100	
81	Gear Box of Coal Mill	50	60	70	80	90	100
82	Coal feeders	60	70	80	90	100	
83	Primary Air Fans	60	70	80	90	100	
84	Forced Draft Fans	60	70	80	90	100	
85	Induced Draft Fans	60	70	80	90	100	
86	Forced Draft (FD)/Induced Draft (ID)/ Primary Air (PA) Fan Servo Motor Assembly	50	60	70	80	90	100
87	Tubes (Carbon Steel)	50	60	70	80	90	100
88	Steel pipes (Coarbon Steel)	50	60	70	80	90	100
89	Steam drum	50	60	70	80	90	100
90	Separator	50	60	70	80	90	100
91	Selective Catalytic Reduction (SCR)	50	60	70	80	90	100
	Electro-Static Precipitators (ESPs)						
92	Casing	60	70	80	90	100	
93	Electrodes	60	70	80	90	100	
94	Rapping System	60	70	80	90	100	
95	Hopper Heaters	60	70	80	90	100	
96	Transformer Rectifiers	60	70	80	90	100	
97	Insulators	60	70	80	90	100	
	Turbine & Auxiliaries						
98	Turbine (High Pressure/Intermediate Pressure/Low Pressure)	50	60	70	80	90	100
99	Condensate Extraction Pumps	60	70	80	90	100	
100	Condenser On line Tube Cleaning System (COLTC)	60	70	80	90	100	
101	Debris filters	60	70	80	90	100	
102	Deaerator	60	70	80	90	100	
103	Drain Cooler and Flash Tank	60	70	80	90	100	
104	ECW Pump	50	60	70	80	90	100
105	Plate Heat Exchanger	50	60	70	80	90	100
106	Self- cleaning filters	50	60	70	80	90	100
107	Condensate Polishing Units (CPUs)	60	70	80	90	100	
108	Chemical Dosing System	60	70	80	90	100	
109	Oil Filter	60	70	80	90	100	
110	Gland Steam Condenser	60	70	80	90	100	
111	Oil Purifying Centrifuge	50	60	70	80	90	100
112	Water Cooled Condenser	50	60	70	80	90	100
113	Boiler Feed Pumps (BFPs)	50	60	70	80	90	100
	Generator and Auxillieries						
114	Generator (including Seal Oil System, Hydrogen Cooling System, Stator water cooling system)	60	70	80	90	100	
	Electrical Works						
115	Control and metering equipment	60	70	80	90	100	
	Control & Instrumentation System (C&I System)						
116	Thermocouples	50	60	70	80	90	100
117	Measuring instruments [Resistance Temperature Detectors (RTDs)], Local gauges	50	60	70	80	90	100
118	Actuators (Pneumatic and conventional electric)	50	60	70	80	90	100
119	Interplant Communication/ Public Address (PA) system except IP based	50	60	70	80	90	100
	Coal Handling Plant						
120	Conveyors	60	70	80	90	100	
121	Wagon Tippler	60	70	80	90	100	
122	Side Arm Charger	60	70	80	90	100	
123	Paddle feeder	60	70	80	90	100	
124	Crushers & Screens	60	70	80	90	100	
125	Dust suppression (dry fog & plain water) system	60	70	80	90	100	
126	Air Compressors	50	60	70	80	90	100
127	Magnetic separators & metal detectors	60	70	80	90	100	
128	Coal Sampling System	60	70	80	90	100	
129	Stacker cum reclaimer	60	70	80	90	100	
130	Belt weighing & monitoring system.	60	70	80	90	100	
131	Wheel & axle assembly (without bearings) for Bottom Opening Bottom Release (BOBR) Wagons	60	70	80	90	100	
	Ash Handling System						
132	Clinker grinder	60	70	80	90	100	
133	Water jet ejectors	60	70	80	90	100	
134	Scrapper chain conveyor	60	70	80	90	100	
135	Dry fly ash vacuum extraction system	60	70	80	90	100	
136	Pressure pneumatic conveying system	60	70	80	90	100	
137	Ash water & ash slurry pumps	60	70	80	90	100	
138	Compressors, air dryers & air receivers	50	60	70	80	90	100
139	Ash water recovery system	60	70	80	90	100	
	Raw Water Intake & Supply System						
140	Travelling water screens	60	70	80	90	100	

141	Raw water supply pumps	60	70	80	90	100	
142	Valves, RE joints etc.	60	70	80	90	100	
	Water Treatment System and Effluent Treatment System						
143	Clarification plant	60	70	80	90	100	
144	Filtration plant	60	70	80	90	100	
145	Ultra filtration plant	50	60	70	80	90	100
146	Reverse Osmosis (RO) plant and its membrane	55	60	70	80	90	100
147	De-Mineralised water plant (DM Plant)	60	70	80	90	100	
148	Chlorination plant	60	70	80	90	100	
149	Chemical dosing system	60	70	80	90	100	
150	Effluent Treatment Plant	60	70	80	90	100	
	Circulationg Water (CW) & Auxiliary Circulating Water (ACW) System						
151	CW & ACW Pumps	60	70	80	90	100	
152	Butter Fly (BF) valves, Non-return Valves (NRVs) etc.	60	70	80	90	100	
153	Rubber Expansion (RE) joints	60	70	80	90	100	
154	Air release valves	60	70	80	90	100	
	Cooling Towers (NDCT/ IDCT)-Natural-Draft and Induced Draft Cooling Tower						
155	Water Distribution System	60	70	80	90	100	
156	Spray nozzles	60	70	80	90	100	
157	Packing	60	70	80	90	100	
158	Drift eliminators	60	70	80	90	100	
159	Cooling Tower (CT) Fans (for Induced Draft Cooling Towers IDCT)	60	70	80	90	100	
160	Gear boxes, shafts & motors (for IDCT)	60	70	80	90	100	
	Air Conditioning & Ventilation System						
161	Split & window air conditioners	60	70	80	90	100	
162	Chilling/ condensing unit [upto 500 ton of refrigeration(TR)]	55	60	70	80	90	100
163	Air Handling Unit (AHU) and Fresh air unit	60	70	80	90	100	
164	Cooling Towers	60	70	80	90	100	
165	Air Washing Units (AWUs), axial fans, roof extractors	60	70	80	90	100	
166	Ducts, louvers & dampers	60	70	80	90	100	
	Flue Gas Desulphurization (FGD)						
167	Spray Nozzles,	50	60	70	80	90	100
168	Spray header	50	60	70	80	90	100
169	Oxidation Blowers	50	60	70	80	90	100
170	Limestone wet Ball Mill	50	60	70	80	90	100
171	Slurry Handling Pumps for FGD system	50	60	70	80	90	100
172	Booster Fans for FGD system	50	60	70	80	90	100
173	Carbon Steel Ducts and Dampers for FGD	60	70	80	90	100	
174	Storage Tanks and Silos	60	70	80	90	100	
175	Process Water Pump for FGD system	50	60	70	80	90	100
	E) Other Common Items						
	Fire protection and detection system						
176	Motor driven fire water pumps	60	70	80	90	100	
177	Diesel engine driven fire water pumps	60	70	80	90	100	
178	Hydrant system for the power plant.	60	70	80	90	100	
179	High velocity water spray system	60	70	80	90	100	
180	Medium velocity water spray system	60	70	80	90	100	
181	Foam protection system	60	70	80	90	100	
182	Inert gas flooding system	60	70	80	90	100	
183	Fire tenders	60	70	80	90	100	
184	Portable fire-extinguishers	60	70	80	90	100	
185	Cranes, EOT cranes, gantry crane & chain pulley blocks etc.	60	70	80	90	100	
186	Elevator	60	70	80	90	100	

Any other item

(2) Minimum Local Content percentages in Engineering Procurement & Construction (EPC)/ Turnkey project

In case the contract is awarded through the EPC route, the contractor should comply with the requirement of MLC for indidual Item as listed in Annexure-I and should purchase these items only from Class-I Local Supplier. In Addition, MLC for complete EPC project may also be prescribed as below

	(A) Package Based Works	Minimum Local Content (%)					
1	Boiler	60	70	80	90	100	
2	TG System (Water Cooled Condensor)	60	70	80	90	100	
3	Ash Handling Plant	60	70	80	90	100	
4	Coal Handling Plant	60	70	80	90	100	
5	Electro-static Precipitator (ESP)	60	70	80	90	100	
6	Circulating Water (CW) System	60	70	80	90	100	
7	Cooling Tower	60	70	80	90	100	
8	Water Treatment System	60	70	80	90	100	
9	Air Conditioning System (below 500 TR)	60	70	80	90	100	
10	Flue Gas Desusphurisation (FGD) System	60	70	80	90	100	
11	Station Control & Instrumentation (C&I)	50	60	70	80	90	100
12	Hydro Power Projects (Electro-Mechanical Works)	60	70	80	90	100	

	Gas based generation						
	Overall Gas Turbine Package (on finished Product basis)						
13	< 44 MW	60	70	80	90	100	
14	44 -145 MW	50	60	70	80	90	100
	Overall Combine Cycle Gas Turbine (CCGT) Package (on finished Product basis)						
15	< 44 MW	60	70	80	90	100	
16	44-145 MW	60	70	80	90	100	
17	> 150 MW	60	70	80	90	100	
	(B) Project as a whole						
1	Works and service contracts in Power Sector	60	70	80	90	100	
2	Transmission Line with Conventional conductors (ACSR, AAAC, AL-59 etc.)	60	70	80	90	100	
3	Transsmission Line with High temperature Low Sag (HTLS) conductors	60	70	80	90	100	
4	HVAC Substation Air Insulated (AIS)	60	70	80	90	100	
5	HVAC Substation Gas Insulated (GIS)	60	70	80	90	100	
6	HVDC Substation	60					
7	Distribution Sector	60	70	80	90	100	

Any other item

List of additional items for inclusion in sufficiency in capacity and competitiveness:

Sl. No.	Electrical Equipment for Generation, Transmission and Distribution sectors with sufficent local capacity and competition	Proposed Minimum Local Content (%)	Rationale for change (if any) in MLC (%)	HSN Code	list of OEMs and venders from India	list of OEMs and venders from outside India but not from countries sharing border with India	Justification for inclusion in Annexure-I

Clause No.	Responsible Entity	Compliance Assignment
5.2(i)	Each distribution licensee within a State	Estimate the demand in its control area including the demand of open access consumers and factoring in captive generating plants, energy efficiency measures, distributed generation, demand response, in different time horizons, namely long-term, medium term and short-term.
5.2(ii)	STU (on behanlf of distribution licensee)/other designated agency	Estimate the demand for the entire State duly considering the diversity in different time horizons, namely long-term, medium term and short-term.
5.3(a)	Each distribution licensee	(i) assess the existing generation resources and identify the additional generation resource requirement to meet the estimated demand in different time horizons, (ii) prepare generation resource procurement plan.
5.3(c)	Each distribution licensee	Generation resource procurement planning (specifying procurement from resources under State control area and regional control area) shall be undertaken in different time horizons, namely long-term, medium term and short-term to ensure (i) adequacy of generation resources and (ii) planning reserve margin (PRM) taking into account loss of load probability and energy not served as specified by CEA.
5.3(d)	STU (on behalf of distribution licensee)/other designated agency	STU or other designated agency by state comission shall provide to NLDC, •the details regarding demand forecasting, •assessment of existing generation resources •such other details as may be required for carrying out a national level simulation for generation resource adequacy for States.
5.3(e)	NLDC	Based on the information received, NLDC shall carry out a simulation to assist the States in drawing their optimal generation resource adequacy plan.
5.3(f)	Each distribution licensee	Each distribution licensee shall ensure demonstrable generation resource adequacy for such period as specified by the respective SERC
31.1(a)	NLDC/RLDC/SLDC	Operational planning in advance by NLDC, RLDCs and SLDCs within their respective control areas: Monthly and Yearly time horizons in co-ordination with CTU, RPCs or STUs, as applicable.
31.1(b)	NLDC/RLDC/SLDC	Operational planning shall be carried out in advance by NLDC, RLDCs and SLDCs within their respective control areas on Intra-day, Day Ahead, Weekly time horizons.

31.1(c)	NLDC/RLDC	Procedure and data format by NLDC/RLDC for following activity •Operational planning analysis •Real-time monitoring, •Real-time assessments. Format is available at *https://posoco.in/wp-content/uploads/2024/03/Final-NLDC-Operating-Procedure_as-submitted-to-CERC-dated-290923.pdf*
31.1(d)	SLDC	SLDC may also issue procedures and formats for data collection for the above purposes.
31.2(a)	SLDC	Each SLDC shall carry out demand estimation (active & reactive) as part of operational planning after duly factoring in the demand estimation done by STU as part of resource adequacy planning referred to in Chapter 2 of these regulations.
31.2(b)	SLDC	Each SLDC shall develop methodology for daily, weekly, monthly, yearly demand estimation in MW and MWh for operational analysis as well as resource adequacy purposes
31.2(c)	SLDC	The demand estimation by each SLDC shall be done on day ahead basis with time block wise granularity for the daily operation and scheduling . Revision in real-time demand estimate by SLDC if major change is observed and sharing with RLDC
31.2(d)	SLDC	Each SLDC shall submit node-wise morning peak, evening peak, day shoulder and night off-peak estimated demand in MW and MVA on a monthly and quarterly basis for the nodes 110 kV and above
31.2(e)	SLDC	SLDC shall also estimate peak and off-peak demand (active as well as reactive power) on a weekly and monthly basis for load -generation balance planning as well as for operational planning analysis
31.2(f)	ISTS connected bulk consumers or distribution licensees	The entities such as bulk consumers or distribution licensees that are directly connected to ISTS shall estimate and furnish such a demand estimate to the concerned RLDC
31.2(g)	RLDC/NLDC	Based on the demand estimate furnished by the SLDCs and other entities directly connected to ISTS, each RLDC shall prepare the regional demand estimate and submit it to the NLDC. NLDC, based on regional demand estimates furnished by RLDCs, shall prepare national demand estimate
31.2(h)	SLDC	Submission of demand estimate data by SLDCs or other entities directly connected to ISTS, as applicable, to the respective RLDC and RPC as per below timeline : - Daily: 10:00 hrs of previous day - Weekly: First workinh day of previus week - Monhtly: Fifth day of previous month - Yearly: 30th September of the previous year

31.2(i)	SLDC/RLDC/NLDC	Compute forecasting error for intra-day, dayahead, weekly, monthly and yearly forecasts and analyse the same in order to reduce forecasting error in the future. The computed forecasting errors shall be made available by SLDCs, RLDCs and NLDC on their respective websites.
31.3(a)	SLDC	The generation estimation by each SLDC shall be done on day ahead basis with time block wise granularity for the daily operation and scheduling . Revision in real-time generation estimate by SLDC if major change is observed and sharing with RLDC
31.3(b)	RLDC	RLDC shall forecast generation from wind, solar, ESS and Renewable Energy hybrid generating stations that are regional entities and SLDC shall forecast generation from such sources that are intra-state entities, for different time horizons as referred to in clause (1) of Regulation 31 of these regulations for the purpose of operational planning
31.4(a)	SLDC	SLDCs estimate and ensure the adequacy of resources, identify generation reserves, demand response capacity and generation flexibility requirements with due regard to the resource adequacy framework as specified under Chapter 2 of these regulations
31.4(b)	SLDC	Furnishing time block-wise information for the following day in SLDC respect of all intra-state entities to the concerned RLDC who shall validate the adequacy of resources with due regard to the following: (i) Demand forecast aggregated for the control area; (ii) Renewable energy generation forecast for the control area; (iii) Injection schedule for intra-State entity generating station; (iv) Requisition from regional entity generating stations (v) Secondary and planned procurement through Tertiary reserve requirement; (vi) Planned procurement of power through other bilateral or collective transactions, if any.
33.1	NLDC, RLDC, SLDC & (RPC: Monthly & Yearly)	Based on the operational planning analysis data, operational planning study shall be carried out by various agencies for time horizons such as Real time, Intra Day , Weekly , Monthly & Yearly
33.2	SLDC, RLDCs and NLDC	SLDCs, RLDCs and NLDC shall utilize network estimation tool integrated in their EMS and SCADA systems for the real time operational planning study.

33.3	SLDC	SLDCs shall perform day-ahead, weekly, monthly and yearly operational studies for the concerned State for: (a) assessment and declaration of total transfer capability (TTC) and available transfer capability (ATC) for the import or export of electricity by the State. TTC and ATC shall be revised from time to time based on the commissioning of new elements and other grid conditions and shall be published on SLDC website with all the assumptions and limiting constraints; (b) planned outage assessment; (c) special scenario assessment; (d) system protection scheme assessment; (e) natural disaster assessment; and (f) any other study relevant in operational scenario.
33.4	RLDCs and NLDC	RLDCs and NLDC shall perform day-ahead, weekly, monthly and yearly operational studies for: (a) assessment of TTC and ATC at inter-regional, intra-regional, and inter-state levels; (b) planned outage assessment; (c) special scenario assessment; (d) system protection scheme assessment; (e) natural disaster assessment; and (f) any other study relevant to operational scenarios
33.5	RLDCs	RLDC shall assess intra-regional and inter-state level TTC and ATC and submit them to NLDC. NLDC shall declare TTC and ATC for import or export of electricity between regions including simultaneous import or export capability for a region, and crossborder interconnections 11 (Eleven) months in advance for each month on a rolling basis.
33.6	RLDCs	Operational planning study shall be done to assess whether the planned operations shall result in deviations from any of the system operational limits defined under these regulations and applicable CEA Standards. The deviations, if any, shall be reviewed in the monthly operational meeting of RPC and significant deviations shall be monitored by RPC for early resolution.
33.7	NLDC, RLDCs, RPCs and SLDCs	NLDC, RLDCs, RPCs and SLDCs shall maintain records of the completed operational planning study, including date specific power flow study results, the operational plan and minutes of meetings on operational study.
33.8	NLDC, RLDCs, RPCs and SLDCs	NLDC, RLDCs, RPCs and SLDCs shall have operating plans to address potential deviations from system operational limit identified as a result of the operational planning study.
33.9	SLDCs	Each SLDC shall undertake a study on the impact of new elements to be commissioned in the intra-state system in the next six (6) months on the TTC and ATC for the State and share the results of the studies with RLDC

33.10	RLDCs	Each RLDC shall undertake a study on the impact of new elements to be commissioned in the next six (6) months in (a) the ISTS of the region and (b) the intrastate system on the inter-state system and share the results of the studies with NLDC
33.11	NLDC	NLDC shall undertake study on the impact of new elements to be commissioned in the next six (6) months in (a) inter-regional system, (b) cross-border link and (c) intraregional system on the inter-regional system.
33.12	NLDC, RLDCs and SLDCs	NLDC, RLDCs and SLDCs shall compare the results of the studies of the impact of new elements on the system and transfer capability addition with those of the interconnection and planning studies by CTU and STUs
33.13	concerned user or SLDC or RLDC or NLDC	Defense mechanisms like system protection scheme, load-rejection scheme, generation run-back, islanding scheme or any other scheme for system security shall be proposed by the concerned user or SLDC or RLDC or NLDC and shall be deployed as finalized by the respective RPC

S.No.	Voltage Level	Name of Line	Circuit ID	Tower Configura	Line Length	O&M by	Agency at		Type of conductor	Remarks	Replaced with Polymer Insulator (As a % of Total Line	Remarks
							End-I	End-II				
1. HVDC lines												
ISTS LINES												
A. POWERGRID												
1	± 800kV	Agra-Bishwanath Chariali Pole-I	1	Bi-pole	1728	POWERGRID	POWERGRID	POWERGRID	Hexagon Lapwing	HVDC capcacity 6000 MW, only two physical lines	Partial (11%)	
2	± 800kV	Agra-Bishwanath Chariali Pole-II	2	Bi-pole	1728	POWERGRID	POWERGRID	POWERGRID	Hexagon Lapwing		Partial (11%)	
3	± 800kV	Agra-Alipurduar Pole-I	1	Bi-pole	1296*	POWERGRID	POWERGRID	POWERGRID	Hexagon Lapwing		Partial (11%)	
4	± 800kV	Agra-Alipurduar Pole-II	2	Bi-pole	1296*	POWERGRID	POWERGRID	POWERGRID	Hexagon Lapwing		Partial (11%)	
5	± 800kV	Kurukshetra-Champa Pole-I	1	Bi-pole	1305	POWERGRID	POWERGRID	POWERGRID	Hexagon Lapwing	HVDC capcacity 6000 MW, only two physical lines	Partial (11%)	
6	± 800kV	Kurukshetra-Champa Pole-II	2	Bi-pole	1305	POWERGRID	POWERGRID	POWERGRID	Hexagon Lapwing		Partial (11%)	
7	± 800kV	Kurukshetra-Champa Pole-III	3	Bi-pole	1305	POWERGRID	POWERGRID	POWERGRID	Hexagon Lapwing		Partial (11%)	
8	± 800kV	Kurukshetra-Champa Pole-IV	4	Bi-pole	1305	POWERGRID	POWERGRID	POWERGRID	Hexagon Lapwing		Partial (11%)	
9	± 500kV	Balia-Bhiwadi Pole-I	1	Bi-pole	790	POWERGRID	POWERGRID	POWERGRID	ACSR Quad Bersimis	HVDC capacity 2500 MW	Partial (15%)	
10	± 500kV	Balia-Bhiwadi Pole-II	2	Bi-pole	790	POWERGRID	POWERGRID	POWERGRID			Partial (15%)	
11	± 500kV	Rihand-Dadri Pole-I	1	Bi-pole	815	POWERGRID	POWERGRID	POWERGRID	ACSR Quad Bersimis	HVDC capacity 1500 MW	Partial (62%)	
12	± 500kV	Rihand-Dadri Pole-II	2	Bi-pole	815	POWERGRID	POWERGRID	POWERGRID			Partial (43%)	
B. Adani Power Ltd (Adani Transmission India Ltd.)												
1	± 500kV	Adani Mundra - Mahindergarh Pole-I	1	Bi-pole	990	ATIL	APL Mundra	ATIL	ACSR Quad Bersimis	HVDC capacity 2500 MW	Partial (43%)	
2	± 500kV	Adani Mundra - Mahindergarh Pole-II	2	Bi-pole	990	ATIL	APL Mundra	ATIL			Partial (43%)	
2. 765kV Transmission Line												
ISTS LINES												
A. POWERGRID												
1	765kV	Agra-Aligarh	1	D/C	123	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis	LILO of Agra-Gr. Noida at Aligarh (LILO portion	Polymer Insulator	
2	765kV	Aligarh-Gr.Noida	1	D/C	51	POWERGRID	POWERGRID	WUPPTCL	Quad Bersimis		Polymer Insulator	
3	765kV	Agra-Fatehpur	1	S/C	335	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Conventional	
4	765kV	Agra-Fatehpur	2	S/C	334	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Conventional	
5	765kV	Agra-Jhatikara	1	S/C	252	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Polymer Insulator	
6	765kV	Ajmer-Chittorgarh	1	D/C	211	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
7	765kV	Ajmer-Chittorgarh	2	D/C	211	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
8	765kV	Ajmer-Bhadla II	1	D/C	326	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra	LILO of 765kV D/C Ajmer-Bikaner-1 at Bhadla II(PG)	Not Available	
9	765kV	Ajmer-Bhadla II	2	D/C	326	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra	LILO of 765kV D/C Ajmer-Bikaner-2 at Bhadla II(PG)	Not Available	
10	765kV	Balia - Lucknow765 (N)	1	S/C	319	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Conventional	
11	765kV	Bikaner - Bhadla	1	D/C	167	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
12	765kV	Bikaner - Bhadla	2	D/C	167	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
13	765kV	Bikaner- Moga	1	D/C	367	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
14	765kV	Bikaner- Moga	2	D/C	367	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
15	765kV	Bikaner-Bhadla II	1	D/C	197	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra	LILO of 765kV D/C Ajmer-Bikaner-1 at Bhadla II(PG)	Not Available	
16	765kV	Bikaner-Bhadla II	2	D/C	197	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra	LILO of 765kV D/C Ajmer-Bikaner-2 at Bhadla II(PG)	Not Available	
17	765kV	Kanpur(GIS)-Aligarh	1	D/C	322	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis	LILO of Kanpur-Jhatikara at Aligarh	Polymer Insulator	
18	765kV	Aligarh-Jhatikara	1	D/C	158	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Polymer Insulator	
19	765kV	Jhatikara-Bhiwani (PG)	1	S/C	85	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Polymer Insulator	
20	765kV	Koteshwar(PG)-Meerut	1	S/C	176	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis	Earlier charged at 400kV	Not Available	
21	765kV	Koteshwar(PG)-Meerut	2	S/C	176	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Not Available	
22	765kV	Lucknow-Bareilly	1	S/C	252	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Conventional	
23	765kV	Meerut-Bhiwani(PG)	1	S/C	174	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Partial (99%)	

24	765kV	Meerut-Gr.Noida	1	S/C	119	POWERGRID	POWERGRID	WUPPTCL	Quad Bersimis	Agra-Meerut LILOed at G. Noida by UPPTCL	Polymer Insulator	
25	765kV	Moga- Bhiwani (PG)	1	S/C	273	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Partial (96%)	
26	765kV	Moga-Meerut	1	S/C	338	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Polymer Insulator	
27	765kV	Orai-Aligarh	1	D/C	331	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
28	765kV	Orai-Aligarh	2	D/C	331	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
29	765kV	Phagi-Bhiwani(PG)	1	S/C	272	POWERGRID	RRVPNL	POWERGRID	Quad Bersimis		Partial (18%)	
30	765kV	Phagi-Bhiwani(PG)	2	S/C	277	POWERGRID	RRVPNL	POWERGRID	Quad Bersimis		Partial (16%)	
31	765kV	Varanasi-Balia	1	S/C	166	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Conventional	
32	765kV	Varanasi-Fatehpur	1	S/C	223	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis	LILO of Gaya (ER)-Fatehpur at Varanasi	Conventional	
33	765kV	Varanasi-Kanpur(GIS)	1	S/C	326	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Polymer Insulator	
34	765kV	Varanasi-Kanpur(GIS)	2	S/C	326	POWERGRID	POWERGRID	POWERGRID	Hexa Zebra		Polymer Insulator	
B. PKTSL												
1	765kV	Khetri-Jhatikara	1	D/C	146	PKTSL	PKTSL	POWERGRID	Hexa Zebra		Not Available	
2	765kV	Khetri-Jhatikara	2	D/C	146	PKTSL	PKTSL	POWERGRID	Hexa Zebra		Not Available	
C. PFTL												
1	765kV	Fatehgarh II-Bhadla II	1	D/C	186	PFTL	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
2	765kV	Fatehgarh II-Bhadla II	2	D/C	186	PFTL	POWERGRID	POWERGRID	Hexa Zebra		Not Available	
D. FBTL												
1	765kV	Fatehgarh II-Bhadla	1	D/C	175	FBTL	POWERGRID	POWERGRID	Hexa Zebra	Loop in of 400kV Fatehgarh (FBTL)-	Polymer Insulator	
2	765kV	Fatehgarh II-Bhadla	2	D/C	175	FBTL	POWERGRID	POWERGRID	Hexa Zebra		Polymer Insulator	
E. BKTL												
1	765kV	Bikaner-Khetri	1	D/C	241	BKTL	POWERGRID	PKTSL	Hexa Zebra		Polymer Insulator	
2	765kV	Bikaner-Khetri	2	D/C	241	BKTL	POWERGRID	PKTSL	Hexa Zebra		Polymer Insulator	
F. PAPTL												
1	765kV	Ajmer-Phagi	1	D/C	134	PAPTL	POWERGRID	RRVPNL	Hexa Zebra		Not Available	
2	765kV	Ajmer-Phagi	2	D/C	134	PAPTL	POWERGRID	RRVPNL	Hexa Zebra		Not Available	
G. PASTL												
1	765kV	Aligarh(PG)-SIKAR_2	1	D/C	265	PASTL	PSTL	POWERGRID	Hexa Zebra	Anti theft charged from Aligarh(PG) Upto	Not Available	
2	765kV	Aligarh(PG)-SIKAR_2	2	D/C	265	PASTL	PSTL	POWERGRID	Hexa Zebra		Not Available	
STATE LINES												
A. UPPTCL												
1	765kV	Agra Fatehabad-Ghatampur	1	S/C	229	UPPTCL	UPPTCL	UPPTCL	Quad Bersimis		Not Available	
2	765kV	Agra Fatehabad-Gr. Noida	1	S/C	159	UPPTCL	UPPTCL	UPPTCL	ACSR Quad Bersimis		Not Available	
3	765kV	Agra(Fatehbad)-Lalitpur	1	S/C	337	UPPTCL	UPPTCL	LPGCL	Quad Bersimis		Not Available	
4	765kV	Agra(Fatehbad)-Lalitpur	2	S/C	335	UPPTCL	UPPTCL	LPGCL	Quad Bersimis		Not Available	
5	765kV	AnparaC-AnparaD	1	S/C	3	UPPTCL	LANCO	UPRVUNL	Quad Bersimis		Not Available	
6	765kV	AnparaC-Unnao	1	S/C	409	UPPTCL	LANCO	UPPTCL	Quad Bersimis		Conventional	AnparaB-Unnao shifted to AnparaC and charged at 765kV
7	765kV	AnparaD-Obra_C	1	D/C	53	UPPTCL	UPRVUNL	UPPTCL	Quad Bersimis	After LILO of 765 KV ANPARA D-UNNAO LINE	Not Available	
8	765kV	Obra_C-Unnao	1	D/C	390	UPPTCL	UPRVUNL	UPPTCL	Quad Bersimis		Not Available	
9	765kV	Bara-Mainpuri	1	S/C	377	UPPTCL	UPPTCL	UPPTCL	Quad Bersimis		Not Available	
10	765kV	Gr. Noida-Meerut_PMSTL	1	S/C	100	UPPTCL	UPPTCL	UPPTCL	Quad Bersimis	After LILO of 765 KV GREATER NOIDA	Not Available	
11	765kV	Meerut_PMSTL-Hapur	1	S/C	37	UPPTCL	UPPTCL	UPPTCL	Quad Bersimis		Not Available	
12	765kV	Gr. Noida-Jawaharpur	1	D/C	162	UPPTCL	UPPTCL	UPPTCL	Quad Bersimis	After LILO of 765 KV MAINPURI(SEUPPTCL)-	Not Available	
13	765kV	Jawaharpur-Mainpuri	1	D/C	40	UPPTCL	UPPTCL	UPPTCL	Quad Bersimis		Not Available	
14	765kV	Hapur(UP)-Rampur_PRSTL (UP)	1	S/C	230	UPPTCL	UPPTCL	UPPTCL	Quad Bersimis	LILO of 765kV Hapur-Ghatampur at Rampur. LILO portion is on D/C tower 2.5km 5towers	Not Available	

15	765kV	Mainpuri(UP)-Hapur(UP)	1	S/C	217	UPPTCL	UPPTCL	UPPTCL	Quad Bersimis		Not Available	
B. RRVPNL												
1	765kV	Anta-Phagi	1	S/C	214	RRVPNL	RRVPNL	RRVPNL	Quad Bersimis		Not Available	
2	765kV	Anta-Phagi	2	S/C	212	RRVPNL	RRVPNL	RRVPNL	Quad Bersimis		Not Available	
3. 765kV Transmission Line charged at 400kV												
ISTS LINES												
A. POWERGRID												
1	765kV charged at 400kV	Kishenpur-Moga	1	S/C	275	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Partial (1%)	
2		Kishenpur-Moga	2	S/C	287	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis		Partial (1%)	
3		Tehri-Koteshwar(PG)	1	S/C	15	POWERGRID	THDC	POWERGRID	Quad Bersimis		Conventional	
4		Tehri-Koteshwar(PG)	2	S/C	17	POWERGRID	THDC	POWERGRID	Quad Bersimis		Conventional	
5		Rihand-Vindhyachal Pool	1	S/C	31	POWERGRID	NTPC	POWERGRID	Quad Bersimis		Not Available	
6		Rihand-Vindhyachal Pool	2	S/C	31	POWERGRID	NTPC	POWERGRID	Quad Bersimis		Not Available	
4. 400kV HVAC Transmission Line												
ISTS LINES												
A. POWERGRID												
1	400kV	Abdullapur- Bawana	1	D/C	167	POWERGRID	POWERGRID	DTL	Triple Snowbird		Partial (99%)	
2	400kV	Abdullapur- Deepalpur	1	D/C	141	POWERGRID	POWERGRID	KT Jhajjar	Triple Snowbird	LILO of Abdullapur-Bawana one ckt at Deepalpur by Jhajjar KT	Partial (99%)	LILO of Abdullapur-Bawana one ckt at Deepalpur
3	400kV	Abdullapur-Kurukshetra	1	D/C	52	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird+Twin HTLS for LILO	LILO of Abdullapur-Sonipat line at Kurukshetra	Polymer Insulator	LILO of Abdullapur-Sonepat ckts at Kurukshetra
4	400kV	Abdullapur-Kurukshetra	2	D/C	52	POWERGRID	POWERGRID	POWERGRID		LILO of Abdullapur-Sonipat line at Kurukshetra	Polymer Insulator	
5	400kV	Agra-Agra(Fatehbad)	1	S/C	45	POWERGRID	POWERGRID	UPPTCL	Twin Moose	LILO of Agra(PG)-Agra(UP) ckt-2 at Fatehabad (765kV Agra UP)	Polymer Insulator	
6	400kV	Agra(UP)-Agra(Fatehbad)	1	S/C	56	POWERGRID	UPPTCL	UPPTCL	Twin Moose		Polymer Insulator	
7	400kV	Agra-Agra(UP)	1	D/C	30	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Polymer Insulator	
8	400kV	Agra-Ballabgarh	1	S/C	181	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
9	400kV	Agra-Bassi	1	S/C	211	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	Planned for insulator replacement in 321nos towers under NR3
10	400kV	Agra-Bhiwadi	1	D/C	209	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
11	400kV	Agra-Bhiwadi	2	D/C	209	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
12	400kV	Agra-Jaipur South	1	D/C	254	POWERGRID	POWERGRID	POWERGRID	Twin Moose	LILO of Agra-Bassi D/C at Jaipur South	Partial (4%)	LILO of Agra-Bassi D/C at Jaipur South
13	400kV	Agra-Jaipur South	2	D/C	254	POWERGRID	POWERGRID	POWERGRID	Twin Moose	LILO of Agra-Bassi D/C at Jaipur South	Partial (4%)	
14	400kV	Agra-Sikar	1	D/C	386	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (3%)	
15	400kV	Agra-Sikar	2	D/C	386	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (3%)	
16	400kV	Ajmer-Ajmer(PG)	1	D/C	66	POWERGRID	RRVPNL	POWERGRID	Quad Moose		Not Available	
17	400kV	Ajmer-Ajmer(PG)	2	D/C	66	POWERGRID	RRVPNL	POWERGRID	Quad Moose		Not Available	
18	400kV	Allahabad-Fatehpur	3	S/C	154	POWERGRID	POWERGRID	POWERGRID	Twin Moose	LILO of Allahabad-Kanpur one ckt at Fatehpur	Polymer Insulator	
19	400kV	Allahabad-Fatehpur	1	D/C	140	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Lilo of Allahabad-Mainpuri (PG) D/C at Fatehpur	Conventional	
20	400kV	Allahabad-Fatehpur	2	D/C	140	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Lilo of Allahabad-Mainpuri (PG) D/C at Fatehpur	Conventional	
21	400kV	Allahabad-Varanasi	1	D/C	99	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Allahabad-Sarnath shifted from Sarnath to varanasi	Conventional	
22	400kV	Allahabad-Kanpur	1	S/C	225	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
23	400kV	Allahabad-Kanpur(New 765)	1	D/C	240	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Not Available	
24	400kV	Allahabad-Kanpur(New 765)	2	D/C	240	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Not Available	
25	400kV	Allahabad-Meja(NTPC)	1	D/C	28	POWERGRID	POWERGRID	MUNPL	Twin Moose		Polymer Insulator	MUNPL is joint venture between NTPC and UPRVUN
26	400kV	Allahabad-Meja(NTPC)	2	D/C	28	POWERGRID	POWERGRID	MUNPL	Twin Moose		Polymer Insulator	

27	400kV	Amritsar-Jalandhar	1	S/C	60	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
28	400kV	Amritsar-Jalandhar	2	D/C	71	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	LILO of 400kV Amritsar-Hamirpur at Jalandhar
29	400kV	Amritsar-ParbatiPooling (Banala)	1	D/C	251	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (49%)	
30	400kV	Auraiya-Agra	1	D/C	166	POWERGRID	NTPC	POWERGRID	Twin Moose		Partial (86%)	
31	400kV	Auraiya-Agra	2	D/C	166	POWERGRID	NTPC	POWERGRID	Twin Moose		Partial (90%)	
32	400kV	Baglihar II-Kishenpur	1	S/C	130	POWERGRID	JKSPDCL	POWERGRID	Twin Moose	LILO of 400kV Kishenpur-New Wanpoh ckt-2 at Baglihar. LILO portion is of JK PDD	Conventional	
33	400kV	Baghlihar II-New Wanpoh	1	S/C	130	POWERGRID	JKSPDCL	POWERGRID	Twin Moose		Not Available	
34	400kV	Bagpat-Kaithal	1	D/C	154	POWERGRID	POWERGRID	POWERGRID	Quad Moose	LILO of Meerut-Kaithal DC at Baghpat	Polymer Insulator	
35	400kV	Bagpat-Kaithal	2	D/C	154	POWERGRID	POWERGRID	POWERGRID	Quad Moose	LILO of Meerut-Kaithal DC at Baghpat	Polymer Insulator	
36	400kV	Bagpat-Saharanpur	1	D/C	121	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Partial (41%)	
37	400kV	Bagpat-Dehradun	1	D/C	165	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Partial (40%)	
38	400kV	Bahadurgarh-Kabulpur	1	S/C	42	POWERGRID	POWERGRID	HVPNL	Twin Moose		Polymer Insulator	LILO of Bahadurgarh-Bhiwani at Kabulpur
39	400kV	Bahadurgarh-Sonepat	1	D/C	53	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird		Polymer Insulator	
40	400kV	Bahadurgarh-Sonepat	2	D/C	53	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird		Polymer Insulator	
41	400kV	Balia-Mau	1	D/C	9	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Conventional	
42	400kV	Balia-Sohawal	1	D/C	229	POWERGRID	POWERGRID	POWERGRID	Twin Moose	LILO of Balia-LUCKNOW D/C at Sohawal	Conventional	LILO of Balia-Lucknow (316 KM) D/C at Sohawal
43	400kV	Balia-Sohawal	2	D/C	229	POWERGRID	POWERGRID	POWERGRID	Twin Moose	LILO of Balia-LUCKNOW D/C at Sohawal	Conventional	LILO of Balia-Lucknow (316 KM) D/C at Sohawal
44	400kV	Ballabgarh-Tughlakabad	1	M/C	40	DTL	POWERGRID	POWERGRID	HTLS INVAR (LILO portion) & Bersimis (before LILO)	Tower is quad circuit tower	Polymer	
45	400kV	Ballabgarh-Tughlakabad	2	M/C	40	DTL	POWERGRID	POWERGRID		Tower is quad circuit tower	Polymer	
46	400kV	Ballabhgarh-Gurgaon	1	S/C	43	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
47	400kV	Ballabhgarh-Maharanibagh	1	D/C	61	POWERGRID	POWERGRID	POWERGRID	Quad Bersimis	Bypassed at Maharanibagh to form Dadri-Ballabgarh	Polymer Insulator	
48	400kV	Ballabhgarh-Nawada	1	D/C	13	POWERGRID	POWERGRID	HVPNL	Quad Bersimis		Polymer Insulator	Ballabhgarh-Gnoida LILOed at Nawada (Faridabad,Haryana)
49	400kV	Bareilly PG-Moradabad	1	D/C	93	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Partial (3%)	
50	400kV	Bareilly PG-Rampur_PRSTL	1	S/C	40	POWERGRID	POWERGRID	UPPTCL	Twin Moose	After LILO of 400 KV BAREILLY(PG)-MORADABAD(UPPTCL) CIRCUIT-II at RAMPUR(PRSTL)	Not Available	
51	400kV	Rampur_PRSTL-Moradabad	1	S/C	57	POWERGRID	UPPTCL	UPPTCL	Twin Moose	After LILO of 400 KV BAREILLY(PG)-MORADABAD(UPPTCL) CIRCUIT-II at RAMPUR(PRSTL)	Not Available	
52	400kV	Bareilly PG-Bareilly (765kV)	1	D/C	2	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Conventional	
53	400kV	Bareilly PG-Bareilly (765kV)	2	D/C	2	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Conventional	

54	400kV	Bareilly PG(765kV)-Kashipur	1	D/C	101	POWERGRID	POWERGRID	PTCUL	Quad Moose		Partial (90%)	
55	400kV	Bareilly PG(765kV)-Kashipur	2	D/C	101	POWERGRID	POWERGRID	PTCUL	Quad Moose		Partial (90%)	
56	400kV	Bassi-Bhiwadi	2	S/C	220	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
57	400kV	Bassi-Heerapura	1	D/C	48	POWERGRID	POWERGRID	RRVPNL	Twin Moose		Polymer Insulator	
58	400kV	Bassi-Heerapura	2	D/C	49	POWERGRID	POWERGRID	RRVPNL	Twin Moose		Polymer Insulator	
59	400kV	Bassi-Kotputli	1	S/C	106	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
60	400kV	Bassi-Phagi	1	D/C	48	POWERGRID	POWERGRID	RRVPNL	Quad Moose		Partial (26%)	
61	400kV	Bassi-Phagi	2	D/C	48	POWERGRID	POWERGRID	RRVPNL	Quad Moose		Partial (26%)	
62	400kV	Bassi-Sikar	1	D/C	170	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (16%)	
63	400kV	Bassi-Sikar	2	D/C	170	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (17%)	
64	400kV	Bawana(CCGT)-Bahadurgarh	1	D/C	49	POWERGRID	DTL/Pragati CCGT	POWERGRID	Twin Moose		Polymer Insulator	
65	400kV	Bhadla-Bhadla(PG)	1	D/C	27	POWERGRID	RRVPNL	POWERGRID	Quad Moose		Not Available	
66	400kV	Bhadla-Bhadla(PG)	2	D/C	27	POWERGRID	RRVPNL	POWERGRID	Quad Moose		Not Available	
67	400kV	Bhadla-Bhadla II	1	D/C	52	POWERGRID	POWERGRID	POWERGRID	Twin HTLS+Hexa Zebra	48.309KM Twin HTLS conductor of POWERGRID and 3.73 KM HEXA Zebra of FBTL	Not Available	
68	400kV	Bhadla-Bhadla II	2	D/C	52	POWERGRID	POWERGRID	POWERGRID	Twin HTLS+Hexa Zebra		Not Available	
69	400kV	Bhinmal-Kankroli	1	D/C	202	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Bypassed at Bhinmal to form 400kV Kankroli Zerda ckt-2	Polymer Insulator	
70	400kV	Bhiwadi-Gurgaon	1	S/C	83	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
71	400kV	Bhiwadi-Hissar	1	S/C	212	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
72	400kV	Bhiwadi-Hissar	2	D/C	144	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	LILO of Bhiwadi-Moga both ckts at Hisar
73	400kV	Bhiwadi-Hissar	3	D/C	144	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
74	400kV	Bhiwadi-NeemranaPG	1	D/C	48	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
75	400kV	Bhiwadi-NeemranaPG	2	D/C	48	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
76	400kV	Bhiwani BBMB - Hissar	1	S/C	35	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Bypassed at Hissar to form Bhiwani BBMB-Fatehabad	Polymer Insulator	
77	400kV	Bhiwani (PG) - Hissar	1	S/C	64	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Bypassed at Hissar to form Moga-Bhiwani(PG)	Polymer Insulator	LILO of Bawana-Hisar (132KM) at Bhiwani PG
78	400kV	Bhiwani (PG) - Hissar	2	D/C	57	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Bypassed at Bhiwani(PG) to form Mahindergarh(ATIL)	Polymer Insulator	
79	400kV	Bhiwani (PG) - Hissar	3	D/C	57	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
80	400kV	Bhiwani PG - Jind	1	D/C	82	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
81	400kV	Bhiwani PG - Jind	2	D/C	82	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
82	400kV	Bhiwani PG- BawanaCCGT	1	D/C	97	POWERGRID	POWERGRID	DTL/ CCGT	Twin Moose		Polymer Insulator	LILO of Bawana-Hisar (132KM) at Bhiwani PG
83	400kV	Bhiwani PG- Bhiwani BBMB	1	S/C	34	POWERGRID	POWERGRID	BBMB	Twin Moose		Polymer Insulator	LILO of Bhiwani (BBMB)- Bahadurgarh (84km) at Bhiwani (PG)
84	400kV	Bhiwani PG-Kabulpur	1	S/C	48	POWERGRID	POWERGRID	HVPNL	Twin Moose		Polymer Insulator	LILO of Bahadurgarh-Bhiwani at Kabulpur
85	400kV	Bikaner_2 (PBTSL)-Bikaner(PG)	1	D/C	43	POWERGRID	PBTSL	POWERGRID	Quad Moose		Not Available	
86	400kV	Bikaner_2 (PBTSL)-Bikaner(PG)	2	D/C	43	POWERGRID	PBTSL	POWERGRID	Quad Moose		Not Available	
87	400kV	Chamba pool - Jalandhar	1	D/C	162	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (48%)	
88	400kV	Chamba pool - Jalandhar	2	D/C	162	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (48%)	
89	400kV	Chamera-II - Chamba Pool	1	S/C	0.38	POWERGRID	NHPC	POWERGRID	Twin Moose		Conventional	Two tower is S/C and one tower is D/C
90	400kV	Chamera-II-Chamera-I	1	S/C	36	POWERGRID	NHPC	NHPC	Twin Moose		Conventional	
91	400kV	Chamera-II-Kishenpur	1	S/C	135	POWERGRID	NHPC	POWERGRID	Twin Moose		Conventional	

92	400kV	Chamera-I-Jalandhar	1	D/C	152	POWERGRID	NHPC	POWERGRID	Twin ACAR		Partial (43%)	
93	400kV	Chamera-I-Jalandhar	2	D/C	152	POWERGRID	NHPC	POWERGRID	Twin ACAR		Partial (43%)	
94	400kV	Chittorgarh-Chittorgarh(PG)	1	D/C	49	POWERGRID	RRVPNL	POWERGRID	Quad Moose		Not Available	
95	400kV	Chittorgarh-Chittorgarh(PG)	2	D/C	49	POWERGRID	RRVPNL	POWERGRID	Quad Moose		Not Available	
96	400kV	Chittorgarh-Kankroli	1	D/C	71	POWERGRID	RRVPNL	POWERGRID	Twin Moose		Polymer Insulator	LILO of 400 kV Rapp C-Kankroli at Chhitorgarh
97	400kV	Dadri NCTPP-G. Noida	1	D/C	13	POWERGRID	NTPC	UPPCL	Quad Bersimis		Polymer Insulator	
98	400kV	Dadri NCTPP-Maharanibagh	1	D/C	54	POWERGRID	NTPC	POWERGRID	Quad Bersimis	Bypassed at Maharanibagh to form Dadri-Ballabgarh	Polymer Insulator	
99	400kV	Dadri NCTPP-Kaithal	1	S/C	213	POWERGRID	NTPC	POWERGRID	Twin Moose	LILO of Dadri-Malerkotla at Kaithal	Polymer Insulator	
100	400kV	Dadri NCTPP-Mandola	1	D/C	46	POWERGRID	NTPC	POWERGRID	Quad Bersimis		Polymer Insulator	
101	400kV	Dadri NCTPP-Mandola	2	D/C	46	POWERGRID	NTPC	POWERGRID	Quad Bersimis		Polymer Insulator	
102	400kV	Dadri NCTPP-Muradnagar New	1	S/C	33	POWERGRID	NTPC	UPPTCL	Twin Moose		Polymer Insulator	Line shifted from Muradnagar to Muradnagar New (UPPTCL)
103	400kV	Dadri NCTPP-Panipat	1	S/C	112	POWERGRID	NTPC	BBMB	Twin Moose		Polymer Insulator	
104	400kV	Dadri NCTPP-Panipat	2	S/C	117	POWERGRID	NTPC	BBMB	Twin Moose		Polymer Insulator	
105	400kV	Deepalpur-Bawana	1	D/C	26	POWERGRID	KT-Jhajjar	DTL	Triple Snowbird	LILO of 400kV Bawana-Abdullapur one circuit at Deepalpur by Jhajjar KT	Polymer Insulator	
106	400kV	Dehradun-Abdullapur	1	D/C	89	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Not Available	
107	400kV	Dehradun-Abdullapur	2	D/C	89	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Not Available	
108	400kV	Dulhasti-Kishenpur	1	S/C	120	POWERGRID	NHPC	POWERGRID	Quad Moose		Conventional	
109	400kV	Dulhasti-Kishenpur	2	S/C	120	POWERGRID	NHPC	POWERGRID	Quad Moose		Conventional	
110	400kV	Dwarka-Jhatikara	1	S/C	18	POWERGRID	POWERGRID	POWERGRID	Twin HTLS	After LILO of 400kV Jhatikara-Bamnoli-I at Dwarka(PG)	Not Available	
111	400kV	Dwarka-Bamnauli	1	S/C	10	POWERGRID	POWERGRID	DTL	Twin HTLS		Not Available	
112	400kV	Fatehbad PG-Hissar	1	D/C	89	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Bypassed at Hissar to form Bhiwani BBMB-Fatehabad	Polymer Insulator	
113	400kV	Fatehpur-Kanpur	1	S/C	100	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Bypassed at Kanpur to form Fatehpur-Panki	Polymer Insulator	LILO of Singrauli-Kanpur at Fatehpur
114	400kV	Fatehpur-Kanpur	2	S/C	107	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (64%)	LILO of Allahabad-Kanpur one ckt at Fatehpur
115	400kV	Kanpur-Panki	1	S/C	6	POWERGRID	POWERGRID	UPPTCL	Twin Moose	Bypassed at Kanpur to form Fatehpur-Panki	Polymer Insulator	
116	400kV	Kanpur-Panki	2	S/C	6	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Polymer Insulator	
117	400kV	Fatehpur-Mainpuri	1	D/C	260	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	LILO of Allahabad-Mainpuri (363 KM) D/C at Fatehpur Series compensated line (Degree of comp. - 40%)
118	400kV	Fatehpur-Mainpuri	2	D/C	260	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
119	400kV	G.Noida-Nawada	1	D/C	30	POWERGRID	UPPTCL	HVPNL	Quad Bersimis	Lilo of Ballabgarh-G.Noida at Nawada	Polymer Insulator	Ballabhgarh-Gnoida LILOed at Nawada (Faridabad,Haryana)
120	400kV	Gorakhpur PG-Gorakhpur UP	1	D/C	46	POWERGRID	POWERGRID	UPPCL	Twin Moose		Polymer Insulator	Partial Planning has been completed
121	400kV	Gorakhpur PG-Gorakhpur UP	2	D/C	46	POWERGRID	POWERGRID	UPPCL	Twin Moose		Polymer Insulator	Partial Planning has been completed

122	400kV	Gorakhpur PG-Lucknow PG	1	D/C	264	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (3%)	At crossing
123	400kV	Gorakhpur PG-Lucknow PG	2	D/C	264	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (3%)	At crossing
124	400kV	Gorakhpur PG-Basti (UP)	1	D/C	117	POWERGRID	POWERGRID	UPPTCL	Twin Moose	LILO of 400kV Gorakhpur PG-Lucknow PG ckt-4 at Basti (UP). LILO portion is of UP	Not Available	
125	400kV	Gorakhpur PG-Basti (UP)	2	D/C	108	POWERGRID	POWERGRID	UPPTCL	Twin Moose	LILO of 400kV Lucknow-Gorakhpur-3 at Basti. LILO portion is of UP	Not Available	
126	400kV	Basti (UP)-Lucknow PG	1	D/C	204	POWERGRID	UPPTCL	POWERGRID	Twin Moose		Not Available	
127	400kV	Gurgaon-Sohna Road	1	D/C	7	POWERGRID	POWERGRID	GPTL	Quad Moose	LILO of 400kV Gurgaon-Manesar D/C at Sohna Road by GPTL	Not Available	
128	400kV	Gurgaon-Sohna Road	2	D/C	7	POWERGRID	POWERGRID	GPTL	Quad Moose		Not Available	
129	400kV	Hamirpur-ParbatiPooling (Banala)	1	D/C	77	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	LILO of Amritsar-Banala-1 at Hamirpur
130	400kV	Jaipur South-Bassi	1	D/C	37	POWERGRID	POWERGRID	POWERGRID	Twin Moose	LILO of Agra-Bassi D/C at Jaipur South	Polymer Insulator	LILO of Agra-Bassi D/C at Jaipur South
131	400kV	Jaipur South-Bassi	2	D/C	37	POWERGRID	POWERGRID	POWERGRID	Twin Moose	LILO of Agra-Bassi D/C at Jaipur South	Polymer Insulator	
132	400kV	Jaipur South-Kota	1	D/C	180	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Not Available	
133	400kV	Jaipur South-RAPP D	1	D/C	228	POWERGRID	POWERGRID	NPCIL	Twin Moose		Not Available	
134	400kV	Jalandhar-Nakodar	1	D/C	42	POWERGRID	POWERGRID	PSTCL	Quad Moose		Polymer Insulator	
135	400kV	Jalandhar-Hamirpur	1	D/C	135	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (43%)	LILO of 400kV Amritsar-Hamirpur at Jalandhar
136	400kV	Kaithal-Hissar	1	D/C	113	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird		LILO of Patiala-Hissar at Kaithal	
137	400kV	Kaithal-Hissar	2	D/C	113	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird		LILO of Patiala-Hissar at Kaithal	
138	400kV	Kaithal-Malerkotla	1	S/C	135	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
139	400kV	Kankroli-Jodhpur	1	S/C	188	POWERGRID	POWERGRID	RRVPNL	Twin HTLS		Conventional	
140	400kV	Kanpur-Agra	1	S/C	240	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
141	400kV	Kanpur-Auraiya	1	D/C	73	POWERGRID	POWERGRID	NTPC	Twin Moose		Conventional	
142	400kV	Kanpur-Auraiya	2	D/C	73	POWERGRID	POWERGRID	NTPC	Twin Moose		Conventional	
143	400kV	Kanpur-Ballabgarh	1	S/C	386	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	*Series Compensated,Ckt 1-35%, Ckt-2 & 3-40%
144	400kV	Kanpur-Ballabgarh	2	D/C	371	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	*Series Compensated,Ckt 1-35%, Ckt-2 & 3-40%
145	400kV	Kanpur-Ballabgarh	3	D/C	371	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	*Series Compensated,Ckt 1-35%, Ckt-2 & 3-40%
146	400kV	Kanpur-Kanpur(GIS)	1	D/C	21	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Polymer Insulator	
147	400kV	Kanpur-Kanpur(GIS)	2	D/C	21	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Polymer Insulator	
148	400kV	Kanpur(GIS)-Lucknow(765)	1	D/C	160	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Not Available	
149	400kV	Kanpur(GIS)-Lucknow(765)	2	D/C	160	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Not Available	
150	400kV	Kishenpur-NewWanpoh	1	D/C	130	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
151	400kV	Kishenpur-NewWanpoh	3	D/C	135	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
152	400kV	Kishenpur-NewWanpoh	4	D/C	135	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Not Available	
153	400kV	Kishenpur-Samba	1	D/C	35	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Not Available	
154	400kV	Kishenpur-Samba	2	D/C	35	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
155	400kV	Kota-Merta	1	D/C	256	POWERGRID	POWERGRID	RRVPNL	Twin Moose		Conventional	

156	400kV	Kotputli-Bhiwadi	1	S/C	132	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	LILO of Bassi-Bhiwadi-2 at Kotputli
157	400kV	Kurukshetra-Jind	1	D/C	103	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Not Available	
158	400kV	Kurukshetra-Jind	2	D/C	103	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Not Available	
159	400kV	Kurukshetra-Sonipat	1	D/C	125	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird (Twin HTLS for LILOportion)	LILO of Abdullapur-Sonipat line at Kurukshetra	Partial (99%)	LILO of Abdullapr-Sonipat ckts at
160	400kV	Kurukshetra-Sonipat	2	D/C	125	POWERGRID	POWERGRID	POWERGRID			Partial (99%)	
161	400kV	Kurukshetra(PG)-Dhanansu(PS)	1	D/C	165	POWERGRID	POWERGRID	PSTCL	Quad Moose	LILO of 400kv Kurukshetra-Jalandhar (LILO portion is of	Polymer Insulator	LILO portion to be checked
162	400kV	Dhanansu(PS)-Jalandhar(PG)	1	D/C	106	POWERGRID	PSTCL	POWERGRID	Quad Moose		Polymer Insulator	
163	400kV	Kurukshetra-Nakodar	1	D/C	234	POWERGRID	POWERGRID	PSTCL	Quad Moose		Polymer Insulator	
164	400kV	Lucknow-Basti	1	D/C	203	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Not Available	
165	400kV	Lucknow-Basti	2	D/C	203	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Not Available	
166	400kV	Lucknow PG-Lucknow UP	1	S/C	63	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Conventional	
167	400kV	Lucknow PG-Unnao	1	D/C	74	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Conventional	
168	400kV	Lucknow PG-Unnao	2	D/C	74	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Conventional	
169	400kV	Lucknow UP-Bareilly PG	1	S/C	279	POWERGRID	UPPTCL	POWERGRID	Twin Moose		Conventional	
170	400kV	765 Lucknow (PG) - Lucknow (PG)	1	D/C	3	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Polymer Insulator	
171	400kV	765 Lucknow (PG) - Lucknow (PG)	2	D/C	3	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Polymer Insulator	
172	400kV	LucknowPG-Sohawal	1	D/C	98	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	LILO of Balia-Lucknow (316 KM) D/C at Sohawal
173	400kV	LucknowPG-Sohawal	2	D/C	98	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
174	400kV	Lucknow PG-Shahjahanpur	1	D/C	170	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (10%)	
175	400kV	Lucknow PG-Shahjahanpur	2	D/C	170	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Partial (10%)	
176	400kV	Lucknow-Jehta	1	D/C	32	POWERGRID	POWERGRID	UPPTCL	Twin Moose	LILO of 400kV Lucknow-Unnao DC at Jehta (UP). LILO portion is of	Not Available	
177	400kV	Lucknow-Jehta	2	D/C	32	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Not Available	
178	400kV	Ludhiana-Jalandhar	1	S/C	85	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
179	400kV	Ludhiana-Malerkotla	1	S/C	36	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
180	400kV	Ludhiana-Patiala	1	D/C	76	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
181	400kV	Ludhiana-Patiala	2	D/C	76	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
182	400kV	Mainpuri-Ballabgarh	1	D/C	236	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
183	400kV	Mainpuri-Ballabgarh	2	D/C	236	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
184	400kV	Malerkotla-Patiala	1	S/C	62	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
185	400kV	Manesar- Sohna Road	1	D/C	17	POWERGRID	POWERGRID	GPTL	Quad Moose	LILO of 400kV Gurgaon-Manesar D/C at Sohna Road by GPTL	Not Available	
186	400kV	Manesar- Sohna Road	2	D/C	17	POWERGRID	POWERGRID	GPTL	Quad Moose		Not Available	
187	400kV	Mandola-Maharanibagh	1	D/C (LILO towers are M/C)	29	POWERGRID	POWERGRID	POWERGRID	Twin HTLS	After LILO of 400KV Mandola-Bawana D/C Lines at 400KV Maharanibagh(PG)	Not Available	
188	400kV	Mandola-Maharanibagh	2	D/C (LILO towers are M/C)	29	POWERGRID	POWERGRID	POWERGRID	Twin HTLS		Not Available	
189	400kV	Maharanibagh-Bawana	1	D/C	29	POWERGRID	POWERGRID	DTL	Twin HTLS		Not Available	
190	400kV	Maharanibagh-Bawana	2	D/C	29	POWERGRID	POWERGRID	DTL	Twin HTLS		Not Available	
191	400kV	Meerut-Bagpat	1	D/C	71	POWERGRID	POWERGRID	POWERGRID	Twin Moose	LILO of Meerut-Kaithal DC at Baghpat	Polymer Insulator	
192	400kV	Meerut-Bagpat	2	D/C	71	POWERGRID	POWERGRID	POWERGRID	Twin Moose	LILO of Meerut-Kaithal DC at Baghpat	Polymer Insulator	
193	400kV	Meerut-Mandola	1	D/C	60	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
194	400kV	Meerut-Mandola	2	D/C	60	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
195	400kV	Meerut-Muzzafarnagar	1	S/C	37	POWERGRID	POWERGRID	UPPTCL	Twin Moose		Polymer Insulator	
196	400kV	Moga-Fatehabad	1	D/C	179	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
197	400kV	Moga-Hissar	1	D/C	209	POWERGRID	POWERGRID	POWERGRID	Twin Moose	Bypassed at Hissar to form Moga-Bhiwani(PG)	Polymer Insulator	

198	400kV	Moga-Hissar	2	D/C	206	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	LILO of Bhiwadi-Moga both ckts at Hisar
199	400kV	Moga-Hissar	3	D/C	206	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
200	400kV	Moga-Jalandhar	1	D/C	85	POWERGRID	POWERGRID	POWERGRID	Twin ACAR		Polymer Insulator	
201	400kV	Moga-Jalandhar	2	D/C	85	POWERGRID	POWERGRID	POWERGRID	Twin ACAR		Polymer Insulator	
202	400kV	Muradnagar-Hapur	1	S/C	28	POWERGRID	UPPTCL	UPPTCL	Twin Moose	Moradabad-Muradnagar LILOed at Hapur; LILO portion of	Not Available	
203	400kV	Moradabad-Hapur	2	S/C	109	POWERGRID	UPPTCL	UPPTCL	Twin Moose		Not Available	
204	400kV	Nallagarh-Koldam	1	D/C	46	POWERGRID	POWERGRID	NTPC	Quad Moose		Conventional	Koldam to Parbati pool section is of
205	400kV	Nallagarh-Patiala	1	D/C	94	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird		Polymer Insulator	
206	400kV	Nallagarh-Patiala	2	D/C	94	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird		Polymer Insulator	
207	400kV	Nathpa Jhakri-Gumma	1	D/C	55	POWERGRID	SJVNL	HPPTCL	Triple Snowbird	LILO of DC Jhakri-Panchkula line at Gumma	Not Available	
208	400kV	Nathpa Jhakri-Gumma	2	D/C	55	POWERGRID	SJVNL	HPPTCL	Triple Snowbird		Not Available	
209	400kV	Gumma-Panchkula	1	D/C	112	POWERGRID	HPPTCL	POWERGRID	Triple Snowbird		Not Available	
210	400kV	Gumma-Panchkula	2	D/C	112	POWERGRID	HPPTCL	POWERGRID	Triple Snowbird		Not Available	
211	400kV	Nathpa Jhakri-RampurHEP	1	D/C	21	POWERGRID	SJVNL	SJVNL	Triple Snowbird	Nathpa Jhakri-Nallagarh LILOed at Rampur HEP	Conventional	LILO of Jhakri-Nalagarh-1 at RampurHEP
212	400kV	Nathpa Jhakri-RampurHEP	2	D/C	21	POWERGRID	SJVNL	SJVNL	Triple Snowbird		Conventional	
213	400kV	NeemranaPG-Manesar	1	D/C	67	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
214	400kV	NeemranaPG-Manesar	2	D/C	67	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
215	400kV	NeemranaPG-Babai	1	D/C	85	POWERGRID	POWERGRID	RRVPNL	Twin Moose	LILO PORTION IF OF NRSS36(B), LILO of 400kV Neemrana-Sikar-1 at Babai	Not Available	LILO of 400kV Neemrana-Sikar at Babai by NRSSXXXVI (Essel group): Earlier 29% of Neemrana-Sikar PG
216	400kV	NeemranaPG-Sikar	2	D/C	176	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Not Available	
217	400kV	NewWanpoh-Wagoora	1	D/C	57	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
218	400kV	NewWanpoh-Wagoora	2	D/C	57	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
219	400kV	Orai(PG)-Orai	1	D/C	42	POWERGRID	POWERGRID	UPPTCL	Quad Moose		Not Available	
220	400kV	Orai(PG)-Orai	2	D/C	42	POWERGRID	POWERGRID	UPPTCL	Quad Moose		Not Available	
221	400kV	Panchkula -Abdullapur	1	D/C	63	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird		Polymer Insulator	LILO of Jhakri-Abdullapur at Panchkula
222	400kV	Panchkula -Abdullapur	2	D/C	63	POWERGRID	POWERGRID	POWERGRID	Triple Snowbird		Polymer Insulator	LILO of Jhakri-Abdullapur at
223	400kV	Patiala-Panchkula	1	D/C	65	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
224	400kV	Patiala-Panchkula	2	D/C	65	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Polymer Insulator	
225	400kV	Patiala-Patran	1	D/C	79	POWERGRID	POWERGRID	PTCL	Triple Snowbird	LILO of 400kV D/C Patiala – Kaithal Line at Patran SS under the ownership of PTCL.	Polymer Insulator	LILO of 400 kV Kaithal-
226	400kV	Patiala-Patran	2	D/C	79	POWERGRID	POWERGRID	PTCL	Triple Snowbird		Polymer Insulator	
227	400kV	Patran-Kaithal	1	D/C	47	POWERGRID	PTCL	POWERGRID	Triple Snowbird		Polymer Insulator	
228	400kV	Patran-Kaithal	2	D/C	47	POWERGRID	PTCL	POWERGRID	Triple Snowbird		Polymer Insulator	
229	400kV	RampurHEP-Nallagarh	1	D/C	128	POWERGRID	SJVNL	POWERGRID	Triple Snowbird	Nathpa Jhakri-Nallagarh LILOed at Rampur HEP	Conventional	LILO of Jhakri-Nalagarh-1 at RampurHEP
230	400kV	RampurHEP-Nallagarh	2	D/C	128	POWERGRID	SJVNL	POWERGRID	Triple Snowbird		Conventional	
231	400kV	RAPS-C-Chittorgarh	1	D/C	155	POWERGRID	NPCIL	RRVPNL	Twin Moose		Partial (38%)	LILO of 400 kV Rapp C-Kankroli at Chhitorgarh
232	400kV	RAPS-C-Kankroli	1	D/C	199	POWERGRID	NPCIL	POWERGRID	Twin Moose		Partial (51%)	

233	400kV	RAPS-C-Kota	1	S/C	51	POWERGRID	NPCIL	POWERGRID	Twin Moose		Partial (55%)	400kV RAPS-Jaipur line whose work was completed till Kota section is connected with 400kV Raps-Kota#2 (for antitheft purpose) and hence 400kV RapsC-Kota #2 is now two twin moose lines connected in parallel paths
234	400kV	RAPS-C-Kota	2	D/C	55	POWERGRID	NPCIL	POWERGRID	Twin Moose	D/C with 400kV Jaipur-RAPP D line	Not Available	
235	400kV	Rasra-Balia	1	S/C	46	POWERGRID	UPPTCL	POWERGRID	Twin Moose	LILO of 400kV Balia-Mau-II at Rasara. LILO portion is of UP	Not Available	
236	400kV	Rasra-Mau	1	S/C	38	POWERGRID	UPPTCL	UPPTCL	Twin Moose		Not Available	
237	400kV	Rihand-Allahabad	1	D/C	279	POWERGRID	NTPC	POWERGRID	Twin Moose		Conventional	
238	400kV	Rihand-Allahabad	2	D/C	279	POWERGRID	NTPC	POWERGRID	Twin Moose		Conventional	
239	400kV	Roorkee-Kashipur	1	D/C	151	POWERGRID	POWERGRID	PTCUL	Quad Moose		Partial (72%)	
240	400kV	Roorkee-Kashipur	2	D/C	151	POWERGRID	POWERGRID	PTCUL	Quad Moose		Partial (72%)	
241	400kV	Roorkee-Saharanpur	1	D/C	36	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Polymer Insulator	
242	400kV	Roorkee-Dehradun	1	D/C	80	POWERGRID	POWERGRID	POWERGRID	Quad Moose		Partial (50%)	
243	400kV	Sarnath-Varanasi	1	D/C	70	POWERGRID	UPPTCL	POWERGRID	Quad Moose		Partial (52%)	LILO of Sarnath-Allahabad (144 KM) at 765/400kV Varanasi
244	400kV	Sarnath-Varanasi	2	D/C	107	POWERGRID	UPPTCL	POWERGRID	Quad Moose		Partial (52%)	
245	400kV	Shahjahanpur-Bareilly PG	1	D/C	116	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
246	400kV	Shahjahanpur-Bareilly PG	2	D/C	116	POWERGRID	POWERGRID	POWERGRID	Twin Moose		Conventional	
247	400kV	Shahjahanpur-Rosa	1	D/C	8	POWERGRID	POWERGRID	UPPCL	Twin Moose		Not Available	
248	400kV	Shahjahanpur-Rosa	2	D/C	8	POWERGRID	POWERGRID	UPPCL	Twin Moose		Not Available	
249	400kV	Shree Cement-Kota	1	D/C	208	POWERGRID	Sh. Cement	POWERGRID	Twin Moose		Polymer Insulator	
250	400kV	Shree Cement-Merta	2	D/C	103	POWERGRID	Sh. Cement	RRVPNL	Twin Moose		Polymer Insulator	
251	400kV	Sikar-Babai	1	D/C	95	POWERGRID	POWERGRID	RRVPNL	Twin Moose	LILO PORTION IF OF NRSS36(B), LILO of 400kV Neemrana-Sikar 1 at Babai	Not Available	
252	400kV	Sikar-Ratangarh	1	D/C	76	POWERGRID	POWERGRID	RRVPNL	Twin Moose		Conventional	
253	400kV	Sikar-Ratangarh	2	D/C	76	POWERGRID	POWERGRID	RRVPNL	Twin Moose		Conventional	
254	400kV	Singrauli-Allahabad	1	S/C	224	POWERGRID	NTPC	POWERGRID	Twin Moose		Conventional	
255	400kV	Singrauli-Allahabad	2	S/C	202	POWERGRID	NTPC	POWERGRID	Twin Moose		Conventional	
256	400kV	Singrauli-Allahabad	3	S/C	215	POWERGRID	NTPC	POWERGRID	Twin Moose		Not Available	
257	400kV	Singrauli-Anpara	1	S/C	25	POWERGRID	NTPC	UPPTCL	Twin Moose		Partial (91%)	
258	400kV	Singrauli-Fatehpur	1	S/C	331	POWERGRID	NTPC	POWERGRID	Twin Moose		Conventional	LILO of Singrauli-Kanpur at Fatehpur
259	400kV	Singrauli-LucknowUP	1	S/C	409	POWERGRID	NTPC	UPPTCL	Twin Moose		Conventional	
260	400kV	Singrauli-Rihand	1	S/C	42	POWERGRID	NTPC	NTPC	Twin Moose		Conventional	
261	400kV	Singrauli-Rihand	2	S/C	44	POWERGRID	NTPC	NTPC	Twin Moose		Conventional	
262	400kV	Singrauli-Vindhyachal	1	S/C	3	POWERGRID	NTPC	POWERGRID	Twin Moose		Conventional	
263	400kV	Singrauli-Vindhyachal	2	S/C	5	POWERGRID	NTPC	POWERGRID	Twin Moose		Conventional	
264	400kV	Koteswar(PG)-Koteswar(THDC)	1	D/C	3	POWERGRID	POWERGRID	THDC	Twin Moose		Conventional	
265	400kV	Koteswar(PG)-Koteswar(THDC)	2	D/C	3	POWERGRID	POWERGRID	THDC	Twin Moose		Conventional	
266	400kV	Tehri-Koteshwar(PG)	3	S/C	14	POWERGRID	THDC	POWERGRID	Quad Moose		Not Available	

267	400kV	Unnao-Jehta	1	D/C	70	POWERGRID	UPPTCL	UPPTCL	Twin Moose	LILO of 400kV Lucknow-Unnao DC at Jehta (UP). LILO portion is of UP	Not Available	
268	400kV	Unnao-Jehta	2	D/C	70	POWERGRID	UPPTCL	UPPTCL	Twin Moose	LILO of 400kV Lucknow-Unnao DC at Jehta (UP). LILO portion is of UP	Not Available	
269	400kV	Uri-II - Uri-I	1	S/C	10	POWERGRID	NHPC	NHPC	Twin Moose		Conventional	LILO of 400kV Uri-I - Wagoora D/C at Amargarh
270	400kV	Uri-II - Wagoora	1	S/C	105	POWERGRID	NHPC	POWERGRID	Twin Moose		Conventional	
271	400kV	Jauljivi-Bareilly_2	1	D/C	205	POWERGRID	POWERGRID	POWERGRID	Twin Moose	After LILO of 400kV Dhauliganga - Bareilly(UP) Double circuit line(Initially LILOed at Pithoragarh and charged at 220kV level) at Jauljivi(PG)	Not Available	
272	400kV	Jauljivi-Bareilly_2	2	D/C	205	POWERGRID	POWERGRID	POWERGRID	Twin Moose	After LILO of 400kV Dhauliganga - Bareilly(UP) Double circuit line(Initially LILOed at Pithoragarh and charged at 220kV level) at Jauljivi(PG)	Not Available	
B. POWERLINK Transmission Ltd												
1	400kV	Bareilly PG-Meerut	1	D/C	250	POWERLINK	POWERGRID	POWERGRID	Twin Moose		Conventional	LILO of Bareilly PG-Mandola-1 (241 Km) at
2	400kV	Bareilly PG-Meerut	2	D/C	250	POWERLINK	POWERGRID	POWERGRID	Twin Moose		Conventional	
3	400kV	Bareilly UP-Bareilly PG	1	D/C	14	POWERLINK	UPPTCL	POWERGRID	Twin Moose		Polymer Insulator	
4	400kV	Bareilly UP-Bareilly PG	2	D/C	14	POWERLINK	UPPTCL	POWERGRID	Twin Moose		Polymer Insulator	
5	400kV	Gorakhpur PG-Lucknow PG	1	D/C	246	POWERLINK	POWERGRID	POWERGRID	Twin Moose		Conventional	*Series compensated line
6	400kV	Gorakhpur PG-Lucknow PG	2	D/C	246	POWERLINK	POWERGRID	POWERGRID	Twin Moose		Conventional	
7	400kV	Meerut-Mandola	3	D/C	102	POWERLINK	POWERGRID	POWERGRID	Twin Moose		Conventional	LILO of Bareilly PG-Mandola-1&2 (241 Km)
8	400kV	Meerut-Mandola	4	D/C	102	POWERLINK	POWERGRID	POWERGRID	Twin Moose		Conventional	
C. PKTSL												
1	400kV	Khetri-Sikar	1	D/C	78	PKTSL	PKTSL	POWERGRID	Twin HTLS		Not Available	
2	400kV	Khetri-Sikar	2	D/C	78	PKTSL	PKTSL	POWERGRID	Twin HTLS		Not Available	
D. Adani Transmission India Ltd.												
1	400kV	Mahindergarh (APL)-Bhiwani PG	1	D/C	50	ATIL	APL	POWERGRID	Twin Moose		Conventional	
2	400kV	Mahindergarh (APL)-Bhiwani PG	2	D/C	50	ATIL	APL	POWERGRID	Twin Moose		Conventional	
3	400kV	Mahindergarh (APL)-Bhiwani PG	3	D/C	56	ATIL	APL	POWERGRID	Twin Moose	Bypassed at 400kV Bhiwani to form 400kV Bypassed at Dhanonda to form	Not Available	
4	400kV	Mahindergarh (APL)-Bhiwani PG	4	D/C	56	ATIL	APL	POWERGRID	Twin Moose		Not Available	
5	400kV	MahindergarhHVDC-Dhanonda	1	D/C	5	ATIL	APL	HVPNL	Quad Moose		Conventional	
6	400kV	MahindergarhHVDC-Dhanonda	2	D/C	5	ATIL	APL	HVPNL	Quad Moose		Conventional	
E. APCPL (Aravali Power Corporation Pvt Ltd.)												
1	400kV	Jhajjar (IGSTPS)-Mundka	1	D/C	66	APCPL	APCPL	DTL	Twin Moose		Polymer	
2	400kV	Jhajjar (IGSTPS)-Mundka	2	D/C	66	APCPL	APCPL	DTL	Twin Moose		Polymer	
F. PHTL (Powergrid Himachal Transmission Limited)												
1	400kV	Abdullapur-Kala Amb	1	D/C	39	PHTL	POWERGRID	PKATL	Quad Moose		Conventional	
2	400kV	Abdullapur-Kala Amb	2	D/C	39	PHTL	POWERGRID	PKATL	Quad Moose		Conventional	
3	400kV	Kala Amb- Wangtoo (HP)	1	D/C	174	PHTL	PKATL	HPPTCL	Quad Moose	Karcham-Kala Amb LILOed at Wangtoo (HP)	Not Available	
4	400kV	Karcham Wangtoo - Wangtoo (HP)	1	D/C	1	PHTL	JSW	HPPTCL	Quad Moose		Not Available	
5	400kV	Karcham Wangtoo - Wangtoo (HP)	2	D/C	1	PHTL	JSW	HPPTCL	Quad Moose		Not Available	
6	400kV	Baspa-Karcham Wangtoo	1	D/C	22	PHTL	JPVL	JSW	Triple snowbird		Conventional	
7	400kV	Baspa-Karcham Wangtoo	2	D/C	22	PHTL	JPVL	JSW	Triple snowbird		Conventional	
8	400kV	Karcham Wangtoo-NJPC	1	D/C	34	PHTL	JSW	SJVNL	Triple snowbird		Conventional	

9	400kV	Karcham Wangtoo-NJPC	2	D/C	34	PHTL	JSW	SJVNL	Triple snowbird		Conventional	
10	400kV	Sorang-Wangtoo	1	D/C	21	PHTL	SORANG	HPPTCL	Quad Moose		Not Available	
11	400kV	Sorang-Kala Amb	1	D/C	160	PHTL	SORANG	PKATL	Quad Moose		Not Available	
G. PKTCL (Parbati-Koldam Transmission)												
1	400kV	Koldam-Ludhiana	1	D/C	151	PKTCL	NTPC	POWERGRID	Triple Snowbird		27% Polymer & 73% porcelain	
2	400kV	Koldam-Ludhiana	2	D/C	151	PKTCL	NTPC	POWERGRID	Triple Snowbird		27% Polymer & 73% porcelain	
3	400kV	Koldam-Banala	1	D/C	67	PKTCL	NTPC	POWERGRID	Quad Moose		100% porcelain	
4	400kV	Nallagarh-Banala	1	D/C	62	PKTCL	POWERGRID	POWERGRID	Quad Moose		100% porcelain	Powergrid owned 46.38km
5	400kV	Parbati-II- ParbatiPooling (Banala)	1	S/C	13	PKTCL	NHPC	POWERGRID	Quad Moose		100% porcelain	Some portion is of Powergrid
6	400kV	Parbati-III- ParbatiPooling (Banala)	1	S/C	4	PKTCL	NHPC	POWERGRID	Quad Moose		100% porcelain	
7	400kV	Parbati II- Sainj	1	S/C	1	PKTCL	NHPC	HPPCL	Quad Moose		100% porcelain	LILO of 400kV Parbati II-Parbati III at Sainj
8	400kV	Parbati III- Sainj	1	S/C	9	PKTCL	NHPC	HPPCL	Quad Moose		100% porcelain	
H. INDIGRID:NRSS-29 Transmission Company Limited												
1	400kV	Jalandhar-Samba	1	D/C	135	NRSS-29	POWERGRID	POWERGRID	Twin Moose		Polymer	
2	400kV	Jalandhar-Samba	2	D/C	135	NRSS-29	POWERGRID	POWERGRID	Twin Moose		Polymer	
3	400kV	Amargarh-Samba	1	D/C	286	NRSS-29	NRSS-29	POWERGRID	Twin Moose		Polymer	
4	400kV	Amargarh-Samba	2	D/C	286	NRSS-29	NRSS-29	POWERGRID	Twin Moose		Polymer	
5	400kV	Uri-I - Amargarh	1	D/C	62	NRSS-29	NHPC	NRSS-29	Twin Moose	LILO of 400kV D/C Uri-I – Wagoora Line at Amargarh SS under the ownership of NRSS-XXIX.	Polymer	
6	400kV	Uri-I - Amargarh	2	D/C	62	NRSS-29	NHPC	NRSS-29	Twin Moose		Polymer	
7	400kV	Amargarh - Wagoora	1	D/C	36	NRSS-29	NRSS-29	POWERGRID	Twin Moose		Polymer	
8	400kV	Amargarh - Wagoora	2	D/C	36	NRSS-29	NRSS-29	POWERGRID	Twin Moose		Polymer	
I. Powergrid Unchahar Transmission Ltd.												
1	400kV	Fatehpur-Unchahar	1	D/C	54	PUTL	POWERGRID	NBPPL	Twin Moose		Not Available	
2	400kV	Fatehpur-Unchahar	2	D/C	54	PUTL	POWERGRID	NBPPL	Twin Moose		Not Available	
J. NRSSXXXI(B) (Sekura Energy)												
1	400kV	Amritsar-Malerkotla	1	D/C	149	NRSSXXXI(B)	POWERGRID	POWERGRID	Twin Moose		Polymer	
2	400kV	Amritsar-Malerkotla	2	D/C	149	NRSSXXXI(B)	POWERGRID	POWERGRID	Twin Moose		Polymer	
3	400kV	Kurukshetra-Malerkotla	1	D/C	139	NRSSXXXI(B)	POWERGRID	POWERGRID	Twin Moose		Polymer	
4	400kV	Kurukshetra-Malerkotla	2	D/C	139	NRSSXXXI(B)	POWERGRID	POWERGRID	Twin Moose		Polymer	
K. Gurgaon Palwal Transmission Ltd.												
1	400kV	Dhanoda-Neemrana	1	D/C	47	GPTL	HVPNL	POWERGRID	Twin HTLS	Bypassed at Dhanonda to form	Polymer	
2	400kV	Dhanoda-Neemrana	2	D/C	47	GPTL	HVPNL	POWERGRID	Twin HTLS		Polymer	
3	400kV	Prithala-Kadarpur	1	D/C	29	GPTL	GPTL	GPTL	Twin HTLS		Polymer	
4	400kV	Prithala-Kadarpur	2	D/C	29	GPTL	GPTL	GPTL	Twin HTLS		Polymer	
5	400kV	Prithala(GPTL)-Aligarh(PG)	1	D/C	49	GPTL	GPTL	POWERGRID	Twin HTLS		Polymer	
6	400kV	Prithala(GPTL)-Aligarh(PG)	2	D/C	49	GPTL	GPTL	POWERGRID	Twin HTLS		Polymer	
7	400kV	Kadarpur-Sohna Road	1	D/C	10	GPTL	GPTL	GPTL	Twin HTLS		Polymer	
8	400kV	Kadarpur-Sohna Road	2	D/C	10	GPTL	GPTL	GPTL	Twin HTLS		Polymer	
L. FBTL												
1	400kV	AREPRL-Fatehgarh Pooling	1	D/C	1	FBTL	FBTL	FBTL	Quad moose		Not Available	
2	400kV	AREPRL-Fatehgarh Pooling	2	D/C	1	FBTL	FBTL	FBTL	Quad moose		Not Available	
3	400kV	Fatehgarh II-Fatehgarh Pooling	1	D/C	45	FBTL	POWERGRID	FBTL	Hexa Zebra+ Twin HTLS	LILO of 400kV Fatehgarh I-Bhadla-1 at Fatehgarh II. LILO Portion is of Powergrid	Not Available	
4	400kV	Fatehgarh II-Fatehgarh Pooling	2	D/C	45	FBTL	POWERGRID	FBTL	Hexa Zebra+ Twin HTLS		Not Available	
M. PBTSL												
1	400kV	Bikaner_2 (PBTSL)-Khetri (PKTSL)	1	D/C (some towers M/C)	275	PBTSL	PBTSL	PKTSL	Twin HTLS		Not Available	

2	400kV	Bikaner_2 (PBTSL)-Khetri (PKTSL)	2	D/C (some towers M/C)	275	PBTSL	PBTSL	PKTSL	Twin HTLS		Not Available
3	400kV	Bikaner_2 (PBTSL)-Khetri (PKTSL)	3	D/C (some towers M/C)	275	PBTSL	PBTSL	PKTSL	Twin HTLS		Not Available
4	400kV	Bikaner_2 (PBTSL)-Khetri (PKTSL)	4	D/C (some towers M/C)	275	PBTSL	PBTSL	PKTSL	Twin HTLS		Not Available
5	400kV	Khetri (PKTSL)-Bhiwadi(PG)	1	D/C	126	PBTSL	PKTSL	POWERGRID	Twin HTLS		Not Available
6	400kV	Khetri (PKTSL)-Bhiwadi(PG)	2	D/C	126	PBTSL	PKTSL	POWERGRID	Twin HTLS		Not Available
N. PRTL											
1	400kV	Jaisalmer(RS)-Fatehgarh_III(PG)	1	D/C	50	PRTL	RAJASTHAN	PRTL	Twin HTLS		Not Available
2	400kV	Jaisalmer(RS)-Fatehgarh_III(PG)	2	D/C	50	PRTL	RAJASTHAN	PRTL	Twin HTLS		Not Available
3	400kV	Fatehgarh_III(PG)- Fatehgarh_II(PG)	1	D/C	44	PRTL	PRTL	POWERGRID	Twin HTLS		Not Available
4	400kV	Fatehgarh_III(PG)- Fatehgarh_II(PG)	2	D/C	44	PRTL	PRTL	POWERGRID	Twin HTLS		Not Available
O. NRSS-36											
1	400kV	Babai(RS)-Bhiwani(PG)	1	D/C	111	NRSS-36	NRSS-36	POWERGRID	Twin Moose		Not Available
2	400kV	Babai(RS)-Bhiwani(PG)	2	D/C	111	NRSS-36	NRSS-36	POWERGRID	Twin Moose		Not Available
RE Connected at ISTS Dedicated Lines											
A. RENEW											
1	400kV	Bikaner(PG) - Bikaner (Renew)	1	S/C	5	RENEW	POWERGRID	RENEW	Twin Moose		Not Available
B. Avaada											
1	400kV	Bikaner(PG)-Avaada	1	S/C	14	AEPL	POWERGRID	AEPL	Twin Moose		Not Available
C. ARPOPL											
1	400kV	Bikaner(PG)-Ayana	1	S/C	12	ARPOPL	PGCIL	Ayana	ACSR Twin Moose+AL 59		Not Available
D. Azure											
1	400kV	Bikaner(PG)-Azure 43 PSS	1	S/C	9	Azure	POWERGRID	Azure 43 PSS	Twin Moose		Not Available
2	400kV	Azure43(RSS)-Azure 43 PSS	1	S/C	3	Azure	Azure 43 PSS	Azure 43 RSS	Twin Moose		Not Available
E. RSRPL											
1	400kV	Bikaner(RENEW) - Renew Surya Ravi	1	S/C	13	RSRPL	RENEW	RSRPL	Twin Moose		Not Available
F. NTPC											
1	400kV	Bhadla II - Kolayat	1	D/C	29	NTPC	POWERGRID	NTPC	Quad Moose		Not Available
2	400kV	Kolayat - Kolayat_2	1	D/C	2	NTPC	NTPC	NTPC	Quad Moose		Not Available
STATE LINES											
A. DTL											
1	400kV	Bamnauli-Tughlakabad	1	M/C	68	DTL	DTL	POWERGRID		Tower is quad circuit tower	Polymer Insulator
2	400kV	Bamnauli-Tughlakabad	2	M/C	68	DTL	DTL	POWERGRID		Tower is quad circuit tower	Polymer Insulator
3	400kV	Bamnoli-Jhatikara	1	D/C	12	DTL	DTL	POWERGRID	Quad bersimis		Polymer Insulator
4	400kV	Bamnoli-Jhatikara	2	D/C	12	DTL	DTL	POWERGRID	Quad bersimis		Polymer Insulator
5	400kV	Bawana-Mundka	1	D/C	18	DTL	DTL	DTL	Quad bersimis		Polymer Insulator
6	400kV	Bawana-Mundka	2	D/C	18	DTL	DTL	DTL	Quad bersimis		Polymer Insulator
7	400kV	Jhatikara-Mundka	1	D/C	17	DTL	POWERGRID	DTL	Quad bersimis		Polymer Insulator
8	400kV	Jhatikara-Mundka	2	D/C	17	DTL	POWERGRID	DTL	Quad bersimis		Polymer Insulator
B. HVPNL											
1	400kV	CLP Jhajjar -Dhanonda	1	D/C	20	HVPNL	CLP Jhajjar	HVPNL	Twin Moose		Conventional
2	400kV	CLP Jhajjar -Dhanonda	2	D/C	20	HVPNL	CLP Jhajjar	HVPNL	Twin Moose		Conventional
3	400kV	CLP Jhajjar- Kabulpur	1	D/C	35	JKTPL	CLP Jhajjar	HVPNL	Quad Moose		Already had Anti fog
4	400kV	CLP Jhajjar- Kabulpur	2	D/C	35	JKTPL	CLP Jhajjar	HVPNL	Quad Moose		Polymer Insulator
5	400kV	Deepalpur-Kabulpur	1	D/C	67	JKTPL	KT Jhajjar	HVPNL	Quad Moose		Installed on every
6	400kV	Deepalpur-Kabulpur	2	D/C	67	JKTPL	KT Jhajjar	HVPNL	Quad Moose		towers

7	400kV	Dhanoda-Daultabad	1	D/C	73	HVPNL	HVPNL	HVPNL	Quad Moose		Already had Polymer Insulator	
8	400kV	Dhanoda-Daultabad	2	D/C	73	HVPNL	HVPNL	HVPNL	Quad Moose			
9	400kV	Gurgaon-Daultabad	1	D/C	21	HVPNL	POWERGRID	HVPNL	Quad Moose			Six towers multi-circuit with Bamnauli-
10	400kV	Gurgaon-Daultabad	2	D/C	21	HVPNL	POWERGRID	HVPNL	Quad Moose			
11	400kV	Jhajjar-Daulatabad	1	D/C	64	HVPNL	APCPL	HVPNL	Twin Moose		Polymer Insulator	Partial (84%),
12	400kV	Jhajjar-Daulatabad	2	D/C	64	HVPNL	APCPL	HVPNL	Twin Moose		Polymer Insulator	Remaining pending
13	400kV	Khedar-Fatehabad	1	D/C	40	HVPNL	HPGCL	POWERGRID	Twin Moose		Conventional	Presently there is no planning of replacment of Convention disc Insulator with Polymer Insulators
14	400kV	Jind-Kirori	1	D/C	51	HVPNL	POWERGRID	HVPNL	Twin Moose		Polymer Insulator	
15	400kV	Jind-Kirori	2	D/C	51	HVPNL	POWERGRID	HVPNL	Twin Moose		Polymer Insulator	
16	400kV	Khedar-Kirori	1	D/C	6.2	HVPNL	HPGCL	HVPNL	Twin Moose		Conventional	Presently there is no planning of replacment
17	400kV	Khedar-Kirori	2	D/C	6	HVPNL	HPGCL	HVPNL	Twin Moose			
18	400kV	Khedar-Nuhiawali	1	D/C	114	HVPNL	HPGCL	HVPNL	Twin Moose		Conventional	Existing disc insulator
19	400kV	Nuhiawali-Fatehabad	1	D/C	78	HVPNL	HVPNL	POWERGRID	Twin Moose		Conventional	are of Porcelain
C. PDD (Jammu & Kashmir)												
1	400kV	Baglihar(stage 1)-Kishenpur	1	D/C	68	JK PDD	JKSPDCL	POWERGRID	Twin Moose		Conventional	
2	400kV	Baglihar(stage 1)-Kishenpur	2	D/C	68	JK PDD	JKSPDCL	POWERGRID	Twin Moose		Not Available	
D. PSTCL												
1	400kV	Behman Jassa- HMEL	1	D/C	17	PSTCL	PSTCL	PSTCL	Twin Moose		Not Available	
2	400kV	Behman Jassa- HMEL	2	D/C	17	PSTCL	PSTCL	PSTCL	Twin Moose		Not Available	
3	400kV	Behman Jassa- Moga	1	S/C	113	PSTCL	PSTCL	PSTCL	Twin Moose	After LILO of 400 KV TSPL to 400 KV Moga at 400 KV Behman Jassa Singh	Not Available	
4	400kV	Makhu-Amritsar	1	D/C	64	PSTCL	PSTCL	PSTCL	Twin Moose		Partial (10%)	
5	400kV	Makhu-Amritsar	2	D/C	64	PSTCL	PSTCL	PSTCL	Twin Moose		Partial (10%)	
6	400kV	Muktsar-Makhu	1	D/C	96	PSTCL	PSTCL	PSTCL	Twin Moose		Conventional	
7	400kV	Muktsar-Makhu	2	D/C	96	PSTCL	PSTCL	PSTCL	Twin Moose		Conventional	
8	400kV	Nakodar-Makhu	1	D/C	52	PSTCL	PSTCL	PSTCL	Twin Moose		Conventional	
9	400kV	Nakodar-Makhu	2	D/C	52	PSTCL	PSTCL	PSTCL	Twin Moose		Conventional	
10	400kV	Nakodar-Moga	1	S/C	78	PSTCL	PSPCL	POWERGRID	Twin Moose		Not Available	LILO of 400kV Talwandi sabo-Nakodar at Moga
11	400kV	Rajpura-Dhuri	1	D/C	86	PSTCL	PSTCL	PSTCL	Twin Moose		Conventional	Lilo of Rajpura th-Dhuri
12	400kV	Rajpura TPS- Rajpura	1	D/C	9	PSTCL	PSPCL	PSTCL	Twin Moose		Conventional	1 at 400kV Rajpura
13	400kV	Rajpura-Dhuri	2	D/C	86	PSTCL	PSTCL	PSTCL	Twin Moose		Conventional	Lilo of Rajpura th-Dhuri
14	400kV	Rajpura TPS- Rajpura	2	D/C	9	PSTCL	PSPCL	PSTCL	Twin Moose		Not Available	2 at 400kV Rajpura
15	400kV	Rajpura TPS-Nakodar	1	D/C	139	PSTCL	PSPCL	PSTCL	Twin Moose		Conventional	
16	400kV	Rajpura TPS-Nakodar	2	D/C	139	PSTCL	PSPCL	PSTCL	Twin Moose		Conventional	
17	400kV	Talwandi Saboo- Dhuri	1	D/C	175	PSTCL	PSPCL	PSTCL	Twin Moose		Partial (22%)	
18	400kV	Talwandi Saboo- Dhuri	2	D/C	175	PSTCL	PSPCL	PSTCL	Twin Moose		Partial (22%)	
19	400kV	Talwandi Saboo- Behman Jassa	1	D/C	20	PSTCL	PSPCL	PSTCL	Twin Moose	After LILO of 400 KV TSPL to 400 KV Moga at 400 KV Behman Jassa Singh	Not Available	
20	400kV	Talwandi Saboo- Nakodar	1	D/C	180	PSTCL	PSPCL	PSTCL	Twin Moose		Conventional	
21	400kV	Talwandi Saboo- Muktsar	1	D/C	100	PSTCL	PSPCL	PSTCL	Twin Moose		Conventional	
22	400kV	Talwandi Saboo- Muktsar	2	D/C	100	PSTCL	PSPCL	PSTCL	Twin Moose		Conventional	
E. PTCUL												
1	400kV	Alaknanda(GVK)-Srinagar(PTCUL)	1	D/C	14	PTCUL	GVKPIL	PTCUL	Twin Moose		Conventional	
2	400kV	Alaknanda(GVK)-Srinagar(PTCUL)	2	D/C	14	PTCUL	GVKPIL	PTCUL	Twin Moose		Conventional	
3	400kV	Muradabad-Kashipur	1	S/C	108	PTCUL	UPPTCL	PTCUL	Twin Moose		Conventional	
4	400kV	Rishikesh-Nehtaur	1	D/C	124	PTCUL	PTCUL	UPPTCL	Twin Moose		Not Available	LILO of 400kV

5	400kV	Nehtaur-Kashipur	2	D/C	80	PTCUL	UPPTCL	PTCUL	Twin Moose		Not Available	Rishikesh-Kashipur
6	400kV	Roorkee-Rishikesh	1	S/C	50	PTCUL	POWERGRID	PTCUL	Twin Moose	LILO portion is of POWERGRID	Not Available	
7	400kV	Roorkee-Muzaffarnagar	1	S/C	71	PTCUL	POWERGRID	UPPTCL	Twin Moose		Not Available	
F. RRVPNL												
1	400kV	Ajmer-Bhilwara	1	D/C	160	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
2	400kV	Ajmer-Bhilwara	2	D/C	160	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
3	400kV	Akal-Barmer	1	S/C	124	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Conventional	
4	400kV	Akal-Jodhpur	1	S/C	225	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Conventional	
5	400kV	Akal-Ramgarh	1	D/C	99	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
6	400kV	Akal-Ramgarh	2	D/C	99	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
7	400kV	Anta-Chhabra	1	S/C	90	RRVPNL	RRVPNL	RVUNL	Quad Moose	Bypassed at Anta to form Chhabra-Kota(PG)	Not Available	
8	400kV	Anta-Chhabra SC	1	D/C	89	RRVPNL	RRVPNL	RVUNL	Quad Moose		Not Available	
9	400kV	Anta-Chhabra SC	2	D/C	89	RRVPNL	RRVPNL	RVUNL	Quad Moose		Not Available	
10	400kV	Anta-Kalisindh	1	D/C	80	RRVPNL	RRVPNL	RVUNL	Quad Moose		Not Available	
11	400kV	Anta-Kalisindh	2	D/C	80	RRVPNL	RRVPNL	RVUNL	Quad Moose		Not Available	
12	400kV	Anta-Kawai	1	D/C	50	RRVPNL	RRVPNL	Kawai(Adani)	Quad Moose		Not Available	
13	400kV	Anta-Kawai	2	D/C	50	RRVPNL	RRVPNL	Kawai(Adani)	Quad Moose		Not Available	
14	400kV	Anta-Kota (PG)	1	S/C	91	RRVPNL	RRVPNL	POWERGRID	Twin Moose	Bypassed at Anta to form Chhabra-Kota(PG)	Not Available	
15	400kV	Barmer-Bhinmal	1	D/C	144	RRVPNL	RRVPNL	POWERGRID	Twin Moose		Not Available	
16	400kV	Barmer-Bhinmal	2	D/C	144	RRVPNL	RRVPNL	POWERGRID	Twin Moose		Not Available	
17	400kV	Barmer-Jaisalmer-II (Bhaesada)	1	D/C	117	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
18	400kV	Barmer-Jaisalmer-II (Bhaesada)	2	D/C	117	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
19	400kV	Barmer-Rajwest	1	D/C	15	RRVPNL	RRVPNL	RAJWEST	Twin Moose		Conventional	
20	400kV	Bhadla-Jodhpur	1	D/C	106	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
21	400kV	Bhilwara-Chhabra	1	S/C	303	RRVPNL	RRVPNL	RVUNL	Twin Moose		Conventional	
22	400kV	Bhilwara-Chittorgarh(RRVPNL)	1	D/C	49	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
23	400kV	Bhilwara-Chittorgarh(RRVPNL)	2	D/C	49	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
24	400kV	Bikaner-Bhadla	1	D/C	189	RRVPNL	RRVPNL	RRVPNL	Quad Moose		Not Available	
25	400kV	Bikaner-Bhadla	2	D/C	189	RRVPNL	RRVPNL	RRVPNL	Quad Moose		Not Available	
26	400kV	Bikaner-Merta	1	S/C	172	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
27	400kV	Bikaner-Sikar(PG)	1	D/C	171	RRVPNL	RRVPNL	POWERGRID	Twin Moose		Not Available	
28	400kV	Bikaner-Sikar(PG)	2	D/C	171	RRVPNL	RRVPNL	POWERGRID	Twin Moose		Not Available	
29	400kV	Chhabra - Kawai SCTPS	1	S/C	45	RRVPNL	RVUNL	APRL	Twin Moose		Conventional	
30	400kV	Chhabra-Chhabra SC	1	D/C	2	RRVPNL	RRVPNL	RVUNL	Quad Moose		Not Available	
31	400kV	Chhabra-Chhabra SC	2	D/C	2	RRVPNL	RRVPNL	RVUNL	Quad Moose		Not Available	
32	400kV	Heerapura-Hindaun	1	S/C	192	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Conventional	
33	400kV	Hindaun-Chhabra	1	S/C	305	RRVPNL	RRVPNL	RVUNL	Twin Moose		Conventional	
34	400kV	Kakani (Jodhpur New)-Jodhpur	2	S/C	102	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
35	400kV	Kankani (Jodhpur New)-Akal	1	D/C	223	RRVPNL	RRVPNL	RRVPNL	Quad Moose		Not Available	
36	400kV	Kankani(Jodhpur New)-Jaisalmer-II(Bhainsra)	1	D/C	177	RRVPNL	RRVPNL	RRVPNL	Quad Moose	LILO of 400kV Kankani(Jodhpur New)-Akal ckt-2	Not Available	
37	400kV	Jaisalmer-II(Bhainsra)-Akal	1	D/C	61	RRVPNL	RRVPNL	RRVPNL	Quad Moose		Not Available	
38	400kV	Kankani (Jodhpur New)-Jodhpur	1	S/C	67	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
39	400kV	Kankani (Jodhpur New)-Merta	1	S/C	140	RRVPNL	RRVPNL	RRVPNL	Twin Moose	LILO of 400kV Jodhpur-Merta-1 at Kakani	Not Available	
40	400kV	Merta-Bhadla	1	D/C	175	RRVPNL	RRVPNL	RRVPNL	Twin Moose	LILO of 400kV Jodhpur-Merta-2 at Bhadla	Not Available	
41	400kV	Merta-Heerapura	1	S/C	175	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Conventional	
42	400kV	Merta-Ratangarh	1	S/C	173	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Conventional	

43	400kV	Phagi-Ajmer(RRVPNL)	1	D/C	109	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
44	400kV	Phagi-Ajmer(RRVPNL)	2	D/C	109	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
45	400kV	Phagi-Heerapura	1	D/C	52	RRVPNL	RRVPNL	RRVPNL	Quad Moose		Not Available	
46	400kV	Phagi-Heerapura	2	D/C	52	RRVPNL	RRVPNL	RRVPNL	Quad Moose		Not Available	
47	400kV	Rajwest - Kankani (Jodhpur New)	1	S/C	209	RRVPNL	RRVPNL	RRVPNL	Twin Moose	LILO of 400kV Jodhpur-Rajwest-I at Kakani	Not Available	
48	400kV	Rajwest-Jodhpur	1	D/C	209	RRVPNL	RWPL	RRVPNL	Twin Moose		Conventional	
49	400kV	Ramgarh-Bhadla	1	D/C	160	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
50	400kV	Ramgarh-Bhadla	2	D/C	160	RRVPNL	RRVPNL	RRVPNL	Twin Moose		Not Available	
51	400kV	Suratgarh-Bikaner	1	S/C	146	RRVPNL	RVUNL	RRVPNL	Twin Moose		Conventional	
52	400kV	Suratgarh-Ratangarh	1	S/C	144	RRVPNL	RVUNL	RRVPNL	Twin Moose		Conventional	
53	400kV	Suratgarh-Ratangarh	2	S/C	144	RRVPNL	RVUNL	RRVPNL	Twin Moose		Conventional	
54	400kV	Suratgarh-Suratgarh SC	1	S/C	2	RRVPNL	RVUNL	RVUNL	Quad Moose		Not Available	
55	400kV	Suratgarh SC-Bikaner	1	D/C	140	RRVPNL	RVUNL	RRVPNL	Twin Moose		Not Available	
56	400kV	Suratgarh SC-Bikaner	2	D/C	140	RRVPNL	RVUNL	RRVPNL	Twin Moose		Not Available	
G. UPPTCL												
1	400kV	Agra (Fatehbad)-Agra South	1	D/C	70	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
2	400kV	Agra (UP)-Agra(Fatehbad)	1	S/C	104	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	LILO of 400 kV Agra(UP)-Muradnagar(N) at Fatehabad(UP)
3	400kV	Agra UP-Unnao	1	S/C	279	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Partial (25%)	
4	400kV	Agra(Fatehbad)-Mathura	1	S/C	142	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
5	400kV	Agra(Fatehbad)-Mathura	2	D/C	151	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	LILO of 400 kV Fatehabad(UP)-Muradnagar at Mathura
6	400kV	Alakhnanda-Vishnuprayag	1	D/C	109	UPPTCL	GVKPIL	JPVL	Twin Moose		Not Available	
7	400kV	Aligarh-Mainpuri	1	D/C	93	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
8	400kV	Aligarh-Mainpuri	2	D/C	93	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
9	400kV	Aligarh-Muradnagar	1	S/C	177	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	*Series Compensated line (40%). It would be shifted
10	400kV	Aligarh-Sikandrabad	1	D/C	95	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
11	400kV	Aligarh-Harduaganj	1	S/C	40	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
12	400kV	AnparaB-AnparaC	1	D/C	0.05	UPPTCL	UPRVUNL	LANCO	Quad Moose		Conventional	
13	400kV	AnparaB-AnparaC	2	D/C	0.05	UPPTCL	UPRVUNL	LANCO	Quad Moose		Conventional	
14	400kV	AnparaB-AnparaD	1	D/C	5	UPPTCL	UPRVUNL	UPPTCL	Twin Moose		Not Available	
15	400kV	AnparaB-AnparaD	2	D/C	5	UPPTCL	UPRVUNL	UPPTCL	Twin Moose		Not Available	
16	400kV	AnparaB-Mau	1	S/C	262	UPPTCL	UPRVUNL	UPPTCL	Twin Moose		Partial (13%)	
17	400kV	AnparaB-Obra B	1	S/C	40	UPPTCL	UPRVUNL	UPPTCL	Twin Moose		Partial	
18	400kV	AnparaB-Sarnath	1	D/C	158	UPPTCL	UPRVUNL	UPPTCL	Twin Moose		Partial	
19	400kV	AnparaB-Sarnath	2	D/C	158	UPPTCL	UPRVUNL	UPPTCL	Twin Moose		Conventional	
20	400kV	Ataur-Hapur	1	D/C	52	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
21	400kV	Ataur-Hapur	2	D/C	52	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
22	400kV	Ataur-Indirapuram	1	D/C	15	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
23	400kV	Ataur(UP)-Noida Sec 123(UP)	1	D/C	19	UPPTCL	UPPTCL	UPPTCL	Quad Moose (LILO portion Twin HTLS)	LILO of 400 KV ATAUR-INDIRAPURAM CKT-II at 400 KV NOIDA SECTOR 123	Not Available	
24	400kV	Indirapuram(UP)-Noida Sec 123(UP)	1	D/C	17	UPPTCL	UPPTCL	UPPTCL	Quad Moose (LILO portion Twin HTLS)		Not Available	
25	400kV	Azamgarh-Mau	1	S/C	48	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Partial (79%)	
26	400kV	Azamgarh-Tanda	1	D/C	153	UPPTCL	UPPTCL	NTPC	Twin Moose		Not Available	
27	400kV	Badaun-Sambhal	1	D/C	77	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
28	400kV	Badaun-Sambhal	2	D/C	77	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
29	400kV	Banda-Orai	1	D/C	108	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	

30	400kV	Banda-Orai	2	D/C	108	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
31	400kV	Banda-Rewa road	1	D/C	177	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
32	400kV	Banda-Rewa road	2	D/C	177	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
33	400kV	Bara-Meja	1	D/C	32	UPPTCL	UPPTCL	MUNPL	Quad Moose		LILO of 400kV Bara-Rewa road D/C at Meja	
34	400kV	Bara-Meja	2	D/C	32	UPPTCL	UPPTCL	MUNPL	Quad Moose			
35	400kV	Bareilly UP-Unnao	1	D/C	271	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Partial (15%)	*Series Compensated line (45%)
36	400kV	Bareilly UP-Unnao	2	D/C	271	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Partial (15%)	*Series Compensated line (45%)
37	400kV	Gorakhpur UP-Azamgarh	1	S/C	90	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Partial (76%)	
38	400kV	Gr. Noida(765)-Sector 148	1	D/C	47	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
39	400kV	Gr. Noida(765)-Sector 148	2	D/C	47	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
40	400kV	Gr. Noida-Gr. Noida (765)	1	D/C	45	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
41	400kV	Gr. Noida-Gr. Noida (765)	2	D/C	45	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
42	400kV	Gr.Noida-Sikandrabad	1	D/C	17	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
43	400kV	Gr.Noida-Sikandrabad	2	D/C	17	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
44	400kV	Hapur-Dasna	1	D/C	14	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
45	400kV	Hapur-Dasna	2	D/C	14	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
46	400kV	Hapur-Moradabad	1	S/C	109	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
47	400kV	Hapur-Muradnagar	1	S/C	28	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
48	400kV	Harudaganj-Sikandarabad	1	S/C	115	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
49	400kV	Mainpuri(UP)-Mainpuri(PG)	1	D/C	25	UPPTCL	UPPTCL	POWERGRID	Twin Moose		Not Available	LILO of 400kV Orai-Mainpuri(PG) at Mainpuri(UP)
50	400kV	Mainpuri(UP)-Mainpuri(PG)	2	D/C	26	UPPTCL	UPPTCL	POWERGRID	Twin Moose		Not Available	
51	400kV	Meja-Musauli	1	D/C	65	UPPTCL	MUNPL	UPPTCL	Quad Moose		Not Available	
52	400kV	Meja-Rewa road	1	D/C	45	UPPTCL	MUNPL	UPPTCL	Quad Moose		Not Available	
53	400kV	Muradnagar New- Mathura	1	D/C	246	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	LILO of 400 kV Fatehabad(UP)-Muradnagar at Mathura
54	400kV	Muradnagar-Ataur	2	D/C	18	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
55	400kV	Musauli-Rewa road	1	D/C	34	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
56	400kV	Muzaffarnagar-Alakhnanda	1	D/C	189	UPPTCL	UPPTCL	GVKPIL	Twin Moose		Not Available	
57	400kV	Muzaffarnagar-Ataur	1	D/C	121	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
58	400kV	Muzaffarnagar-Vishnuprayag	1	D/C	280	UPPTCL	UPPTCL	JPVL	Twin Moose		Conventional	
59	400kV	Noida Sec 148 - Noida Sec 123	1	D/C	20	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
60	400kV	Noida Sec 148 - Noida Sec 123	2	D/C	20	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
61	400kV	Noida Sec 148-Noida Sec 123	1	D/C	20	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
62	400kV	Noida Sec 148-Noida Sec 123	2	D/C	20	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
63	400kV	Obra-Rewa road	1	S/C	179	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
64	400kV	Obra-Sultanpur	1	S/C	230	UPPTCL	UPRVUNL	UPPTCL	Twin Moose		Conventional	
65	400kV	Obra B - Obra C	1	S/C	1	UPPTCL	UPRVUNL	UPRVUNL	Twin Moose		Not Available	
66	400kV	Orai-Mainpuri(UP)	1	D/C	176	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
67	400kV	Orai-Mainpuri(UP)	2	D/C	176	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
68	400kV	Orai-Paricha	1	D/C	111	UPPTCL	UPPTCL	UPRVUNL	Twin Moose		Not Available	
69	400kV	Orai-Paricha	2	D/C	111	UPPTCL	UPPTCL	UPRVUNL	Twin Moose		Not Available	

70	400kV	Panki-Aligarh	1	S/C	285	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Partial (24%)	
71	400kV	Rewa road -Panki	1	S/C	210	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	LILO of Bara-Panki at 400kV Rewa Road
72	400kV	Rosa-Badaun	1	D/C	85	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
73	400kV	Rosa-Badaun	2	D/C	85	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
74	400kV	Sarnath-Azamgarh	1	S/C	97	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
75	400kV	Lucknow_1(PG)-Mohanlalganj (PGYTL)	1	S/C	58	UPPTCL	POWERGRID	UPPTCL	Twin Moose	LILO of 400kV LUCKNOW(PG)-	Conventional	
76	400kV	Sultanpur(UP)-Mohanlalganj (PGYTL)	1	S/C	133	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Conventional	
77	400kV	Sultanpur-Tanda	1	D/C	103	UPPTCL	UPPTCL	NTPC	Twin Moose		Not Available	
78	400kV	Tanda-Basti	1	D/C	44	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
79	400kV	Tanda-Basti	2	D/C	44	UPPTCL	UPPTCL	UPPTCL	Quad Moose		Not Available	
80	400kV	Mohanlalganj (PGYTL)-Unnao(UP)	1	S/C	104	UPPTCL	UPPTCL	UPPTCL	Twin Moose	LILO of 400 KV SAROJANI	Partial (13%)	Status after LILO?
81	400kV	Lucknow(UP)-Mohanlalganj (PGYTL)	1	S/C	89	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Partial (13%)	
82	400kV	Unnao-Panki	1	S/C	49	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Partial (41%)	
83	400kV	Varanasi-Jaunpur	1	D/C	73	UPPTCL	POWERGRID	UPPTCL	Twin Moose		Not Available	
84	400kV	Varanasi-Jaunpur	2	D/C	73	UPPTCL	POWERGRID	UPPTCL	Twin Moose		Not Available	
85	400kV	Jaunpur (UP)-Obra_B(UP)	1	D/C	177	UPPTCL	UPPTCL	UPPTCL	Twin Moose	After LILO of 400 KV OBRA B- OBRA-C CKT-	Not Available	
86	400kV	Obra_C_TPS(UP)-Jaunpur (UP)	1	D/C	176	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
87	400kV	Sambhal-Rampur	1	D/C	74	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
88	400kV	Sambhal-Rampur	2	D/C	74	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
89	400kV	Simbholi-Meerut_PMSTL	1	D/C	29	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
90	400kV	Simbholi-Meerut_PMSTL	2	D/C	29	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
91	400kV	Simbholi_PMSTL (UP)-Muradnagar_2(UP)	1	D/C	71	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
92	400kV	Simbholi_PMSTL (UP)-Muradnagar_2(UP)	2	D/C	71	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
93	400kV	Panki-Panki_TPS	1	S/C	1	UPPTCL	UPPTCL	UPPTCL	Twin Moose		Not Available	
H. PJFTL												
1	400kV	Firozabad-Jawaharpur	1	D/C	40	PJFTL	PJFTL	UPRVUNL	Quad Moose	Anti-theft charging from Firozabad(PJFTL)	Not Available	
2	400kV	Firozabad-Jawaharpur	2	D/C	40	PJFTL	PJFTL	UPRVUNL	Quad Moose		Not Available	
3	400kV	Agra South-Firozabad PJFTL	1	D/C	79	PJFTL	UPPTCL	PJFTL	Twin Moose	LILO of 400kV Agra South-Agra Fatehabad ckt-2 at Firozabad PJFTL	Not Available	
4	400kV	Agra(Fatehabad)-Firozabad PJFT	1	D/C	79	PJFTL	UPPTCL	PJFTL	Twin Moose		Not Available	
I. GTL												
1	400kV	Kanpur(PG)-Ghatampur_TPS(UP)	1	D/C	49	GTL	POWERGRID	UPPTCL	Twin Moose	Antitheft charging from Kanpur(PG) Upto DEAD	Not Available	
2	400kV	Kanpur(PG)-Ghatampur_TPS(UP)	2	D/C	49	GTL	POWERGRID	UPPTCL	Twin Moose		Not Available	
J. HPPTCL												
1	400kV	Lahal-Chamba	1	D/C	35	HPPTCL	HPPTCL	POWERGRID	Twin Moose		Not Available	
2	400kV	Lahal-Chamba	2	D/C	35	HPPTCL	HPPTCL	POWERGRID	Twin Moose		Not Available	
K. NTPC JV												
1	400kV	Dadri-Loni (Harsh Vihar)	1	D/C	54	NTPC	NTPC	DTL	Twin Moose		Polymer	
2	400kV	Dadri-Loni (Harsh Vihar)	2	D/C	54	NTPC	NTPC	DTL	Twin Moose		Polymer	
L. MTSCL												
1	400kV	Ajmer-Deedwana	1	S/C	110	MTSCL	RRVPNL	MTSCL	Twin Moose		Not Available	
2	400kV	Bikaner-Deedwana	1	S/C	129	MTSCL	RRVPNL	MTSCL	Twin Moose		Conventional	
M. Aravali Transmission Service Company Ltd (ATSCL)												
1	400kV	Alwar-Hindaun	1	S/C	96	ATSCL	ATSL	RRVPNL	Twin Moose		Not Available	Partly owned by Aravali Transmission Services lLtd.
N. BBMB												
1	400kV	Dehar-Rajpura	1	S/C	129	BBMB	BBMB	PSTCL	Twin Morkulla+ LILO portion is of twin moose	Dehar-Bhiwani LILOed at Rajpura	Antifog	LILO of Dehar-Bhiwani at Rajpura
2	400kV	Bhiwani(BBMB)-Rajpura	1	S/C	213	BBMB	BBMB	PSTCL		Dehar-Bhiwani LILOed at Rajpura	Antifog	

3	400kV	Dehar-Panchkula	1	S/C	125	BBMB	BBMB	POWERGRID	Twin Morkulla+ LILO portion is of twin moose	POWERGRID owned LILO portion of 9.034Km	Antifog	LILO of Dehar-Panipat at Panchkula
4	400kV	Panchkula-Panipat	1	S/C	155	BBMB	POWERGRID	BBMB			Antifog	
OTHER DEDICATED LINES												
A. THDC												
1	400kV	Aligarh-Khurja	1	D/C	35	THDC	POWERGRID	THDC	Twin Moose		Not Available	
2	400kV	Aligarh-Khurja	2	D/C	35	THDC	POWERGRID	THDC	Twin Moose		Not Available	
5. 400kV Transmission Line charged at 220kV												
STATE LINES												
A. RRVPNL												
1	400kV charged at 220kV	Dholpur-Hindaun	1	S/C	100	RRVPNL	RRVUNL	RRVPNL	Twin Moose		Conventional	
2	400kV charged at 220kV	Kota-KTPS	1	D/C	7	RRVPNL	POWERGRID	RRVUNL	Twin Moose		Conventional	
3	400kV charged at 220kV	Kota-KTPS	2	D/C	7	RRVPNL	POWERGRID	RRVUNL	Twin Moose		Conventional	

* - Fixed series capacitor (FSC) is owned by POWERGRID

National Load Despatch Centre
Import Capability of Punjab for January 2025

\

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1st January 2025 to 31st January 2025	00-24	10300	500	9800	5497	4303		https://www.punjabsldc.org/ATC_TTC.aspx
Limiting Constraints		N-1 contigency of 400/220KV ICT at Rajpura, Ludhiana, Jalandhar, Muktsar Loading close to N-1 contingency limits of 400/220kV Patran, Malerkotla and Patiala ICTs 220 kV underlying network at Jalandhar, Ludhiana and Amritsar						

National Load Despatch Centre
Import Capability of Uttar Pradesh for January 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1st January 2025 to 31st January 2025	00-24	17300	600	16700	10165	6535		https://www.upsldc.org/documents/20182/0/ttc_atc_24-11-16/4c79978e-35f2-4aef-8c0f-7f30d878dbde
Limiting Constraints	N-1 contingency of 400/220kV Obra, Allahabad(PG), Gorakhpur (UP), Agra(PG), Lucknow (PG) ICTs							

National Load Despatch Centre
Import Capability of Haryana for January 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1st January 2025 to 31st January 2025	00-24	10300	300	10000	5418	4582		https://hvpn.org.in/#/atcttc
Limiting Constraints	N-1 contingency of 400/220kV ICT at Deepalpur, Hisar, Kabulpur and Panipat(BBMB)							

National Load Despatch Centre
Import Capability of Rajasthan for January 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1st January 2025 to 31st January 2025	00-24	7600	600	7000	5755	1245		https://sldc.rajasthan.gov.in/rrvpnl/scheduling/downloads
Limiting Constraints		N-1 contingency of 400/220kV Heerapura, Jodhpur, Bikaner, Ajmer, Merta, Hindaun and Ratangarh ICTs. Low voltage issues at Hindaun, Alwar, Bhinmal, Bikaner etc.						

National Load Despatch Centre
Import Capability of Delhi for January 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1st January 2025 to 31st January 2025	00-24	7300	300	7000	4810	2190		https://www.delhisldc.org/resources/atcttcreport.pdf
Limiting Constraints	N-1 contingency of 400/220kV Mundka, HarshVihar and Bawana (bus-split) ICTs.							

National Load Despatch Centre
Import Capability of Uttarakhand for January 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1st January 2025 to 31st January 2025	00-24	1810	100	1710	1402	308		https://uksldc.in/ttc-atc
Limiting Constraints		N-1 contingency of 400/220kV Kashipur ICTs. High loading of 220kV Roorkee-Roorkee and 220kV CBGanj-Pantnagar lines						

National Load Despatch Centre
Import Capability of HP for January 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1st January 2025 to 31st January 2025	00-24	2386	100	2286	1130	1156		https://hpsldc.com/mrm_category/ttc-atc-report/
Limiting Constraints		Overloading of 2*100MVA Giri transformers						

National Load Despatch Centre
Import Capability of J&K for January 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1st January 2025 to 31st January 2025	00-24	3500	100	3400	1977	1423		
Limiting Constraints		N-1 contigency of 400/220KV ICTs at Amargarh 220 kV underlying network at Amargarh, Wagoora						

National Load Despatch Centre
Import Capability of Chandigarh for January 2025

Issue Date: - Issue Time: 1600 Revision No. 0

Date	Time Period in IST (hrs)	Total Transfer Capability (TTC) (MW)	Reliability Margin (MW)	Available Transfer Capability (ATC) (MW)	Approved General Network Access (MW)	Margin Available for Temporary General Network Access(MW)	Changes in TTC w.r.t. Last Revision	Comments
1st January 2025 to 31st January 2025	00-24	400	20	380	342	38		
Limiting Constraints		N-1 contigency of 220kV Nallagarh-Kishengarh						

Annexure-B.IV

RE: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh IInk

Thu 8/29/2024 7:29 PM

To:NRLDC SO 2 <nrldcso2@grid-india.in>; CPCC1 <rtamc.nr1@powergrid.in>;

Cc:seo-nrpc <seo-nrpc@nic.in>; Somara Lakra (सोमारा लाकरा) <somara.lakra@grid-india.in>; Mahavir Prasad Singh (महावीर प्रसाद सिंह) <mahavir@grid-india.in>; Arunkumar P <Arunkumar.P@adani.com>; Sugata Bhattacharya (सुगाता भट्टाचार्या) <sugata@grid-india.in>; Deepak Kumar <deepak.kr@grid-india.in>; AMIT SHARMA <amsharma@grid-india.in>; Bikas Kumar Jha (बिकास कुमार झा) <bikaskjha@grid-india.in>; Manas Ranjan Chand (मानस रंजन चंद) <manas@grid-india.in>; Aman Gautam (अमन गौतम) <amangautam@grid-india.in>; Gnanaguru . <Gnanaguru.1@adani.com>; Sumeet Sharma <Sumeet.Sharma@adani.com>; Naman Vyas <Namany.Vyas@adani.com>; Milan Popat <Milan.Popat@adani.com>; Nihar Raj <nihar.raj@adani.com>; Abhishek Kukreja <Abhishek.Kukreja@adani.com>;

5 attachments (9 MB)

Counter (2).jpg; Counter.jpg; TPS (2).jpg; TPS.jpg; 220KV Alwar ss.jpg;

Dear Sir,

Please find the attached Photos. on 28-08-2024, a representative from M/s. Commtel Networks visited the Mahendragarh site and confirmed the healthiness of the SDH and TPS, along with their associated cards.

All SPS System equipment are functioning properly. The 15 TPS installed in the remote substation.

The details and status of TPS and Counter at Mahendragarh End.

S.No	TPS	TPS Status	Counter	Counter Status
1	PG Hissar	ON	17	OKAY
2	Bhiwani	ON	17	OKAY
3	Dadari	ON	17	OKAY
4	Alwar	ON	-	OFF
5	Bhilwara	ON	12	OKAY
6	Merta	ON	14	OKAY
7	Ratangarh	ON	-	OFF
8	Gobinugarg	ON	-	OFF
9	Malerkotla	ON	-	OFF
10	Laton Kalan	ON	6	OKAY
11	Mandula	ON	12	OKAY
12	Bamnauli	ON	-	OFF
13	Shamli	ON	-	OFF
14	Bahadurgarh	ON	10	OKAY

15	Dhanonda	ON	-	OFF

There alarms on the system are due to the following reasons.

1. Equipment Failure/ card failure/ power failure at Remote Sites.
2. Cable connectivity break between the remote System and cable coming from Field.
3. E1 connectivity outage at remote Sites.

Our team, with support from Commtel Networks, visited the nearest TPS installed at the 220/132 kV Alwar Substation to check its healthiness. However, during the inspection, the panel was found to be de-energized, necessitating an end-to-end test. (Photo Attached) Similarly, each substation needs to be ensured the healthiness of the TPS by respective Substation owner.

We request you to please confirm the healthiness of the Sr no 1 and 2 .

Thanks and Regards,

Kalicharan Sahu
(O&M) HVDC & EHV Substations,
Adani Energy Solutions Limited
| ±500kV HVDC Mahendragarh Terminal Sub Station I
Village-Kheri- Aghiyar, Taluka- Kanina, Mahendragarh 123 029, Haryana, India
Mob +91 9764006167| Off +91 1285 277326

From: NRLDC SO 2 <nrldcso2@grid-india.in>
Sent: Tuesday, August 27, 2024 10:07 AM
To: SLDC Punjab <se-sldcprojects@pstcl.org>; PC PSTCL SLDC PUNJAB <pcpstcl@gmail.com>; Haryana <sldcharyanacr@gmail.com>; Delhi <sldcmintoroad@gmail.com>; UP <sera@upsldc.org>; Rajasthan <SE.LDRVPNL@RVPN.CO.IN>; ce.ld@rvpn.co.in; CPCC1 <rtamc.nr1@powergrid.in>; neerajk@powergrid.in; setncmrt@upptcl.org; bharatlalgujar@gmail.com; akashdeep3433786@gmail.com; xenemtcbhpp2@bbmb.nic.in; PC Control Room <pccont@bbmb.nic.in>; se.prot.engg@rvpn.co.in; Arunkumar P <Arunkumar.P@adani.com>; Kali Charan Sahu <Kalicharan.Sahu@adani.com>; rajbir-walia79@yahoo.com; ase-sldcop@pstcl.org; sesldcop@hvpn.org.in; cepso@upsldc.org; se-sldcop <se-sldcop@pstcl.org>; SICHVDC Controlroom <SICHVDC.Controlroom@adani.com>
Cc: seo-nrpc <seo-nrpc@nic.in>; somara.lakra <somara.lakra@grid-india.in>; Mahavir Prasad Singh (महावीर प्रसाद सिंह) <mahavir@grid-india.in>; Sugata Bhattacharya (सुगाता भट्टाचार्या) <sugata@grid-india.in>; deepak.kr <deepak.kr@grid-india.in>; AMIT SHARMA <amsharma@grid-india.in>; bikaskjha <bikaskjha@grid-india.in>; Manas Ranjan Chand (मानस रंजन चंद) <manas@grid-india.in>; Aman Gautam (अमन गौतम) <amangautam@grid-india.in>
Subject: Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

Sir,

उत्तर प्रदेश राज्य भार प्रेषण केन्द्र लि०
यू०पी०एस०एल०डी०सी०परिसर, विभूति
खण्ड II,गोमती नगर, लखनऊ–226010
ई मेल : sera@upsldc.org

U.P. State Load Despatch Centre Ltd.
UPSLDC Complex, Vibhuti Khand II
Gomti Nagar, Lucknow- 226010
E-mail: sera@upsldc.org

No: - 2661 /SE(R&A)/EE-II/SPS Dated:- 07/08/ 2024

General Manager, NRLDC18-A,
SJSS Marg, Katwaria Sarai,
New Delhi – 110016

Subject- Regarding SPS of HVDC Mundra-Mahendargarh line

Kindly refer to SE (ETC) Muzaffarnagar letter no/062/E.T.C./MZN/400 kV S/S Shamli dated 05.05.2024. (copy enclosed) regarding feeder wise load of Shamli area. As per the letter, at present complete load relief (i.e. 300MW) may not be provided by 220 kV Shamli, so that alternatively feeder and load details of 400 kV Shamli has also been provided. Also it is informed that at present SPS system at 220 kV Shamli is not healthy which is being maintained by PGCIL.

It is therefore requested to kindly instruct the concerned to incorporate 132 kV feeders of 220 kV Shamli & 400 kV Shamli in SPS of HVDC Mundra-Mahendargarh line so that appropriated load relief may be provided from UP Control area and take necessary action regarding healthiness of SPS system

Sangeet

(Sangeeta)
Superintending Engineer (R&A)

No: - /SE(R&A)/EE-II/SPS Dated: - 2024

Copy forwarded to following via e-mail 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), Vibhuti Khand – II, Gomti Nagar, Lucknow.
4. Chief Engineer (Trans. West),PareshanBhawan, 130D, Hydel Colony, Victoria Park, Meerut 250001.
5. SE (Operations), 18 – A SJSS Marg, Katwaria Sarai, New Delhi, 110016.

(Sangeeta)
Superintending Engineer (R&A)

कार्यालय
अधीक्षण अभियन्ता
विद्युत पारेषण मण्डल
उ०प्र०पावर ट्रांसमिशन कारपोरेशन लि०
132 के०वी० भोपारोड उपकेन्द्र
मुजफ्फरनगर-251001

OFFICE OF THE
SUPERINTENDING ENGINEER
Electricity Transmission Circle
U.P. Power Transmission Corporation Ltd.
132 KV Bhopa Road Sub-station
Muzaffarnagar-251001

दूरभाष [0131-2608038
Ph.[0131-2608038
E-mail : seetcmzn@upptcl.org, seetcmzn@gmail.com

संख्या / No. 1062 /E.T.C./MZN/400 KV S/S Shamli दिनांक / DATED 05/08/24

Subject: - Regarding SPS of HVDC Mundra-Mahendargarh.

Superintending Engineer (R & A)
U.P State Load Despatch Centre Ltd.
UPSLDC Complex, Vibhuti Khand-II
Gomti Nagar, Lucknow.
Email. sera@upsldc.org

Please refer to your office letter no. 2187 dt. 01.07.2024, forwarded to this office by SE (T&C), Meerut vide endorsement no. 2237/CE(TW)/MT/SPS dt. 23.07.2024 vide which it has been requested to provide details of 132 KV feeders for planned relief to HVDC Mundra-Mahendargarh SPS.

In this reference, it is to apprise that following is the details of 132 KV feeders being fed from 220 KV Sub-Station Shamli.

S.No.	Name of feeder	Connected Load (MVA)	Maximum Load (MW)	Average Load (MW)
1	132 KV Lalukheri	63+63	72	47
2	132 KV Jhinjhana	63+40+40	80	52
3	132 KV Kairana-I/II	63+63	41	27
4	132 KV Jasala	63+40	58	38
	Total		251	164

1. Following Case wise Trippings of 132 KV Feeders at 220 KV Sub-Station, Shamli for tripping of HVDC Mundra-Mahendergarh Line may be used.

(A) In Maximum Load Condition:-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 300 MW	220 KV Subsatatio n, Shamli	132 KV Jasala	58	1	1	1	1
2			132 KV Kairana-I	20.5		1		1
3			132 KV Kairana-II	20.5	-	1		1
4			132 KV Lalukheri	72	-	-	1	1
5			132 KV Jinjhana	80	-		1	1
			Total Relief	251	58	99	210	251

(B) In Average Load Condition :-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 =300 MW	220 KV Subsatatio n, Shamli	132 KV Jasala	38	1		1	1
2			132 KV Kairana-I	13.5	1		1	1
3			132 KV Kairana-II	13.5	-		1	1
4			132 KV Lalukheri	47	-	1	1	1
5			132 KV Jinjhana	52	-	1	1	1
			Total Relief	164	51.5	99	164	164

Alternatively HVDC Mundra-Mahendargarh SPS may be shifted to 400 KV Sub-Station Shamli, details of 132 KV feeders from 400 KV Sub-Station Shamli with its Maximum and Average load is as follows :

S.No.	Name of feeder	Connected Load (MVA)	Maximum Load (MW)	Average Load (MW)
1	132 KV Budhana	63+40	82	53
2	132 KV Kharad	63+40	78	51
3	132 KV Jalalpur	40+40	41	27
4	132 KV Thanabhawan	63+63+40	74	48
5	132 KV Kaniyan	40+40	35	23
	Total		310	202

2. Following Case wise Trippings of 132 KV Feeders at 400 KV Sub-Station, Shamli for tripping of HVDC Mundra-Mahendergarh Line is hereby recommended

(A). In Maximum Load Condition :-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 =300 MW	400 KV Subsatatio n, Shamli	132 KV Budhana	82	-	-	1	1
2			132 KV Kharad	78	-	-	1	1
3			132 KV Jalalpur	41	1	-	1	1
4			132 KV Thanabhawan	74	-	1	-	1
5			132 KV Kaniyan	35	1	1	-	1
			Total Relief	310	76	109	201	310

(B). In Average Load Condition :-

S. No.	State.L.S quantum	Name of feeding substation	Feeder/line/ equipment	MW	Case-1 50 MW	Case-2 100 MW	Case-3 200MW	Case-4 300 MW
1	Uttar Pradesh Case-1 =50 MW Case-2 =100 MW Case-3 =200 MW Case-4 =300 MW	400 KV Subsatatio n, Shamli	132 KV Budhana	53	-	1	1	1
2			132 KV Kharad	51	1	1	1	1
3			132 KV Jalalpur	27	-	-	1	1
4			132 KV Thanabhawan	48	-	-	1	1
5			132 KV Kaniyan	23	-		1	1
			Total Relief	202	51	104	202	202

Submitted for information and necessary action

(Nikhil Kumar)
Superintending Engineer

संख्या / No. /E.T.C./MZN/ दिनांक / DATED

Copy forwarded to the following for information and necessary action :

1. Chief Engineer (TW) UPPTCL Meerut.
2. Superintending Engineer, Electricity (T&C) Circle, UPPTCL Meerut.
3. Executive Engineer Electricity Transmission Division, Shamli

(Nikhil Kumar)
Superintending Engineer

कार्यालय
अधीक्षण अभियन्ता
विद्युत परीक्षण एवं परिचालन मण्डल
उ0प्र0 पावर ट्रांसमिशन कारपोरेशन लि0
प्रथम तल पारेषण भवन, 130–डी, विक्टोरिया पार्क
मेरठ– 250 003
मोबाइल: 9412749817

OFFICE OF THE
SUPERINTENDING ENGINEER
Electricity Test & Commissioning Circle
U.P. POWER TRANSMISSION CORPORATION LTD.
1st Floor Pareshan Bhawan, 130-D, Victoria Park,
Meerut 250 003
Mobile: 9412749817

No. 82 / ETCC-MT / Dated- 30/05/24

Sub :- SPS related to HVDC Mundra-Mahendargarh.

Superintending Engineer (R&A) (By e-mail)
UPSLDC Vibhuti Khand ,
Gomti Nagar,
Lucknow.

In reference to the above cited subject, UPSLDC via email on 22.05.2024 informed that on 17.05.2024 at 16:20 hrs, Case-3 of SPS related to HVDC Mundra - Mahendergarh operated. As per action in case-3 operation of this line SPS, 200MW load relief at 220kV Shamli (UP) is desired. However, no load relief at 220kV Shamli was observed at given date and time. It is to bring in your notice that due to commissioning of 400kV Shamli S/s entire power flow scenario has been changed. Current situation is summarized as below.

At 220kV Shamli S/s feeders shown in the list	Planned load relief (MW)	Current situation
Thana Bhawan -1	25	The only line cateting Thana Bhawan has been made LILO at 132kV Jalalpur. Now Jalalpur is fed from 220kV Shamli S/s while load of Thana Bhawan is fed from 400kV Shamli S/s.
Thana Bhawan -2	25	
Jasala-1	25	Only one line exists.
Jasala-2	25	
Kharad-1	50	Only one line exists which is normally kept open at Kharad and load of Kharad is normally fed from 400kV Shamli S/s.
Kharad-2	50	
Baraut-1	150 (case-4)	No such line exist at 220kV Shamli S/s.
Baraut-2	150 (case-4)	

In view of the above facts, entire load relief strategy needs to be reviewed and redesigned for SPS. On 17.05.2024 at 16:20 hrs, no tripping observed at 220kV S/S Shamli as SPS system is unhealthy, which is being maintained by M/s PGCIL.

Hence it is requested to you to kindly coordinate with M/s PGCIL for modification of the scheme and rectification of the fault in SPS.

(Pramod Kumar Mishra)
Superintending Engineer

No. 82 /ETCC-MT/ Dated/– 30/05/24

Copy forwarded to the following for information & necessary action:-

1. Chief Engineer (TW), UPPTCL Victoria Park, Meerut.
2. Executive Engineer, Electricity Test & Commissioning Div., Muzaffarnagar.

(Pramod Kumar Mishra)
Superintending Engineer

SK/SENew/NewEngLetter01

Rajasthan Details

Revised updated feeder details (radial) along with expected average Load Relief

S.No.	Name of Sub- Station	Feeder name as per existing detail	Revised name of Existing Feeder /Line/Equipment	Average Load relief (MW)	Remark
1	220 kV GSS Alwar	132 kV GSS Mundawar	132 kV GSS Pinan	25	
		132 kv GSS Bansoor	132 kV GSS Telco	45	
		132 kV GSS Ramgarh	132 kV GSS Ramgarh	65	
		132 kV GSS Malakhera	132 kV GSS Malakhera	50	
		132 kV Alwar (LOCAL)	132 kV GSS Alwar (LOCAL)	120	
2	220 kV GSS Ratangarh	132 kV Sardar Sher			Generally Feed from 220 kV Halasar
3	220 kV GSSV Bhilwara	132 kV GSS Gangapur	132 kv GSS Karoi	15	
		132 kV GSS Danta	132 kV GSS Danta	30	
		132 kV GSS Devgarh	132 kV GSS Bankali	18	
		132 kV GSS Kareda			
4	400 kV GSS Merta	132 kV GSS Kuchera	132 kV GSS Dhawa	25	
		132 kV GSS Lamba	132 kV GSS Lamba jatan	55	
		132 kV GSS Gotan			

Email **Control Room CONTROL ROOM SLDC**

Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

From : Executive Engineer TS Rewari <xentsrwr@hvpn.org.in> Thu, Aug 29, 2024 01:20 PM

Subject : Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

To : Control Room CONTROL ROOM SLDC <controlroomsldc@hvpn.org.in>

Cc : SE TS GGN <setsggn@hvpn.org.in>, Executive Engineer Executive Engineer <xen400kvdhanoda@hvpn.org.in>, Substation Engineer <sse220kvlulaahir@hvpn.org.in>

In continuation of trailing email and discussion held today telephonically, it is gathered that desired load relief shall not get as load of 220 kV Lula Ahir shall be fed through 220 kV Dadri-Lula Ahir line being synchronized. Therefore, it is proposed that in the existing scheme SPS, the tripping of 220 kV D/C Lula Ahir line at 400 kV Dhanonda end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV TFs and one no. 33 kV incomer of 100 MVA 220/33 kV TF) at 220 kV Lula Ahir substation may be added.

The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA

The average load on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 50 MVA, 70 MVA and 70 MVA

From: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>
To: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
Cc: "SE TS GGN" <setsggn@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, "Substation Engineer" <sse220kvnarnaul@hvpn.org.in>
Sent: Wednesday, August 28, 2024 12:46:13 PM
Subject: Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

In reference of trailing email it is submitted that 220 kV Lula Ahir is connected with 400 kV Dhanonda through 220kV D/C line and with 220 kV Dadri through 220kV S/C line and with 220 kV Rewari with 220kV S/C line.
In general circuits of 400 kV Dhanonda and 220 kV Dadri runs in synchronization. The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA. It is further added that in general 220 kV Dadri takes load from 220 kV Lula Ahir substation and thus act as sink.

In case of operation of SPS at 400 kV Dhanonda, the desired load relief as mentioned in trailing email (90+95 MW) can be achieved through existing scheme (by outage of three no. 100 MVA TFs and 220 kV Dadri (acting as sink)).

Regards
XEN/TS Division
HVPNL Rewari.

From: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
To: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>, "Executive Engineer TS Rohtak" <xentsrtk@hvpn.org.in>, "Executive Engineer Ts Bhiwani" <xentsbhw@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, xendhanonda@gmail.com
Cc: "Chief Engineer SO Commercial" <cesocomml@hvpn.org.in>, "Chief Engineer TS Panchkula" <cetspkl@hvpn.org.in>, "Chief Engineer TS Hisar" <cetshsr@hvpn.org.in>, "Superintending Engineer SLDC OP" <sesldcop@hvpn.org.in>, "SE TS Rohtak" <setsrtk@hvpn.org.in>, "SE TS GGN" <setsggn@hvpn.org.in>, "Superintending Engineer TS Hisar" <setshsr@hvpn.org.in>, "Superintending Engineer MP CC Dhulkote" <sempccdkt@hvpn.org.in>, "Superintending Engineer MP CC Delhi" <sempccdelhi@hvpn.org.in>, "Executive Engineer MP Rohtak" <xenmpccrtk@hvpn.org.in>, "XEN MP Hisar" <xenmpcchsr@hvpn.org.in>, "XEN MP CC" <xenmpccggn@hvpn.org.in>
Sent: Wednesday, August 21, 2024 11:57:59 AM
Subject: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

Sir,

Please see the attachments.

--
Regards,
SCE (पाली प्रभारी अभियंता)/SLDC Control room,
HVPNL Panipat
Contact No- 9053090722,9053090721,0180-2664095

Fwd: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

Control Room CONTROL ROOM SLDC <controlroomsldc@hvpn.org.in>

Fri 8/30/2024 12:44 PM

To:NRLDC SO 2 <nrldcso2@grid-india.in>; NRLDC SO-II <nrldcso2@gmail.com>; Deepak Kumar <deepak.kr@grid-india.in>;

Cc:Superintending Engineer SLDC OP <sesldcop@hvpn.org.in>;

2 attachments (209 KB)

Email SPS Rewari.pdf; Regarding SPS Bhiwani.pdf;

Sir,

In reference to the SPS installed for 500kV HVDC Munda - Mahindergarh link the information received from TS wing (copy attached) is as under:

1. At 400kV Dhanonda through Lula Ahir substation:- It is proposed that in the existing scheme SPS, the tripping of 220 kV D/C Lula Ahir line at 400 kV Dhanonda end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV TFs and one no. 33 kV incomer of 100 MVA 220/33 kV TF) at 220 kV Lula Ahir substation may be added. The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA. The average load on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 50 MVA, 70 MVA and 70 MVA.

2. At 400/220kV Bhiwani BBMB: It is proposed that in the existing scheme SPS, the tripping of 220 kV Bapora (Bhiwani HVPNL) D/C line at Bhiwani BBMB end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV T-1 & T-2 TFs) at 220 kV Bapora (Bhiwani HVPNL) substation may be added. The maximum load on two no. 100 MVA TFs installed at 220kV Bhiwani HVPNL is 80 MW and 85 MW respectively. The average load on two no. 100 MVA TFs installed at 220kV Bhiwani HVPNL is 70 MW and 70 MW respectively.

3. At 132kV Charkhi Dadri: It is proposed that in the existing scheme SPS, the tripping of 132kV Kalanaur line at Dadri BBMB end may be removed and tripping of 132kV Haluwas & 132kV Dadri old at Dadri BBMB may be added. The maximum load on 132kV Haluwas & 132kV Dadri old line is 45 MW and 50 MW respectively. The average load on 132kV Haluwas & 132kV Dadri old line is 40 MW and 40 MW respectively.

Rest information kept unchanged. It is also added here that the fiber connectivity is also available on all the above substations.
It is also pertinent to mention here that 700 MW load relief is expected from Haryana. Rest of the states have been allotted with a relative less amount of relief as compared to Haryana for 500kV HVDC Mundra - Mahendargarh link. The Haryana share from APL Mundra has also been reduced now. In view of the above, the expected load relief from the NR states is required to be reviewed accordingly. The same was also pointed out by this office during the online meeting held on dated 20.08.2024.

This is for information & further necessary action please.

From: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>
To: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
Cc: "SE TS GGN" <setsggn@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, "Substation Engineer" <sse220kvlulaahir@hvpn.org.in>
Sent: Thursday, August 29, 2024 1:20:08 PM
Subject: Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

In continuation of trailing email and discussion held today telephonically, it is gathered that desired load relief shall not get as load of 220 kV Lula Ahir shall be fed through 220 kV Dadri-Lula Ahir line being synchronized. Therefore, it is proposed that in the existing scheme SPS, the tripping of 220 kV D/C Lula Ahir line at 400 kV Dhanonda end may be removed and tripping of all incomers (2 no. 132 kV Incomers of 100 MVA 220/132 kV TFs and one no. 33 kV incomer of 100 MVA 220/33 kV TF) at 220 kV Lula Ahir substation may be added.

The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA
The average load on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 50 MVA, 70 MVA and 70 MVA

From: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>
To: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
Cc: "SE TS GGN" <setsggn@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, "Substation Engineer" <sse220kvnarnaul@hvpn.org.in>
Sent: Wednesday, August 28, 2024 12:46:13 PM
Subject: Re: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

In reference of trailing email it is submitted that 220 kV Lula Ahir is connected with 400 kV Dhanonda through 220kV D/C line and with 220 kV Dadri through 220kV S/C line and with 220 kV Rewari with 220kV S/C line.
In general circuits of 400 kV Dhanonda and 220 kV Dadri runs in synchronization. The maximum load (for FY 2023-24) on three no. 100 MVA TFs installed at 220 kV Lula Ahir is 53.46 MVA, 86.26 MVA and 87.02 MVA. It is further added that in general 220 kV Dadri takes load from 220 kV Lula Ahir substation and thus act as sink.

In case of operation of SPS at 400 kV Dhanonda, the desired load relief as mentioned in trailing email (90+95 MW) can be achieved through existing scheme (by outage of three no. 100 MVA TFs and 220 kV Dadri (acting as sink)).

Regards
XEN/TS Division
HVPNL Rewari.

From: "Control Room CONTROL ROOM SLDC" <controlroomsldc@hvpn.org.in>
To: "Executive Engineer TS Rewari" <xentsrwr@hvpn.org.in>, "Executive Engineer TS Rohtak" <xentsrtk@hvpn.org.in>, "Executive Engineer Ts Bhiwani" <xentsbhw@hvpn.org.in>, "Executive Engineer Executive Engineer" <xen400kvdhanoda@hvpn.org.in>, xendhanonda@gmail.com
Cc: "Chief Engineer SO Commercial" <cesocomml@hvpn.org.in>, "Chief Engineer TS Panchkula" <cetspkl@hvpn.org.in>, "Chief Engineer TS Hisar" <cetshsr@hvpn.org.in>, "Superintending Engineer SLDC OP" <sesldcop@hvpn.org.in>, "SE TS Rohtak" <setsrtk@hvpn.org.in>, "SE TS GGN" <setsggn@hvpn.org.in>, "Superintending Engineer TS Hisar" <setshsr@hvpn.org.in>, "Superintending Engineer MP CC Dhulkote" <sempccdkt@hvpn.org.in>, "Superintending Engineer MP CC Delhi" <sempccdelhi@hvpn.org.in>, "Executive Engineer MP Rohtak" <xenmpccrtk@hvpn.org.in>, "XEN MP Hisar" <xenmpcchsr@hvpn.org.in>, "XEN MP CC" <xenmpccggn@hvpn.org.in>
Sent: Wednesday, August 21, 2024 11:57:59 AM
Subject: Review of SPS installed for 500kV HVDC Mundra - Mahindergarh.

Sir,

Please see the attachments.

--
Regards,
SCE (पाली प्रभारी अभियंता)/SLDC Control room,
HVPNL Panipat
Contact No- 9053090722,9053090721,0180-2664095

--
Regards,
SCE (पाली प्रभारी अभियंता)/SLDC Control room,
HVPNL Panipat
Contact No- 9053090722,9053090721,0180-2664095

Every 8333.3 sheets of paper costs us a tree.
Please don't print this e-mail unless you really need to. Save Paper Save Trees

HARYANA VIDYUT PRASARAN NIGAM LIMITED

Regd. Office: Shakti Bhawan, Plot No. C-4, Sector-6, Panchkula, 134109.
Corporate Identity Number: U40101HR1997SGC033683
Website: www.hvpn.org.in, E-mail - xentsbhw@hvpn.org.in
Phone No: 01664-242797(O)

To

The Executive Engineer,
LDPC, HVPNL,
Panipat.

Memo No.Ch-116/OMBE-7 Dated: 29.08.2024

Subject: SPS scheme at HVPNL substations for getting load relief due to tripping of 500Kv HVDC Mundra – Mahendargarh

Please refer to this O/Memo No. 108/OMBE-7 dated 27.08.2024 and O/Email dated 09.08.2024 on the subject cited matter.

In this continuation to above, the details of SPS under TS division, HVPNL, Bhiwani is as under:

S No.	Name of feeding S/Stn	Feeder/Line/Equipment	SPS Installed	Max. Load	Load Relief (Avg Load)	Remarks
1	220KV S/Stn Bhiwani	132KV IA Bhiwani Line	UFR	50MW	40 MW	SPS (UFR)Installed and healthy
2	220KV S/Stn Bhiwani	132KV Bhiwani Ckt 2	UFR	50MW	40 MW	SPS (UFR)Installed and healthy
3	220KV S/Stn Bhiwani	132KV Tosham	UFR	-	-	SPS (UFR) Installed and healthy but line is running on No load as 2nd source to 132KV Tosham
4	220KV S/Stn Bhiwani	132KV Incomer of Transformer 100MVA Transformer T2	-	85MW	70 MW	SPS may be provided for load relief as mentioned on subject above.
5	220KV S/Stn Bhiwani	132KV Incomer of 100MVA Transformer T1	-	80MW	70 MW	SPS may be provided for load relief as mentioned on subject above.
6	132kV substation Dadri-2	132kV Dadri-kalanaur ckt	Yes		Nil	SPS Installed and healthy but line is running on No load as 2nd source to 132KV Kalanaur
7	132kV substation Dadri-2	132kV Dadri-Makrani ckt	Yes		Nil	SPS Installed and healthy but line is running on No load as 2nd source to 132KV Makrani
8	132kV substation Dadri-2	132kV Dadri-Haluwas ckt	-	45MW	40MW	SPS may be provided for load relief as mentioned on subject above.
9	132kV substation Dadri-2	132kV Dadri-Dadri old	-	50MW	40MW	SPS may be provided for load relief as mentioned on subject above.

This is for kind information and necessary action please.

Executive Engineer,
Transmission System Division,
HVPNL, Bhiwani

CC to:

1. SE/TS Circle, HVPNL, Hisar for kind information, please.

Delhi Details

Re: Mock testing of SPS of 500kV HVDC Mundra-Mahindergarh link

SLDC, DELHI <sldcmintoroad@gmail.com>

Wed 8/28/2024 3:48 PM

To:NRLDC SO 2 <nrldcso2@grid-india.in>;

Cc:sinha.surendra <sinha.surendra@yahoo.com>; dgmsodelhisldc@gmail.com <dgmsodelhisldc@gmail.com>; Manager (T) SO <managersogd@gmail.com>;

In reference to trailing mail, the maximum load on 220kV feeders covered under SPS of 500kV HVDC Mundra-Mahindergarh link are as under:

S. No.	Name of the Element	MW
1	220 KV BAMNAULI-PAPANKALAN-I CKT.-I	120
2	220 KV BAMNAULI-PAPANKALAN-I CKT.-II	120
3	220 KV MANDAULA- GOPALPUR CKT.-I	212
4	220 KV MANDAULA- GOPALPUR CKT.-II	214

Regards,
SLDC Delhi

On Tue, Aug 27, 2024 at 10:07 AM NRLDC SO 2 <nrldcso2@grid-india.in> wrote:

> Sir,
>
> In reference of the trailing mail, it is to be mentioned that inputs have received from Rajasthan only. Members agreed to shared the details by 22nd August 2024, however no further details received from Haryana, Punjab, Delhi, UP & ADANI.
>
> Kindly share the details as discussed during the meeting held on 20th August 2024, so that further remedial actions can be initiated on the basis of those details.
>
> सादर धन्यवाद/ Thanks & Regards
> प्रणाली संचालन-II/ System Operation-II
> उ॰क्षे॰भा॰प्रे॰के॰/ NRLDC
> ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड/ Grid Controller of India Limited
> Formerly known as
> पोसोको / POSOCO

Punjab Details

	Name of S/S	66kV Feeders	Average Demand(Amp.)	Maximum Demand(Amp.)
Punjab Control Area	220/66kV Gobindgarh	66kV Talwara-19(ADANI SPS)	375	430
		66kV Talwara-2(ADANI SPS)	375	430
	220/66kV Lalton kalan	66kV Gill road-1(DADRI SPS)	543	610
		66kV Gill Road-2(DADRI SPS)	518	692
		66kV Dugri(DADRI SPS)	325	450
	220/66kV Malerkotla	66kV Malerkotla(ADANI SPS)	213	403
		66kV Amargarh(ADANI SPS)	238	405
		66kV Malaud ckt 1(DTPC SPS)	257	356

Note: 66kV Malaud at 220kV S/S Malerkotla was bifurcated into two circuits in the month of July 2024.

Nodal officers details

Control Area	Station Name	Nodal Person (SPS, communication system)	Contact details	Email Id
Rajasthan	220/132kV Alwar	Sh. Vijaypal Yadav XEN (Prot.) Ms. Pooja Verma AEN (Comm)	9413361407 9413375366	xen.prot.alwar@rvpn.co.in aen.comm.alwar@rvpn.co.in
	220/132kV Ratangarh	Sh. Mukesh Somra AEN (MPT&S) , Sh. Dharmender Singh (Comm.)	9414061442 9413383246	aen.mpt&s.rtg@rvpn.co.in aen.comm.ratangarh@rvpn.co.in
	220/132kV Bhilwara	Sh. Madhusudan Sharma, AEN (SLDC-comm Sh. Suresh Garg, XEN (MPT&S)	9413383176 9414061424	aen.subsldc.bhl@rvpn.co.in xen.mpts.bhl@rvpn.co.in
	220/132kV Merta	Mukesh Kumar (AEN Prot.) Mahip Singh (Aen) Comm)	7734806466 9413362995	aen.prot.mertacity@RVPN.CO.IN aen.comm.merta@RVPN.CO.IN
BBMB	400/220kV Bhiwani(BBMB)			
POWERGRID	400/220kV Hissar(PG)			
	Bhiwani(PG)			
	400/220kV Bahadurgarh(PG)			
Haryana	400/220kV Dhanonda	Gautam / SSE, 400kV Dhanonda	9313472669	dhanonda400kv@gmail.com
	220kV Lulahir	Er. Subhash Chander	9416373135	sse220kvlulaahir@hvpn.org.in
	220kV Rewari	Er. Kavinder Yadav	9315315649	sse220kvrwr@hvpn.org.in
	132kV Charkhi Dadri	Vivek Sangwan	9034459489	sse132kvdadri@hvpn.org.in
Punjab	220/66kV Gobindgarh	Er. Harwinder Singh	96461-18184	ae-220kvg1-mgg@pstcl.org
	220/66kV Laltokalan	Er. Supinder Singh	96461-24495	sse-pm-lalton@pstcl.org
	220/66kV Malerkotla	Er. Sanju Bala	96461-64007	sse-pm-mlrk@pstcl.org
UP	Shamli	Er. Krishna Nand	9412756631	eeetdshamli@upptcl.org,
	400kV Muradnagar	Er. D.S. Sengar	9412748666	ee400mrd2@upptcl.org
Delhi	400/220kV Bamnauli			
	400/220kV Mandola			

Sr No	Element Name	Outage Date	Outage Time	Reason
1	220 KV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-1	01-Nov-24	04:34	Phase to earth fault R-N. no auto-reclosing is observed
		02-Nov-24	18:01	Phase to earth fault R-N. No auto-reclosing is observed
		12-Nov-24	00:01	Phase to earth fault R-N. No auto-reclosing is observed
		19-Nov-24	05:51	Phase to earth fault R-N. No auto-reclosing is observed
		20-Nov-24	03:40	Phase to earth fault R-N. No file received.
2	220 KV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-2	08-Nov-24	19:32	Phase to earth fault R-N. No file received.
		10-Nov-24	23:19	Phase to earth fault R-N. No file received.
		16-Nov-24	22:24	Phase to earth fault R-N. No auto-reclosing is observed
		19-Nov-24	02:23	Phase to earth fault R-N. No auto-reclosing is observed
3	400 KV Agra-Unnao (UP) Ckt-1	08-Nov-24	14:34	Phase to earth fault Y-N.As per PMU, no fault is observed.
		17-Nov-24	13:26	Line tripped due to Direct trip due to tripping at Unnao end for line shifting to work on Bus-1.
		20-Nov-24	13:49	Phase to earth fault B-N. As per PMU, 2 successive B-N faults observed in 8 secs apart.
		30-Nov-24	11:34	Phase to earth fault R-N with unsuccessful auto-reclosing observed along with Oscillations.
4	400 KV Aligarh-Shamli (UP) Ckt-2	02-Nov-24	01:51	Phase to Phase Fault Y-B.
		14-Nov-24	01:10	Phase to Ground Fault R-N. Unsuccessful auto-reclosing with delayed clearance of 1.52s
		26-Nov-24	11:53	Phase to earth fault Y-N. As per PMU, Y-N fault occured, no auto-reclosing is observed.
5	400 KV Aligarh-Sikandrabad (UP) Ckt-1	01-Nov-24	20:42	Phase to earth fault B-N. As per PMU, B-N fault occured, no auto-reclosing is observed.
		14-Nov-24	01:20	Phase to Ground Fault R-N. Unsuccessful auto-reclosing with delayed clearance of 1s
		18-Nov-24	02:55	Phase to earth fault R-N with Unsuccessful auto-reclosing
6	400 KV Amritsar(PG)-Makhu(PS) (PSTCL) Ckt-1	10-Nov-24	07:39	Phase to earth fault Y-N with Unsuccessful auto-reclosing
		15-Nov-24	09:43	Phase to Ground Fault R-N. As per PMU, no fault is observed.
		24-Nov-24	12:46	Phase to earth fault Y-N with Unsuccessful auto-reclosing
7	400 KV Anpara_B(UPUN)-Mau(UP) (UP) Ckt-1	27-Nov-24	06:12	Phase to earth fault Y-N with Unsuccessful auto-reclosing
		22-Nov-24	13:05	Phase to earth fault B-N with Unsuccessful auto-reclosing with delayed clearance of 240msec
		29-Nov-24	12:25	Phase to earth fault B-N with Unsuccessful auto-reclosing with delayed clearance of 200msec
8	400 KV Bareilly-Unnao (UP) Ckt-1	21-Nov-24	01:31	Phase to earth fault B-N with Unsuccessful auto-reclosing
		21-Nov-24	06:13	Phase to earth fault R-N. As per PMU, R-N fault occured, no auto-reclosing is observed.
		25-Nov-24	14:24	Phase to earth fault R-N. As per PMU no fault is observed
		27-Nov-24	04:04	Phase to earth fault R-N. As per PMU, R-N fault occured, no auto-reclosing is observed.
9	400 KV Talwandi Saboo(PSG)-Nakodar(PSG) (PS) Ckt-1	12-Nov-24	04:35	Phase to earth fault B-N. As per PMU, B-N fault occured, no auto-reclosing is observed.
		14-Nov-24	07:29	Phase to earth fault R-N with Unsuccessful auto-reclosing
		14-Nov-24	23:47	Phase to earth fault R-N with Unsuccessful auto-reclosing

Annexure-B.VI

Grid Event summary for November 2024

S.No.	Category of Grid Incident/ Disturbance	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)
	(GI-1 to GD-V)				Date	Time	Date	Time					Generation Loss(MW)	Load Loss (MW)	% Generation Loss(MW)	% Load Loss (MW)	Antecedent Generation (MW)	Antecedent Load (MW)	
1	GI-1	1) 220 kV Bhadla(RS)-Saurya Urja Ckt-1	Rajasthan	RVPNL, Saurya Urja	1-Nov-24	12:47	1-Nov-24	15:04	02:17	i)Total generation of 220kV Saurya Urja(IP) S/s is evacuated to Bhadla(RS) at 220kV level through 220 kV Bhadla(RS)-Saurya Urja D/C. ii)During antecedent condition, 220 kV Bhadla(RS)-Saurya Urja Ckt-1 & 2 were carrying approx. 245 MW and 239 MW respectively. iii)As reported at 12:47 hrs, 220 kV Bhadla(RS)-Saurya Urja Ckt-1 tripped from Bhadla(RS) end only on R-N phase to earth fault with fault current of 5kA and fault distance of 1.85km from Bhadla(RS) end; fault sensed in zone-1 from Bhadla(RS) end. Exact reason of fault cannot be identified after patrolling. Hence it seems that fault was of transient nature and there was issue in A/R operation at Bhadla(RS) end. iv)As per PMU at Bhadla(PG), 3-phase to earth fault is observed with fault clearing time of 80msec. v)As per SCADA, change in solar generation of approx. 300 MW and no change in demand are observed in Rajasthan control area.	0	0	300	0	0.604	0.000	49642	49437	80
2	GI-2	1) 400 KV Aligarh-Muradnagar_1 (UP) Ckt 2) 400 KV Aligarh-Shamli (UP) Ckt-1 3) 400 KV Aligarh-Shamli (UP) Ckt-2	Uttar Pradesh	UPPTCL	2-Nov-24	01:51	2-Nov-24	03:23	01:32	i)400/220kV Aligarh(UP) has one and half breaker scheme at 400kV level and double main and transfer bus scheme at 220kV level. ii)As reported, at 01:51 hrs, 400 KV Aligarh-Muradnagar_1 (UP) Ckt tripped on B-N phase to earth fault with fault current of 2.912kA from Muradnagar_1 end and 18.916kA from Aligarh end; fault sensed in zone-1 at Aligarh end and zone-2 at Muradnagar_1 end. As per DR at Muradnagar_1 end, fault clearing time was ~377ms (delay in fault clearing at Muradnagar_1, carrier not received). As per DR at Aligarh end, unsuccessful A/R was observed with A/R dead time of 840 ms (less A/R dead time observed). iii)During the same time, 400 KV Aligarh-Shamli (UP) Ckt-1 & 2 also tripped on over-voltage at Aligarh end (as per EL of Main-1 at Aligarh). As per DR, R-ph voltage reached upto ~1.35 p.u. at Aligarh end of 400 KV Aligarh-Shamli (UP) Ckt-1 and B-N phase to earth fault with fault current of 642 A from Aligarh end is observed in 400 KV Aligarh-Shamli (UP) Ckt-2. Time sync issue is observed in Main-2 relay at Aligarh end of both 400 KV Aligarh-Shamli (UP) Ckt-1 & 2. As reported, DT received at Shamli end for both the lines. iv)As per PMU at Mainpuri(PG), B-N phase to earth fault with unsuccessful A/R is observed with fault clearing time of 80ms. v)As per SCADA, change in demand of approx. 130 MW is observed in UP control area.	0	0.199	0	130	0.000	0.331	31301	39244	80
3	GI-1	1) 66 MW Pong HPS - UNIT 6 2) 66 MW Pong HPS - UNIT 2 3) 220KV Bus 2 at Pong(BB) 4) 220 KV Jalandhar-Pong (BB) Ckt-2 5) 220 KV Jessore(HP)-Pong(BB) (PG) Ckt-1 6) 220 KV Pong(BB)-Dasuya(PS) (BBMB) Ckt-2	Himachal Pradesh	BBMB, HPPTCL, PSTCL, PGCIL	6-Nov-24	20:45	6-Nov-24	22:54	02:09	i)During antecedent condition, 66MW Unit-2, 3, 5 & 6 at Pong HEP were running and generating approx. 66MW, 66MW, 64MW and 56MW respectively (as per SCADA). 66MW Unit-1 & 4 at Pong HEP were not in service. ii)As reported, at 20:45 hrs, while stopping 66 MW Unit-6 at Pong (BB), the Relay MICOM P643- CB Head Flashover operated. As informed by the site, the Earth Fault relay connected to Unit-06 GT neutral operated, and the CB of Unit-6 opened. However, the Earth Fault current did not reduce to 0 A immediately. As a result, due to the AND operation logic (where the CB is open and the Earth Fault remains active), the CB Head Flashover was initiated, causing simultaneous tripping of 220 kV Bus-2 at Pong(BB). iii)As 220 KV Jalandhar-Pong (BB) Ckt-2, 220 KV Jessore(HP)-Pong(BB) (PG) Ckt-1, 220 KV Pong(BB)-Dasuya(PS) (BBMB) Ckt-2 and 66 MW Pong HPS - UNIT 2 were connected to 220 kV Bus-2 at Pong(BB), all these elements tripped from Pong end along with Bus-2. iv)As discussed with BBMB personnel, a delay of 15 ms is kept for reduction of earth fault current to 0 A (in case of CB open condition) in CB Head Flashover protection logic to avoid overlapping conditions. v)As per PMU at Jalandhar(PG), no fault is observed in the system. However, fluctuation in voltage is observed. vi)As per SCADA, generation loss of approx. 125 MW at Pong HEP (BB) and no load loss is observed in HP control area.	0	0	125	0	0.319	0.000	39236	52045	NA
4	GI-2	1) 400 KV Jawaharpur_TPS(UP) - Bus 2 2) 400/220 kV 500 MVA ICT 3 at Jawaharpur_TPS(UP) 3) 400/220 kV 500 MVA ICT 4 at Jawaharpur_TPS(UP) 4) 410 MAIN BAY - 400 KV FIROZABAD(PJTL)-JAWAHARPUR_TPS(UP) (UP) CKT-2 (UPRVUNL) AT 400 KV JAWAHARPUR_TPS(UP) 5) 125 MVAR Bus Reactor No 1 at 400 KV Jawaharpur_TPS(UP)	Uttar Pradesh	UPPTCL	11-Nov-24	15:56	11-Nov-24	21:44	05:48	i)During antecedent condition, 400 kV Firozabad–Jawaharpur Ckt 2 (28 MW) and 400/220 kV 500 MVA ICT 4 (27 MW) were connected to 400 kV Bus 2. 400 kV Firozabad–Jawaharpur Ckt 1 (26 MW), 125 MVAR bus reactor, and 400/220 kV 500 MVA ICT 3 (27 MW) were connected to 400 kV Bus 1. The 765/400 KV ICT 1 and 2 were not in service at that point of time. ii)As reported at 15:56:14:463 hrs, R-N fault occurred at TEED portion of bay 401 & 402. On this fault, bus bar protection of 400KV Bus-2 at 400 KV JAWAHARPUR_TPS(UP) operated. This led to tripping of breakers 410, 407 & 401 bay connected to 400KV Bus 2. At the same time (with the gap of 20msec), TEED protection operated which tripped Bay 402 (Tie Bay of 400/220KV ICT 3 & 4). This led to tripping of 400/220KV ICT 4. Further after ~30msec, 400KV Bay No 403 breaker opened led to the tripping 400/220 KV ICT 3 at Jawaharpur(UP). Exact reason of operation of bus bar protection along with TEED protection is yet to be received from UP. DR/EL of the tripping events also yet to be received. iii)After further 60msec, 125 MVAR Bus Reactor No 1 at 400 KV Jawaharpur_TPS(UP) also tripped on back up impedance protection operation. DR of the tripping is yet to be received. iv)As per PMU at Mainpuri (PG), R-N fault which cleared within 100msec is observed. v)As per SCADA, no load loss is observed in UP control area.	0	0	0	0	0.000	0.000	43687	53628	80
5	GI-2	1) 220KV BUS1&2 AT MERTA(RS) 2) 400/220 KV 315 MVA ICT 1 AT MERTA(RS) 3) 400/220 KV 315 MVA ICT 2 AT MERTA(RS) 4) 220KV MERTA-BHOPALGARH (RS) CKT 5) 220KV MERTA-KUCHERA (RS) CKT 6) 220/132 KV 100 MVA ICT 1 AT MERTA(RS) 7) 220/132 KV 100 MVA ICT 2 AT MERTA(RS) 8) 220/132 KV 100 MVA ICT 3 AT MERTA(RS) 9) 220KV MERTA-JETHANA(RS) CKT	Rajasthan	RVPNL	11-Nov-24	12:22	11-Nov-24	23:55	11:33	i)During antecedent condition, loading of 400/220 kV 315 MVA ICT 1 & 2 and 220/132kV 100MVA ICT-1, 2 & 3 at Merta(RS) were 171 MW, 177 MW, 62 MW, 62 MW and 56 MW respectively as per SCADA. 220kV Merta(RS)-Makrana(RS) Ckt was not in service. ii)As reported, at 12:22hrs, R-phase jumper of 220 kV Merta-Jethana snapped, and this broken jumper conductor fell on both 220 kV Bus-A and Bus-B at Merta. Because of this, Bus Bar protection operated at 400/220/132kV Merta S/s. iii)As a result, both 220KV Bus 1 & 2, along with all the elements connected to them i.e., 400/220 ICT-1 & 2, 220KV MERTA-JETHANA(RS), 220KV MERTA-BHOPALGARH (RS), 220KV MERTA-KUCHERA (RS), 220/132 KV 100 MVA ICT 1, ICT 2 & ICT 3 AT MERTA(RS) tripped. iv)As per PMU at Merta(RS), R-Y-B fault is observed with delayed fault clearance time of 720 msec. v)As per SCADA, change in demand of approx. 635 MW is observed in Rajasthan control area.	0	7.34	0	635	0.000	1.110	50765	57194	720
6	GI-1	1) 125 MVAR BUS REACTOR NO 1 AT 400KV HINDAUN(RS) 2) 400 KV Heerapura-Hindaun (RS) CKT-1 3) 400 KV Hindaun(RS)-Chhabra(RVUN) (RS) Ckt 4) 400 KV Alwar(ATIL)-Hindaun(RS) (ATIL) Ckt	Rajasthan	RVPNL, RVUNL, ATIL	16-Nov-24	05:21	16-Nov-24	07:23	02:02	i)As reported, at 05:21 hrs, interrupter of CB Pole (R-Ph.) blasted at the time of opening of CB of 125MVAR Bus Reactor at Hindaun (RS) on voltage regulation. ii)During the same time, 400 KV Hindaun(RS)-Chhabra(RVUN) (RS) Ckt, 400 KV Heerapura-Hindaun (RS) Ckt, and 400 KV Alwar(ATIL)-Hindaun(RS) (ATIL) Ckt at Hindaun(Raj) also tripped (exact reason of tripping yet to be shared). iii)As per DR of 400 KV Hindaun(RS)-Chhabra(RVUN) (end) (RS) Ckt, zone-2 distance protection operated at Chhabra end. R-N phase to earth fault was observed with fault current of 1.676kA and delayed fault clearance time of ~350ms. (DR nomenclature & time sync issue in DR need to be corrected.) iv)As per PMU at Heerapura (RS) and DR of Chhabra end, R-N fault is observed with delayed fault clearance time of 360 ms. v)As per SCADA, load loss of approx. 325 MW in Rajasthan control area was observed.	0	0.66	0	325	0.000	0.762	31398	42640	360
7	GI-1	1) 132 KV HAMIRPUR-II (Mattansidh)(HPSEBL)- Kangoo(HPSEBL) 1 2) 132 KV HAMIRPUR-II (Mattansidh)(HPSEBL)-KANGOO(HPSEBL) 2	Himachal	HPSEBL	21-Nov-24	08:42	21-Nov-24	08:57	00:15	i)220/132 KV Hamitpur-II(HP) substation has double Bus scheme in both 220KV and 132KV system. It has 3 (three) 220/132 KV ICTs along with 2 circuits connecting to 220KV Hamirpur (PG) and in 132 KV Hamirpur I – Hamirpur-II Ckt1 & 2, 132 KV Hamirpur II – Kangoo Ckt.1 & 2 and 132KV Hamirpur-II – Dehra I & II. ii)As reported at 08:42hrs, 132 KV Hamirpur II – Kangoo Ckt-1 & 2 tripped (exact reason of tripping yet to be shared). iii)Also SCADA data for 132 KV Hamirpur II – Kangoo Ckt-1 & 2 wasn't available before or after the tripping incident. iv)As per PMU at Hamirpur (PG) end, no fault was observed. v)As per SCADA, a change in demand of approx. 155 MW is observed in Himachal Pradesh control area.	0	0.039	0	155	0.000	0.285	41923	54379	NA
8	GI-2	1) 400 KV Bhadla-Merta (RS) Ckt-1 2) 400 KV Bikaner-Bhadla (RS) Ckt-1 3) 400 KV Bikaner-Bhadla (RS) Ckt-2	Rajasthan	RVPNL	23-Nov-24	22:11	24-Nov-24	00:02	01:51	i)During antecedent condition, 400 kV Firozabad–Jawaharpur Ckt 2 (28 MW) and 400/220 kV 500 MVA ICT 4 (27 MW) were connected to 400 kV Bus 2. 400 kV Firozabad–Jawaharpur Ckt 1 (26 MW), 125 MVAR bus reactor, and 400/220 kV 500 MVA ICT 3 (27 MW) were connected to 400 kV Bus 1. The 765/400 KV ICT 1 and 2 were not in service at that point of time. ii)As reported at 15:56:14:463 hrs, R-N fault occurred at TEED portion of bay 401 & 402. On this fault, bus bar protection of 400KV Bus-2 at 400 KV JAWAHARPUR_TPS(UP) operated. This led to tripping of breakers 410, 407 & 401 bay connected to 400KV Bus 2. At the same time (with the gap of 20msec), TEED protection operated which tripped Bay 402 (Tie Bay of 400/220KV ICT 3 & 4). This led to tripping of 400/220KV ICT 4. Further after ~30msec, 400KV Bay No 403 breaker opened led to the tripping 400/220 KV ICT 3 at Jawaharpur(UP). Exact reason of operation of bus bar protection along with TEED protection is yet to be received from UP. DR/EL of the tripping events also yet to be received. iii)After further 60msec, 125 MVAR Bus Reactor No 1 at 400 KV Jawaharpur_TPS(UP) also tripped on back up impedance protection operation. DR of the tripping is yet to be received. iv)As per PMU at Mainpuri (PG), R-N fault which cleared within 100msec is observed. v)As per SCADA, no load loss is observed in UP control area.	0	0	0	0	0.000	0.000	29764	42355	80
9	GI-1	1) 220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-1 2) 220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-2	Jammu &Kashmir	JKPDD, INDIGRID	26-Nov-24	14:13	26-Nov-24	15:20	01:07	i)220/132kV Ziankote S/s have two bus at 220kV side i.e., main bus & reserve bus. 220kV Amargarh-Ziankote ckt-1&2 are on the same tower (D/C tower) and line length is ~21.4km. ii)During antecedent condition, 220kV Amargarh (INDIGRID) –Ziankote(JK) D/C was carrying 138 MW each and feeding Ziankote load. iii)As reported, at 14:13 hrs, 220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-1 tripped on B-N phase to earth fault with fault distance of 22.34 km (as per EL) and fault current of Ib=~2.81kA (as per DR) from Amargarh end. Fault sensed in zone-2 at Amargarh end. iv)During the same time, 220 KV Amargarh (INDIGRID)-Ziankote(JK) (PDD JK) Ckt-2 also tripped on B-N phase to earth fault with fault distance of 27.46km (as per EL) and fault current of Ib=~3.43kA (as per DR) from Amargarh end. Fault sensed in zone-2 at Amargarh end. v)As confirmed by Amargarh (INDIGRID), in view of non-availability of carrier communication and A/R scheme at Ziankote end, A/R has been kept disabled at Amargarh end and time delay of Z-2 was also kept as instantaneous at Amargarh end. vi)As per PMU at Amargarh (PG), B-N phase to earth fault which cleared within 80 msec is observed. vii)As per SCADA, change in demand of approx. 260 MW is observed in J&K control area.	0	0.29	0	260	0.000	0.506	47538	51370	80
10	GD-1	1) 400 KV Dulhasti(NH)-Kishenpur(PG) (PG) Ckt-1 2) 130MW Unit-2 at Dulhasti HEP	Jammu &Kashmir	NHPC, PGCIL	27-Nov-24	14:50	27-Nov-24	15:33	00:43	i)During antecedent condition, 130MW Unit-2 at Dulhasti HEP were running generating approx. 110 MW and total generated power of 110MW was evacuating through 400 kV Dulhasti(NH)-Kishenpur(PG) (PG) Ckt-1 only. 130MW Unit-1 & 3 at Dulhasti HEP and 400 kV Dulhasti(NH)-Kishenpur(PG) (PG) Ckt-2 were not in service. ii)As reported, at 14:50hrs, 400 kV Dulhasti(NH)-Kishenpur(PG) (PG) Ckt-1 tripped on Y-N phase to earth fault (Exact reason, location and nature of fault along with DR/EL yet to be shared). As per PMU, unsuccessful A/R is observed with fault current of ~2.025kA followed by ~2.282kA from Kishenpur(PG) end. iii)Due to tripping of 400 kV Dulhasti(NH)-Kishenpur(PG) (PG) Ckt-1, 130MW Unit-2 at Dulhasti HEP tripped due to loss of evacuation path on over-speed protection operation. iv)As per PMU at Kishenpur (PG), Y-N phase to earth fault with unsuccessful A/R is observed with fault clearing time of 80ms. v)As per SCADA, generation loss of approx. 110MW is observed at Dulhasti HEP.	0	0	110	0	0.234	0.000	46964	52087	NA

Annexure-B.VII

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	03-Nov-24	04:36	Nil	Phase to Ground Fault R-N	NA	120	NO	YES (After 24 hrs)	No A/R operation		As per PMU, two successive R-N faults withtge gap of ~500msec with no A/R operation is observed .
2	400 KV RAPS_D(NP)-Shujalpur(PG) (RTCL) Ckt-2	POWERGRID	10-Nov-24	11:46	Nil	Snapping of Jumper	NA	NA	NO	NO	NA		As per PMU, no fault was observed .
3	800 KV HVDC Kurukshetra(PG) Pole-03	POWERGRID	15-Nov-24	18:09	Nil	Tripped due to control mal-operation at Champa end.	NA	NA	YES	YES	NA		As per PMU, no fault was observed, fluctuationin voltage is observed.
4	220 KV Auraiya(NT)-Malanpur(MP) (PG) Ckt-1	POWERGRID	20-Nov-24	13:11	Nil	Phase to earth fault R-N	NA	560	NO	YES	Delayed clearance of fault and no A/R operation		As per PMU, B-N fault at 13:08 hrs with delayed clearence of 560 msec, followed by R-N fault is observed
5	500 KV HVDC Mahindergarh(APL)-Adani Mundra(APL) (ATIL) Ckt-2	APL	27-Nov-24	12:32	Nil	Tripped due to TDM Bus fault at Mundra.	NA	NA	YES	YES	NA		As per PMU, no fault was observed .

 # 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 37.2(c) 2. CEA Grid Standard 15.3
3	FIR Not Furnished	1. IEGC 37.2(b) 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 November 2024 - 30th November 2024

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	AHEJ4L	2	2	100	2	0	100	2	0	100	2	0	100	
2	AMP Energy Green Private Limited	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report not submitted
3	ANTA-NT	3	2	67	2	0	67	2	0	67	2	0	67	
4	APL	1	0	0	0	0	0	0	0	0	0	0	0	Details received
5	AURAIYA-NT	4	4	100	0	0	0	0	0	0	0	0	0	
6	AYANA RENEWABLE POWER THREE PRIVATE LIMITED	1	1	100	1	0	100	1	0	100	1	0	100	
7	BBMB	44	6	14	6	14	20	7	22	32	6	5	15	DR, EL & Tripping report not submitted
8	CHAMERA-I-NH	1	1	100	1	0	100	1	0	100	1	0	100	
9	CHAMERA-II-NH	3	3	100	3	0	100	3	0	100	3	0	100	
10	CPCC1	27	0	0	0	4	0	0	4	0	0	0	0	Details received
11	CPCC2	18	1	6	1	5	8	1	2	6	1	1	6	
12	CPCC3	12	1	8	1	3	11	1	3	11	1	0	8	
13	DADRI-NT	1	1	100	1	0	100	1	0	100	1	0	100	
14	DHAULIGANGA-NH	2	2	100	2	0	100	2	0	100	2	0	100	
15	DULHASTI-NH	2	1	50	1	0	50	1	0	50	1	0	50	
16	INDIGRID	1	1	100	1	0	100	1	0	100	1	0	100	DR, EL & Tripping report not submitted
17	RAILWAYS	2	2	100	2	0	100	2	0	100	2	0	100	
18	RAPPA	11	2	18	11	0	100	11	0	100	7	0	64	
19	RAPPB	1	0	0	1	0	100	1	0	100	1	0	100	
20	RAPPC	1	1	100	1	0	100	1	0	100	1	0	100	
21	RENEW	1	1	100	1	0	100	1	0	100	1	0	100	
22	RIHAND-NT	2	2	100	2	0	100	2	0	100	2	0	100	
23	SALAL-NH	2	0	0	0	0	0	0	0	0	0	0	0	Details received

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

Time Period: 1st November 2024 - 30th November 2024

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		%	
24	SAURYA	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	DR, EL & Tripping report not submitted
25	SEWA-2-NH	3	0	**0**	0	2	**0**	0	1	**0**	0	0	**0**	Details received
26	SLDC-DV	9	1	**11**	8	0	**89**	8	0	**89**	8	0	**89**	DR, EL & Tripping report not submitted
27	SLDC-HP	6	0	**0**	6	0	**100**	6	0	**100**	0	0	**0**	Details received
28	SLDC-HR	15	3	**20**	3	2	**23**	3	2	**23**	3	1	**21**	
29	SLDC-JK	9	4	**44**	4	5	**100**	5	4	**100**	4	3	**67**	
30	SLDC-PS	45	7	**16**	21	7	**55**	21	7	**55**	35	0	**78**	
31	SLDC-RS	69	11	**16**	30	0	**43**	30	0	**43**	33	0	**48**	
32	SLDC-UK	10	0	**0**	3	1	**33**	3	1	**33**	2	0	**20**	DR, EL & Tripping report not submitted
33	SLDC-UP	93	18	**19**	20	10	**24**	19	9	**23**	23	2	**25**	
34	STERLITE	4	0	**0**	0	0	**0**	0	1	**0**	4	0	**100**	
35	TANDA-NT	1	0	**0**	1	0	**100**	1	0	**100**	1	0	**100**	
36	UNCHAHAR-NT	1	1	**100**	1	0	**100**	1	0	**100**	1	0	**100**	
Total in NR Region		**409**	**81**	**20**	**139**	**53**	**39**	**140**	**56**	**40**	**152**	**12**	**38**	

As per the IEGC provision under clause 37.2 (c), detailed tripping report along with DR & EL has to be furnished within 24 hrs of the occurrence of the event

Mock trial run/black start schedule plan for 2024-25

S.No.	Name of Generatiing Station	Fuel Type	Installed Capacity (in MW)	Whether Generating station has black start capability (Yes/ No)	Type of Black Start Source (DG set etc.)	Capacity of DG Set / Small Generator / Battery	Source of power supply to Communication and Telemetry during black start.	Compliance to 34.3 of IEGC for mock trial runs (Last date on which mock drill carried out)	Tentaive schedule plan for mock trial run		Remarks
									Black start exercise of generating unit (dead bus charging)	Mock black start of subsytem (black start of generating unit / island operation / synchronidation)	
NTPC											
1	Dadri GPS	Gas	4*130.19 + 2*154.51	Yes				16-Dec-23	31-Oct-24	NA	
2	Anta GPS	Gas	3*88.71 + 1*153.2	Yes				29-Feb-24			
3	Auraiya GPS	Gas	4*111.19 + 2*109.3	Yes					09-Jul-24	09-Jul-24	
4	Faridabad GPS	Gas	2*137.75 + 1* 156.07	Yes							
5	Koldam HEP	Hydro	4*200	Yes				14-Mar-24	12-Mar-25	12-Mar-25	
NHPC											
6	Bairasuil	Hydro	3*60	Yes				30-Nov-22	2nd week of November	2nd week of November	
7	Salal Stage-I	Hydro	3*115	Yes				02-Nov-18	3rd week of October	3rd week of October	
8	Salal Stage-II	Hydro	3*115	Yes					3rd week of October	3rd week of October	
9	Tanakpur HPS	Hydro	3*31.4	Yes					4th week of December	4th week of December	
10	Chamera HPS-I	Hydro	3*180	Yes				02-Dec-22	1st week of December	1st week of December	
11	Chamera HPS-II	Hydro	3*100	Yes				02-Dec-22	1st week of December	1st week of December	
12	Chamera HPS-III	Hydro	3*77	Yes				04-Dec-17	1st week of December	1st week of December	
13	URI-I	Hydro	4*120	Yes				20-Dec-16	1st week of December	1st week of December	
14	URI-II	Hydro	4*60	Yes				20-Dec-16	1st week of December	1st week of December	
15	Dhauliganga	Hydro	4*70	Yes				28-Dec-21	4th week of December	4th week of December	
16	Dulhasti	Hydro	3*130						4th week of November	4th week of November	
17	Sewa-II	Hydro	3*40	Yes				29-May-22	3rd week of November	3rd week of November	
18	Parbati-3	Hydro	4*130	Yes				22-Dec-20	4th week of December	4th week of December	
19	Kishanganga	Hydro	3*110	Yes					4th week of October	4th week of October	Conducted on 09.11.2024 (dead bus charging)
SJVNL											
20	Nathpa-Jhakri	Hydro	6*250	Yes				09-Dec-22	20-Nov-24	20-Nov-24	Conducted on 08.12.2024 (island operation)
21	Rampur	Hydro	6*68.67	Yes				09-Dec-22	20-Nov-24	20-Nov-24	
THDC											
22	Tehri	Hydro	4*250	Yes				07-Nov-23	06-Nov-24	06-Nov-24	Conducted on 13.11.2024 (dead bus charging)
23	Koteshwar	Hydro	4*100	Yes				14-Mar-24	Dec-24	Dec-24	Conducted on 13.11.2024 (dead bus charging)
BBMB											
24	Bhakra (L)	Hydro	3*108 + 2*126	Yes				31-Dec-22			
25	Bhakra (**R**)	Hydro	5*157	Yes				26-Dec-22			
26	Ganguwal	Hydro	1*27.99 + 2*24.2								
27	Kotla	Hydro	1*28.94 + 2*24.2								
28	Dehar	Hydro	6*165								
29	Pong	Hydro	6*66					08-Jun-14			
*: Rampur can be black started only after starting of Nathpa Jhakri units due to Tandem operation											
IPPGCL(Indraprashta power generating Corporation Ltd.)/ Delhi Gencos											
30	I.P. Gas Turbine (IPGCL G.T.)	Gas	6*30+ 3*34	Yes				20-Feb-19	10-Apr-24	10-Apr-24	Conducted
31	Pragati Gas Turbine (PPCL)	Gas	2*104.6 + 1*121.2								
32	Bawana GT	Gas	2*253+4*216								
33	Rithala(TPPDL)	Gas	3*36								Not in operation
Haryana											
34	Western Yamuna Canal (WYC-I & II)	Hydro	6*8+ 2*7.2								
Himachal Pradesh											

Mock trial run/black start schedule plan for 2024-25

S.No	Name of Generatiing	Fuel	Installed Capacity (in	Whether Generating station has black	Type of Black Start Source	Capacity of DG Set / Small	Source of power supply to Communication	Compliance to 34.3 of IEGC for mock trial runs (Last date on	Tentaive schedule plan for mock trial run		Remarks
35	Bhabha	Hydro	3*40								
36	Bassi	Hydro	4*16.5								
37	Ghanvi	Hydro	2*11.25								
38	Giri	Hydro	2*30								
39	Larji	Hydro	3*42								
40	Phojal	Hydro	24								
41	Sainj HEP	Hydro	2*50								
42	Swara Kuddu HEP	Hydro	3*37								
43	Bajoli Holi HEP	Hydro	3*60								
AD Hydro Power Ltd.											
44	AD Hydro	Hydro	2*96	Yes				27-Jan-23	24-Feb-25	24-Feb-25	
Greenco											
45	Budhil	Hydro	2*35	Yes							inability to carry out Mock Black start exercise keeping in view the Unit safety being installed capacity low and issue of Governing system. The Governing system of Budhil HEP is of M/S Dong Fong China make and we are not ge ng any support from OEM a er COVID-19.. The planning for changing the governing system is in Process.
46	Sorang HEP	Hydro	2*50								
Malana Power Company Ltd.											
47	Malana-I	Hydro	2*43	Yes				12-Mar-24			
Everest Power Company Ltd.											
48	Malana-II	Hydro	2*50	Yes				03-Jan-19			
Jaiprakash power Venture Ltd.											
49	Vishnu Prayag IPP	Hydro	4*100								
Jammu & Kashmir											
50	Baghlihar-I	Hydro	3*150								
51	Baghlihar-II	Hydro	3*150								
52	Lower Jhelum	Hydro	3*35					20-Dec-16			
53	Upper Sindh	Hydro	2*11.3+ 3*35	Yes				20-Dec-16			
Punjab											
54	Jogendernagar/ Shanan	Hydro	4*15+ 1*50								
55	UBDC	Hydro	3*15+ 3*15.45								
56	Mukerian	Hydro	6*15+ 6*19.5								
57	Anandpur Sahib (APS)	Hydro	4*33.5								
58	Ranjit Sagar (Thein Dam)	Hydro	4*150	Yes					04-May-24	04-May-24	Conducted on 07.05.2024
Rajasthan											
59	Ramgarh GT Extn.	Gas	1*3+1*35.5+2* 37.5+1*110+1* 50								
60	Dholpur CCPP	Gas	3*110								
61	Rana Pratap Sagar (RPS)	Hydro	4*43	Yes				16-Jan-11			
62	Jawahar Sagar	Hydro	3*33								
63	Mahi Bajaj Sagar I	Hydro	2*25	Yes				21-Jul-15			
64	Mahi Bajaj Sagar II	Hydro	2*45	Yes				24-Mar-16			
Uttar Pradesh											
65	Rihand (H) or Pipri	Hydro	6*50	Yes				16-Feb-24			
66	Obra(H)	Hydro	3*33	Yes				16-Feb-24			
67	Khara	Hydro	3*24								
68	Matatila	Hydro	3*10.2	Yes							
GVK											
69	Alaknanda HEP	Hydro	4*82.5								
Uttrakhand											

Mock trial run/black start schedule plan for 2024-25

S.No	Name of Generatiing	Fuel	Installed Capacity (in	Whether Generating station has black	Type of Black Start Source	Capacity of DG Set / Small	Source of power supply to Communication	Compliance to 34.3 of IEGC for mock trial runs (Last date on	Tentaive schedule plan for mock trial run		Remarks
70	Ramganga	Hydro	3*66								
71	Chibro	Hydro	4*60	Yes							
72	Dhalipur	Hydro	3*17								
73	Khodri	Hydro	4*30								
74	Khatima	Hydro	3*13.8								
75	Chilla	Hydro	4*36								
76	Maneri Bhali-I	Hydro	3*30								
77	Maneri Bhali-II	Hydro	4*76								
78	UJVNL IPP	Hydro	58.85								
L&T											
79	Singoli Bhatwari	Hydro	3*33					Not done yet	03-Dec-24	03-Dec-24	Consent did not given for mock drill by SLDC Dehradun due to constraint of partial power evacuation
JSW											
80	Karcham Wangtoo	Hydro	4*250	Yes				29-Dec-21			It is submitted that we shall perform black start Mock trial test after completion of M4 and M5 of GIS overhauling. In the meantime, Karcham Wangtoo HEP can carry out black start exercise of generating unit only at this point (dead bus charging).
81	Baspa	Hydro	3*100	Yes							

Sr. No.	Scheme Name	State Control Area	Date of review of SPS	Last date on which Mock testing carried out	Tentaitve schedule of SPS Mock testing during 2024-25	Remarks
1	SPS for WR-NR corridor - 765kV Agra-Gwalior D/C	POWERGRID		12-03-2024		
2	SPS for contingency due to tripping of HVDC Mundra-Mahendergarh	ADANI				
3	SPS for high capacity 400 kV Muzaffarpur-Gorakhpur D/C Inter-regional tie-line related contingency	POWERGRID				
4	SPS for 1500 MW HVDC Rihand-Dadri Bipole related contingency	POWERGRID				
5	System Protection Scheme (SPS) for HVDC Balia-Bhiwadi Bipole	POWERGRID				
6	SPS for contingency due to tripping of multiple lines at Dadri(NTPC)	NTPC				
7	SPS for reliable evacuation of power from NJPS, Rampur, Sawra Kuddu, Baspa Sorang and Karcham Wangtoo HEP	SJVN/HPPTCL/JSW				
8	SPS for Reliable Evacuation of Ropar Generation	Punjab				
9	SPS for Reliable Evacuation of Rosa Generation	Uttar Pradesh		07-05-2022	counducted on 20-04-2024	
10	SPS for contingency due to tripping of evacuating lines from Narora Atomic Power Station	NAPS				
11	SPS for evacuation of Kawai TPS, Kalisindh TPS generation complex	Rajasthan				
12	SPS for evacuation of Anpara Generation Complex	Uttar Pradesh		06-07-2020		
13	SPS for evacuation of Lalitpur TPS Generation	Uttar Pradesh		14-07-2018	counducted on 21.05.2024	
14	SPS for Reliable Evacuation of Bara TPS Generation	Uttar Pradesh				
15	SPS for Lahal Generation	Himachal Pradesh		08-07-2020		
16	SPS for Transformers at Ballabhgarh (PG) substation	POWERGRID				
17	SPS for Transformers at Maharanibagh (PG) substation	POWERGRID				
18	SPS for Transformers at Mandola (PG) substation	POWERGRID				
19	SPS for Transformers at Bamnauli (DTL) Substation	Delhi				
20	SPS for Transformers at Moradabad (UPPTCL) Substation	Uttar Pradesh			counducted on 20-04-2024	
21	SPS for Transformers at Muradnagar (UPPTCL) Substation	Uttar Pradesh		07-02-2023	counducted on 20-04-2024	
22	SPS for Transformers at Muzaffarnagar(UPPTCL) Substation	Uttar Pradesh			counducted on 20-04-2024	
23	SPS for Transformers at Greater Noida(UPPTCL) Substation	Uttar Pradesh			SPS Unhealthy	
24	SPS for Transformers at Agra (UPPTCL) Substation	Uttar Pradesh		12-07-2023		
25	SPS for Transformers at 400kV Sarojininagar (UPPTCL) Substation	Uttar Pradesh		17-05-2023		
26	SPS for Transformers at 220kV Sarojininagar (UPPTCL) Substation	Uttar Pradesh		18-05-2022		
27	SPS for Transformers at 400kV Unnao (UPPTCL) Substation	Uttar Pradesh		19-05-2023	SPS Unhealthy	
28	SPS for Transformers at 220kV Unnao (UPPTCL) Substation	Uttar Pradesh				
29	SPS for Transformers at 400kV Sultanpur (UPPTCL) Substation	Uttar Pradesh			SPS Unhealthy	
30	SPS for Transformers at 400kV Bareilly (UPPTCL) Substation	Uttar Pradesh				
31	SPS for Transformers at 400kV Azamgarh (UPPTCL) Substation	Uttar Pradesh		14-05-2023	counducted on 06-05-2024	
32	SPS for Transformers at 400kV Mau (UPPTCL) Substation	Uttar Pradesh		17-01-2019	counducted on 27-04-2024	
33	SPS for Transformers at 400kV Gorakhpur (UPPTCL) Substation	Uttar Pradesh		14-05-2023	counducted on 27-04-2024	
34	SPS for Transformers at 400kV Sarnath (UPPTCL) Substation	Uttar Pradesh		19-05-2023	counducted on 23-05-2024	
35	SPS for Transformer at 400kV Rajpura (PSTCL) Substation	Punjab				
36	SPS for Transformers at 400kV Mundka (DTL) Substation	Delhi		19-06-2023		
37	SPS for Transformers at 400kV Deepalpur (JKTPL) Substation	Haryana				
38	SPS for Transformers at 400kV Ajmer (RVPN) Substation	Rajasthan			Condcuted on 10.09.2024	
39	SPS for Transformers at 400kV Merta (RVPN) Substation	Rajasthan			Condcuted on 12.09.2024	
40	SPS for Transformers at 400kV Chittorgarh (RVPN) Substation	Rajasthan			Condcuted on 31.08.2024 & 05.09.2024	
41	SPS for Transformers at 400kV Jodhpur (RVPN) Substation	Rajasthan			Condcuted on 24.09.2024	
42	SPS for Transformers at 400kV Bhadla (RVPN) Substation	Rajasthan			Condcuted on 27.09.2024	
43	SPS for Transformers at 400kV Ratangarh (RVPN) Substation	Rajasthan			Condcuted on 20.09.2024	
44	SPS for Transformers at 400kV Nehtaur(UPPTCL) Substation	Uttar Pradesh		05-07-2022		
45	SPS for Transformers at Obra TPS	Uttar Pradesh			counducted on 20-05-2024	
46	SPS for Transformers at 400KV Kashipur (PTCUL) substation	Uttarakhand		03-09-2023	Septemeber 2024	
47	SPS for Transformers at 400KV Fatehgarh Solar Park (AREPRL)	ADANI				
48	SPS to relive transmission congestion in RE complex (Bhadla2)	POWERGRID				
49	SPS for Transformers at 400kV Bikaner (RVPN) Substation	Rajasthan			Condcuted on 26.09.2024	
50	SPS for Transformers at 400kV Bawana (DTL) Substation	Delhi		06-09-2023		
51	SPS for Transformers at 400kV Bhilwara (RVPN) Substation	Rajasthan			Condcuted on 09.07.2024 & 10.07.2024	
52	SPS for Transformers at 400kV Hinduan (RVPN) Substation	Rajasthan			Condcuted on 26.09.2024	
53	SPS for Transformers at 400kV Suratgarh (RVPN) Substation	Rajasthan				During frequent actual operation of SPS scheme. All alarm & tripping status found OK

Annex

Status of Recording Instruments (220kV & above stations)						
Sr. No	Station Name	Voltage Level	Disturbance Recorder/Station Event logger healthy (Yes or No)	Standardisation (Yes or No)	Time Sync (Yes or No)	Remarks

Format for Station Event logger/SAS status

S. No.	Name of Division	Name of the station	Voltage Level (in kV)	Availability of station event logger	Healthiness of Event Logger	Is event logger time synchronised with GPS (Yes/No)	Date of commissioining / rectification of station event logger (in case of non-existence or unhelathy EL)	Status of Action being taken	
								Tenetative date for commissioning/healthiness	Any other remarks
1	T&CD, Shahjahanpur	220KV S/S Shahjahanpur	220KV	No	No	No	No	No	No
		220KV S/S Azizpur	220KV	YES	YES	YES			
		220KV S/S Hardoi	220KV	No	No	No	No	No	No
		220KV S/S Mallawa	220KV	YES	YES	YES			
		220 KV SITAPUR	220KV	No	No	No	No	No	No
		220 KV KANDUNI	220 KV	YES	YES	NO			
		220 KV NIGHASAN	220KV	YES	YES	NO			
		220 KV GOLA	220KV	YES	YES	YES			
2	T&CD, Gonda	220 KV GONDA	220/132/33 KV	NOT AVAILABLE					
		220 KV BALRAMPUR	220/132/33 KV	NOT AVAILABLE					
		220KV BAHRAICH	220/132/33 KV	NOT AVAILABLE					
3	T&CD, Sarojini Nagar	765kV Unnao	765kV	No	-	-	-	31.08.2024	-
		400kV Unnao	400kV	Yes	Healthy	No	31.05.2024	-	-
		400kV Sarojini Nagar	400kV	Yes	Unhealthy	-	31.05.2024	-	-
		220kV Sarojini Nagar	220kV	No	-	-	-	31.08.2024	-
		220kV/33kV Dahi Chowki Unnao	220kV	Yes	Healthy	Yes	-	-	-
4	T&CD, Sultanpur	400kV S/S Sultanpur	400/220kV	Yes	Unhealthy	No	May-15	31.07.2024	Hard Disc of Event Logger Industrial PC (Advantech make) crashed and ELB relay defective in Event Logger Panel. It is requested to Executive Engineer, Electy 400kV S/S Division, Sultanpur for an early repair/replacement of defective elements of Event Logger.
		220kV S/S Sultanpur	220kV	NO	Not Available	Not Available	Not Available	–	–
		220kV S/S Amethi	220kV	YES	Healthy	yes	04.04.2018	–	SAS Based Event Logger
		220kV S/S Bachhrawan	220kV	YES	Healthy	yes	26.05.2018	–	SAS Based Event Logger
		220kV S/S New Tanda	220kV	NO	Not Available	Not Available	Not Available	–	–
		220kV S/S Sohawal	220kV	NO	Not Available	Not Available	Not Available	–	–
		220kV S/S GIS Ayodhya	220kV	NO	Not Available	Not Available	Not Available	–	–
5	T&CD, Bareilly	400KV S/S BAREILLY	400KV	YES	YES	YES	-	-	All elements not connected due to exhausted capacity
			220KV	YES	YES	YES	-	-	
		220KV S/S DOHNA	220KV	No	N/A	N/A	-	-	-
		220 KV PILIBHIT	220KV	SAS	YES	NO	-	-	-
		220 KV AMARIYA	220 KV	SAS	YES	YES			
		220 KV Badaun	220 KV	Not Installed					
		220 KV Dataganj	220 KV	SAS	Yes	Yes			
		220 KV C B ganj	220 KV	Not Installed					
		220 KV Faridpur	220 KV	SAS	No				
6	T&CD, Lucknow	220KV Hardoi Rd	220KV	NO	-	-	-	-	
		220KV GIS Kanpur Rd	220KV	Yes	Yes	Yes	-	-	
		220KV Bijnor Rd.	220KV	Yes	Yes	Yes	-	-	
		220 KV SS CHINHAT	220 KV	NO	NA	NA			
		220 KV SS C G CITY	220 KV	NOT WORKING	Unhealthy	NA			
		220 KV SS K ROAD	220 KV	YES	Healthy	SYNC			
		220 KV SS BKT	220 KV	YES	Healthy	SYNC			
		220 KV SS GOMTI NAGAR	220 KV	NO	NA	NA			
		220 KV SS SATRIKH ROAD	220 KV	YES	Healthy	SYNC			
		220 KV SS BARABANKI	220 KV	YES	Healthy	SYNC			

DETAILS OF TIME SYNCHRONISATION OF RELAY WITH GPS CLOCK AT 765/400/220 KV SUBSTATION

SNO.	Name of Division	NAME OF S/S	DETAILS OF GPS CLOCK			DETAILS OF TRANSMISSION LINE					DETAILS OF ICTS							WHETHER BUS BAR PLROTECTION IS TIME SYNCHRONISED		WHETHER EVENT LOGGER IS TIME SYNCHRONISED	WHETHER DR IS TIME SYNCHRONISED	WHETHER SPS SCHEME IS GPS SYNCHRONISED	Action being taken and tentative date of synchronization
			AVAILABLE	WHETHER WORKING IF AVAILABLE	WHETHER GPS CLOCK HAS SUFFICIENT NO OF PORTS SNTP, RS 85 ETC	SNO.	NAME OF TRANSMISSION LINE	MAIN 1	MAIN 2	LBB	SNO.	NAME OF ICT	DIFFERENTIAL PROTECTION	HV SIDE BACK UP PROTECTION	LV SIDE BACK UP PROTECTION	REF PROTECTION	OVERFLUX RELAY	HV SIDE	LV SIDE				
1	T&CD, Shahjahanpur	220KV S/S Shahjahanpur	GPS CLOCK IS AVAILABLE	GPS CLOCK IS NOT WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220 KV RPSCL ROSA -I	NOT SYNC	NOT SYNC	NOT SYNC	1	160 MVA ICT -I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	NOT SYNC	NOT APPLICABLE	
						2	220 KV RPSCL ROSA -II	NOT SYNC	NOT SYNC	NOT SYNC	2	160 MVA ICT -II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 KV Faridpur	NOT SYNC	NOT SYNC	NOT SYNC	3	200 MVA ICT	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						4	220 KV Hardoi line	NOT SYNC	NOT SYNC	NOT SYNC													
						5	220 KV Gola line	NOT SYNC	NOT SYNC	NOT SYNC													
						6	220 KV Azizpur line	NOT SYNC	NOT SYNC	NOT SYNC													
		220KV S/S Hardoi	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220 KV Shahjahanpur line	NOT SYNC	NOT SYNC	NOT SYNC	1	160 MVA ICT -I	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	NOT APPLICABLE	NOT SYNC	NOT APPLICABLE	
						2	220KV Mallawan line	SYNC	NOT SYNC	NOT SYNC	2	160 MVA ICT -II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
		220 KV S/S SITAPUR	GPS CLOCK IS NOT AVAILABLE	----------------------	-------------	1	220 KV BKT LINE	NOT SYNC	NOT SYNC	NOT SYNC		200 MVA TXR	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	
						2	220 KV SPN PGCIL LINE	NOT SYNC	NOT SYNC	NOT SYNC		160 MVA TXR	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 KV KANDUNI LINE	NOT SYNC	NOT SYNC	NOT SYNC		100 MVA TXR	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
		220 KV S/S KANDUNI	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220 KV SITAPUR LINE	NOT SYNC	NOT SYNC	NOT SYNC		200 MVA TXR	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						2	220 KV NIGHASHAN LINE	NOT SYNC	NOT SYNC	NOT SYNC													
						3	220 KV PGCIL LKO 1 LINE	NOT SYNC	NOT SYNC	NOT SYNC													
						4	220 KV PGCIL LKO 2 LINE	NOT SYNC	NOT SYNC	NOT SYNC													
		220 KV SS NIGHASAN	GPS CLOCK IS NOT AVILABLE	----------------------	-------------	1	220 KV GOLA LINE	NOT SYNC	NOT SYNC	NOT SYNC	1	160 MVA TXR	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	
						2	220 KV KANDUNI LINE	NOT SYNC	NOT SYNC	NOT SYNC	2	100 MVA TXR 1	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC		
											3	100 MVA TXR 2	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC		
2	T&CD, Gonda	220/132 KV Gonda	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220 KV PGCIL LINE	NOT SYNC	NOT SYNC	NOT SYNC	1	220/132 KV 200 MVA ICT -I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	NOT SYNC	NOT APPLICABLE	
						2	220 KV INTERCONNECRTOR	NOT SYNC	NOT SYNC	NOT SYNC	2	220/132 KV 200 MVA ICT -II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 kv BASTI(400)-I	NOT SYNC	NOT SYNC	NOT SYNC													
						4	220 kv BASTI(400)-II	NOT SYNC	NOT SYNC	NOT SYNC													
		220/132 KV Bahraich	GPS CLOCK IS AVAILABLE	GPS CLOCK IS Not WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220 KV PGCIL LINE	NOT SYNC	NOT SYNC	NOT SYNC	1	220/132 KV 160 MVA ICT -I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	NOT SYNC	NOT APPLICABLE	
						2	220 kv Balrampur Line	NOT SYNC	NOT SYNC	NOT SYNC	2	220/132 KV 160 MVA ICT -II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
											3	220/132 KV 100 MVA ICT	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
3	T&CD, Sarojini Nagar	765 KV UNNAO	GPS CLOCK IS NOT AVAILABLE	NOT APPLICABLE	NOT APPLICABLE	1	765 KV UNNAO-ANPARA C LINE	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	1	765/400 KV 1000 MVA ICT -I	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	NOT APPLICABLE	SYNC BY SNTP	NOT APPLICABLE	
						2	765 KV UNNAO-OBRA C LINE	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	2	765/400 KV 1000 MVA ICT -II	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP				
											3	765/400 KV 1000 MVA ICT -III	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP				
											4	3X63 MVAR BUS REACTOR	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP	SYNC BY SNTP				
		400/220 KV UNNAO	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK DOES NOT HAVE SUFFICIENT NO OF PORTS	1	400 KV UNNAO JEHTA 1 LINE	SYNC	SYNC	NOT SYNC	1	400/220 KV 500 MVA ICT -2	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	EVENT LOGGER HAS TIME SYNCHRONISATION CONNECTION DONE, BUT IS NOT SHOWING CORRECT TIME(APPROXIMATELY THREE MINUTE ADVANCE)
						2	400 KV UNNAO JEHTA 2 LINE	SYNC	NOT SYNC	NOT SYNC	2	400/220 KV 315 MVA ICT -2	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	400 KV UNNAO MOHANLALGANJ LINE	SYNC	NOT SYNC	NOT SYNC	3	400/220 KV 315 MVA ICT -3	SYNC	SYNC	SYNC	SYNC	SYNC	NOT SYNC	NOT SYNC				
						4	400 KV UNNAO BAREILLY 1 LINE	SYNC	NOT SYNC	NOT SYNC													
						5	400 KV UNNAO BAREILLY 2 LINE	SYNC	NOT SYNC	NOT SYNC													
						6	400KV UNNAO- PANKI LINE	SYNC	NOT SYNC	NOT SYNC													
						7	400 KV UNNAO AGRA LINE	SYNC	NOT SYNC	NOT SYNC													
		220/132 KV UNNAO	GPS CLOCK IS NOT AVAILABLE	NOT APPLICABLE	NOT APPLICABLE	1	220 KV UNNAO-PHOOL BAGH-1 LINE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	1	220/132 KV 160 MVA ICT -I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	GPS CLOCK IS NOT AVAILABLE	GPS CLOCK IS NOT AVAILABLE	GPS CLOCK IS NOT AVAILABLE	NO EVENT LOGGER IS INSTALLED
						2	220 KV UNNAO-PHOOL BAGH-2 LINE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	2	220/132 KV 160 MVA ICT -II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE				
						3	220 KV UNNAO- BITHOOR LINE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	3	220/132 KV 160 MVA ICT -III	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE				
						4	220 KV UNNAO- RPH LINE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE													
						5	220 KV UNNAO- GIS KANPUR ROAD LINE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE													
						6	220 KV UNNAO- AJGAIN TSS LINE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE													
						7	220 KV UNNAO- DAHI CHOWKI LINE	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE													
		400KV Sarojini Nagar Lucknow	GPS Clock is Available	Working	GPS Clock has not Sufficient No. of Ports	1	400 KV Singrauli Line	-	-	Non Numerical Relay	Reactor Back Up Impedance Not Sync	1	400/220 KV 500 MVA ICT -I	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync	-	Non Numerical Relay	-	Unhealthy	-
						2	400 KV Bareilly Line	-	-	Non Numerical Relay	-	2	220/132 KV 200 MVA ICT -I	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync	-				
						-	-	-	-	-	-	3	80MVAr Bus Reactor	Not Sync	-	-	Not Sync	-	Back Up Impedance				
		220/132/33 KV SAROJINI NAGAR	GPS CLOCK IS AVAILABLE	GPS Clock is Working DATE : Wrong Time : Ok	GPS CLOCK HAS NOT SUFFICIENT NO OF PORTS	1	220KV Gomati Nagar	Not Sync	Not Sync (Backup Relay)	-		1	220/132 KV 200 MVA ICT -I	-	Not Sync	Not Sync	Not Sync		Not Sync	Not Sync	-	Not Available	-
						2	220KV Hardoi Road	Not Sync	Not Sync (Backup Relay)	-		2	220/132 KV 200 MVA ICT -2	-	Not Sync	Not Sync	Electro Mechanical Relay		Not Sync				
						3	220KV Dahi Chauki	Not Sync	Not Sync (Backup Relay)	-		3	220/132 KV 200 MVA ICT -3	-	Not Sync	Not Sync	Not Sync		Not Sync				
						4	220KV Kanpur Road	Not Sync	Not Sync (Backup Relay)														
						5	220KV Bijnaur	-	Not Sync														
4	T&CD, Sultanpur	400kV S/S Sultanpur	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	400kV NTPC Tanda line	SYNC	SYNC	SYNC	1	400/220kV, 315MVA ICT-I	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	NOT SYNCHRONISED (DEFECTIVE)	SYNC	NOT SYNCHRONISED (DEFECTIVE)	
						2	400kV Obra line	SYNC	SYNC	SYNC	2	400/220kV, 240MVA ICT-II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	
						3	400kV PGCIL Mohanlalganj line	SYNC	SYNC	SYNC	3	400/220kV, 315MVA ICT-III	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	NOT SYNCHRONISED (DEFECTIVE)	SYNC	NOT SYNCHRONISED (DEFECTIVE)	
						4	220kV Amethi line	SYNC	SYNC	SYNC	4	400/220kV, 315MVA ICT-IV	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	NOT SYNCHRONISED (DEFECTIVE)	SYNC	NOT SYNCHRONISED (DEFECTIVE)	
						5	220kV Sangipur line	SYNC	SYNC	SYNC													
		220KV S/S Sultanpur	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK HAS NOT SUFFICIENT NO. OF PORTS	1	220 KV PRATAPGARH LINE	SYNC	SYNC	NA	1	220/132kV. 160 MVA ICT -I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	PARTIAL SYNC	SPS SYSTEM DEFECTIVE	
						2	220 KV SOHAWAL LINE	SYNC	SYNC	NA	2	220/132kV. 160 MVA ICT -III	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 KV NEW TANDA LINE	SYNC	NOT SYNC	NA	3	220/132kV. 200 MVA ICT -II	SYNC	NOT SYNC	NOT SYNC	SYNC	SYNC	NOT SYNC	NOT SYNC				
						4	220 KV NTPC TANDA LINE	SYNC	NOT SYNC	NA													
		220KV S/S BACHRAWAN	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	YES	1	220 KV BIJNAUR ROAD	SYNC	SYNC	SYNC	1	220/132kV. 160 MVA ICT -I	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	YES	YES	SPS SYSTEM NA	
						2	220KV PGCIL RAIBARELI	SYNC	SYNC	SYNC	2	220/132kV. 160 MVA ICT -II	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC				
		220 KV S/S AMETHI	GPS SYSTEM IS AVAILABLE	GPS SYSTEM IS AVAILABLE	YES	1	220 KV SANGIPUR	SYNC	SYNC	SYNC	1	220/132kV. 160 MVA ICT -I	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	YES	YES	SPS SYSTEM NA	
						2	220 KV SULTANPUR	SYNC	SYNC	SYNC	2	220/132kV. 160 MVA ICT -II	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC				
						3	220 KV RAIBAREILI(SIRSIRA) CKT1	SYNC	SYNC	SYNC													
							220 KV RAIBAREILI(SIRSIRA) CKT2	SYNC	SYNC	SYNC													
		220 KV S/S GIS AYODHYA	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220 KV NEW TANDA LINE	SYNC	SYNC	SYNC	1	220/132kV. 160 MVA ICT -I	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	Inbuilt in relay SYNC	SYNC	
						2	220 KV PGCIL LINE	SYNC	SYNC	SYNC	2	220/132kV. 160 MVA ICT -II	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC				
		220 KV S/S SOHAWAL	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220 KV SULTANPUR LINE	NOT SYNC	NOT SYNC	NOT SYNC	1	220/132kV. 160 MVA ICT -I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	Inbuilt in relay SYNC	NOT SYNC	
						2	220 KV GONDA LINE	NOT SYNC	NOT SYNC	NOT SYNC	2	220/132kV. 160 MVA ICT -II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 KV PGCIL LINE-1	NOT SYNC	NOT SYNC	NOT SYNC													
						4	220 KV PGCIL LINE-2	NOT SYNC	NOT SYNC	NOT SYNC													
		220 KV S/S NEW TANDA	GPS CLOCK IS AVAILABLE	GPS CLOCK IS NOT WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220 KV SULTANPUR LINE	NOT SYNC	NA	NA	1	220/132kV. 160 MVA ICT -I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	
						2	220 KV GIS AYODHYA LINE	NOT SYNC	NA	NA	2	220/132kV. 160 MVA ICT -II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 KV PGCIL LINE	NOT SYNC	NA	NA	3	220/132kV. 160 MVA ICT -III	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						4	220 KV NTPC LINE-1	NOT SYNC	NA	NA													
						5	220 KV NTPC LINE-2	NOT SYNC	NOT SYNC	NA													
						6	220 KV NTPC LINE-3	NOT SYNC	NOT SYNC	NA													
5	T&CD, Bareilly	400/220 KV Bareilly	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK DOES NOT HAVE SUFFICIENT NO OF PORTS	1	400 KV UNNAO-1 LINE	SYNC	SYNC	Non Numerical Relay	1	400/220 KV 315 MVA ICT -1	Non Numerical Relay	Non Numerical Relay	Non Numerical Relay	Non Numerical Relay	Non Numerical Relay	Non Numerical Relay	Non Numerical Relay	SYNC	-	Not available	EVENT LOGGER HAS TIME SYNCHRONISATION CONNECTION DONE BUT CAPACITY IS EXHAUSTED(ALL BAYS ARE NOT CONNECTED IN EL)
						2	400 KV UNNAO-2 LINE	SYNC	SYNC	Non Numerical Relay	2	400/220 KV 315 MVA ICT -2	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	400 KV PGCIL BAREILLY 1 LINE	SYNC	SYNC	Non Numerical Relay	3	400/220 KV 315 MVA ICT -3	SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						4	400 KV PGCIL BAREILLY 2 LINE	SYNC	SYNC	Non Numerical Relay	4	80 MVAr Bus Reactor	Non Numerical Relay	Non Numerical Relay	-	Non Numerical Relay	-	-	-				
						5	220 KV DOHNA-1	SYNC	SYNC	SYNC													
						6	220 KV DOHNA-2	SYNC	SYNC	SYNC													
						7	220 KV CB GANJ-1	SYNC	Non Numerical Relay	Non Numerical Relay													
						8	220 KV CB GANJ-2	SYNC	SYNC	SYNC													
						9	220 KV PILIBHIT-1	NOT SYNC	NOT SYNC	NOT SYNC													
						10	220 KV PILIBHIT-2	SYNC	Non Numerical Relay	Non Numerical Relay													
						11	220 KV AMARIYA-1	SYNC	SYNC	SYNC													
						12	220 KV AMARIYA-2	SYNC	SYNC	SYNC													
						13	220 KV PANTNAGAR	SYNC	Non Numerical Relay	Non Numerical Relay													
						14	220 KV FARIDPUR	SYNC	SYNC	SYNC													
		220/132 KV PILIBHIT	GPS CLOCK IS DEFECTIVE	NOT APPLICABLE	NOT APPLICABLE	1	220 KV BAREILLY-1	NOT SYNC	NOT SYNC	NOT SYNC	1	220/132 KV 160 MVA ICT -I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	N/A	-	Not available	SAS S/S
						2	220 KV BAREILLY-2	NOT SYNC	NOT SYNC	NOT SYNC	2	220/132 KV 160 MVA ICT -II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
		220/132 KV AMARIYA	GPS Clock is Available	Working	YES	1	220 KV BAREILLY-1	SYNC	SYNC	SYNC	1	220/132 100 MVA T/F-1	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	N/A	-	Not Available	SAS S/S
						2	220 KV BAREILLY-2	SYNC	SYNC	SYNC	2	220/132 100 MVA T/F-2	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC				
		220/132/33 KV DOHNA	GPS CLOCK IS AVAILABLE	Working	GPS CLOCK HAS NOT SUFFICIENT NO OF PORTS	1	220 KV BAREILLY-1	Not Sync	Not Sync	Not Sync	1	220/132 160 MVA T/F-1	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync	N/A	-	Not Available	EVENT LOGGER NOT INSTALLED
						2	220 KV BAREILLY-2	Not Sync	Not Sync	Not Sync	2	220/132 160 MVA T/F-2	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync				
						3	220KV CB GANJ	Not Sync	Not Sync	Not Sync													
						4	220KV ROZA	Not Sync	Not Sync	Not Sync													
		220KV S/S Badaun	GPS CLOCK IS NOT AVAILABLE	----------------------	------------	1	220 KV C B Ganj(OCBTI-1)	NOT SYNC	NOT SYNC	NOT SYNC	1	200MVA T/F I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	NOT SYNC	NOT APPLICABLE	
						2	220 KV Roza PH-I	NOT SYNC	NOT SYNC	NOT SYNC	2	200MVA T/F II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 KV Roza PH-II	NOT SYNC	NOT SYNC	NOT SYNC													
						4	220 KV Sambhal(chandosi(OCBTI-2)	NOT SYNC	NOT SYNC	NOT SYNC													
		220KV S/S CBGanj	GPS CLOCK IS AVAILABLE	GPS CLOCK IS NOT WORKING	GPS CLOCK HAS NOT SUFFICIENT NO OF PORTS	1	220 Kv 400 Kv BLY	NOT SYNC	NOT SYNC	NOT SYNC	1	200 MVAT/FI	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	NOT SYNC	NOT APPLICABLE	
						2	220 Kv 400 Kv BLY (New)	NOT SYNC	NOT SYNC	NOT SYNC	2	200 MVAT/FII	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 Kv Dohna	NOT SYNC	NOT SYNC	NOT SYNC													
						4	220 Kv Tanakpur	SYNC	SYNC	SYNC													
						5	220 Kv Sitarganj	SYNC	SYNC	SYNC													
						6	220 Kv Rampur	NOT SYNC	NOT SYNC	NOT SYNC													
						7	220 KV OCBTI	NOT SYNC	NOT SYNC	NOT SYNC													
						8	220 Kv Roza (New)	NOT SYNC	NOT SYNC	NOT SYNC													
		220 KV S/S Faridpur	GPS CLOCK IS AVAILABLE	GPS CLOCK IS NOT WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220KV Bareilly (400)	NOT SYNC	NOT SYNC	NOT SYNC		100MVA T/F -I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE	
						2	220KV Shahjahanpur	NOT SYNC	NOT SYNC	NOT SYNC													
		220 KV S/S Dataganj	GPS CLOCK IS AVAILABLE	GPS CLOCK IS WORKING	GPS CLOCK HAS SUFFICIENT NO OF PORTS	1	220KV Badaun	SYNC	SYNC	SYNC		160 MVA T/F-I	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	NOT APPLICABLE	
						2	220KV Roza	SYNC	SYNC	SYNC		160 MVA T/F-II	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC				
						3	220KV OCBTI-I	SYNC	SYNC	SYNC													
						4	220KV OCBTI-II	SYNC	SYNC	SYNC													
6	T&CD, Lucknow	400kV GIS JEHTA	AVAILABLE	WORKING	YES	1	400KV JEHTA(400)- UNNAO CKT-1	SYNC	SYNC	SYNC	SYNC	400/220KV 500 MVA ICT-1	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	YES	YES	NA	
							400KV JEHTA(400)- UNNAO CKT-2	SYNC	SYNC	SYNC	SYNC	400/220KV 500 MVA ICT-2	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC				
							400KV JEHTA(400) - KURSI ROAD CKT-1	SYNC	SYNC	SYNC	SYNC	220/132KV 200 MVA ICT-1	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC				
							400KV JEHTA(400) - KURSI ROAD CKT-2	SYNC	SYNC	SYNC	SYNC	220/132KV 200 MVA ICT-2	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC				
							220KV JEHTA(400) - HARDOI ROAD CKT-1	SYNC	SYNC	SYNC	SYNC												
							220KV JEHTA(400) - HARDOI ROAD CKT-2	SYNC	SYNC	SYNC	SYNC												
							220KV JEHTA(400) - MALLAWAN CKT-1	SYNC	SYNC	SYNC	SYNC												
							220KV JEHTA(400) - MALLAWAN CKT-2	SYNC	SYNC	SYNC	SYNC												
		220KV Hardoi Rd	Yes	No	No	1	220KV Jehta I	Not Sync	Not Sync	Not Sync	1	200MVA TF I	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync	HV Side		NA	NA	NA	Has been informed to SDO regarding this, Process is going on as informed.
						2	220KV Jehta II	Not Sync	Not Sync	Not Sync	2	200MVA TF II	Not Sync	Not Sync	Not Sync	Not Sync	Not Sync	HV Side					
						3	220KV Sarojininagar	Not Sync	Not Sync	Not Sync								HV Side					
						4	220KV Kursi Rd.	Not Sync.	Not Sync.	Not Sync.								HV Side					
		220KV Kanpur Rd	Yes	Yes	Yes	1	220KV Sarojininagar	Sync	Sync	Sync	1	60 MVA TF I	Sync	Sync	Sync	Sync	Sync	HV Side		YES	YES	YES	
						2	220KV Unnao	Sync	Sync	Sync	2	60 MVA TF II	Sync	Sync	Sync	Sync	Sync	HV Side					
											3	60 MVA TF III	Sync.	Sync.	Sync.	Sync.	Sync.	HV Side					
		220KV Bijnor Rd.	Yes	Yes	Yes	1	220KV Sarojininagar	Sync	Sync	Sync	1	160MVA TF I	Sync	Sync	Sync	Sync	Sync	HV Side		YES	YES	YES	
						2	220KV Baccharawan	Sync.	Sync.	Sync.	2	160MVA TF II	Sync.	Sync.	Sync.	Sync.	Sync.	HV Side					
		220 KV CHINHAT	AVAILABLE	NOT WORKING	yes	1	220 KV SATRIKH LINE	NOT SYNC	NOT SYNC		1	220/132 KV 200 MVA T/F-I(BHEL)	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NO	NO	NO	
						2	220 KV GOMTINAGAR	NOT SYNC	NOT SYNC		2	220/132 KV 200 MVA T/F-II(ADITYA)	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 KV PGCIL LKO	NOT SYNC	NOT SYNC														
						4	220 KV KURSI ROAD	NOT SYNC	NOT SYNC														
						5	220 KV LMRC-I	NOT SYNC	NOT SYNC														
						6	220 KV LMRC-II	NOT SYNC	NOT SYNC														
		220 KV GOMTI NAGAR	AVAILABLE	NOT WORKING	YES	1	220 KV CHINHAT	NOT SYNC	NOT SYNC		1	220/33 KV 60 MVA T/F-I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NO	NO	NO	
											2	220/33 KV 60 MVA T/F-II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
											3	220/33 KV 60 MVA T/F-III	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						2	220 KV SAROJINI NAGAR	NOT SYNC	NOT SYNC		4	220/33 KV 60 MVA T/F-IV	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
		220 KV SATRIKH	AVAILABLE	WORKING	YES	1	220 KV CG CITY LINE	SYNC	SYNC		1	220/33 KV 60 MVA T/F-I (TA)	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	YES	YES	YES	
						2	220 KV CHINHAT LINE	SYNC	SYNC		2	220/33 KV 60 MVA T/F-II (BBL)	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC	SYNC				
						3	220 KV Barabanki CKT-I	SYNC	SYNC														
						4	220 KV Barabanki CKT-II	SYNC	SYNC														
		220 KV C.G.CITY	AVAILABLE	NOT WORKING	YES	1	220 KV PGCIL -Raibareilly LINE	NOT SYNC	NOT SYNC		1	220/33 KV 60 MVA T/F-I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NO	NO	NO	
						2	220 KV SATRIKH ROAD LINE	NOT SYNC	NOT SYNC		2	220/33 KV 60 MVA T/F-II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
		220 KV BKT	AVAILABLE	NOT WORKING	YES	1	220 KV PGCIL LINE	NOT SYNC	NOT SYNC		1	220/33 KV 60 MVA T/F-I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NO	NO	NO	
						2	220 KV SITAPUR LINE	NOT SYNC	NOT SYNC		2	220/33 KV 60 MVA T/F-II	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
		220 KV KURSI ROAD	AVAILABLE	NOT WORKING	YES	1	220 KV CHINHAT	NOT SYNC	NOT SYNC		1	200 MVA T/F-I	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NO	NO	NO	
						2	220 KV HARDOI ROAD	NOT SYNC	NOT SYNC		2	100MVA T/F	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 KV PGCIL CKT-I	NOT SYNC	NOT SYNC		3	160 MVA T/F	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
											4												
						4	220 KV PGCIL CKT-II	NOT SYNC	NOT SYNC		5												
		220 KV BARABANKI	AVAILABLE	NOT WORKING	YES	1	220 KV PGCIL CKT-I	NOT SYNC	NOT SYNC		1	220/132 KV 160 MVA T/F -I(BBL)	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NO	NO	NO	
						2	220 KV PGCIL CKT-II	NOT SYNC	NOT SYNC		2	220/132 KV 160 MVA T/F -II(BBL)	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC	NOT SYNC				
						3	220 KV SATRIKH ROAD LINE -I	NOT SYNC	NOT SYNC		3												
						4	221 KV SATRIKH ROAD LINE -II	NOT SYNC	NOT SYNC		4												

ELECTRICITY TEST & COMMISSIONING CIRCLE, MEERUT						
TRANSMISSION WEST ZONE UPPTCL,MEERUT						
Status of recording instruments(220kV and above stations) Annexure-XVII Date: 18.9.24						
Sr.No	**Station Name**	**Voltage Level**	**Disturbance recorder/station event logger healthy (Yes or No)**	**Standardisation (Yes or No)**	**Time synch (Yes or No)**	**Remarks**
1	220 kV SS CHANDPUR	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	Yes	
2	220 kV SS NEHTAUR	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	Yes	
3	220 kV Amroha	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	Yes	
4	220 kV Gajraula	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock is not working.
5	400kV S/S Moradabad	400kV	DR Inbuilt in Relay/Centralised Event Logger Available (Yes)	Yes	Yes	Relays are partially time Synchronized.
6	220kV S/S Sambhal	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock is not working.
7	220kV S/S Chandausi	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	Yes	
8	220kV S/S Moradabad	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	Yes	Partially Relays are time Synchronized
9	220 kV SS Rampur	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	Yes	

10	220kV Nara S/S MZN	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock unhealthy.
11	220kV BadhaiKalan S/S MZN	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	Yes	
12	220kV Khatauli S/S MZN	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	
13	220kV Jansath S/S MZN	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	Communication cable laying pending.
14	400 kV S/S GIS Shamli	400 kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
15	220 kV S/S Shamli	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS Clock not available
16	400 kV S/S MUZAFFARNAGAR	400 kV	DR is inbuilt in relays.(Yes) Centralised event logger is available.	Yes	Yes	
17	220 kV Saharanpur	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	
18	220 kV Behat	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	No	No	
19	220kV Sarsawa	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	No	
20	220 kV Nanauta	220 kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS Clock not available
21	220 kV Deoband	220 kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
22	220kV S/S SEC 62	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock is defective
23	220kV S/S DADRI	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock to relay wiring pending
24	220kV S/S RC GREEN	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	No	SAS unhealthy

25	220kV S/S JALPURA	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
26	220kV S/S KP5	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
27	220kV S/S JEWAR	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
28	220kV S/S METRO DEPOT	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
29	220kV S/S SEC 20	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock to relay wiring pending
30	220kV S/S SEC 129	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock is defective
31	220kV S/S BOTANICAL GARDEN	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
32	400kV SEC 123	400kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
33	400kV SEC 148	400kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
34	220kV S/S SIKANDRABAD	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock is defective
35	220kV S/S RUKHI	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
36	400kV S/S GR NOIDA	400kV	DR inbuilt in relay.(Yes)/ Station Event Logger available	Yes	Yes	Few numerical relays (CSC211) do Not have the inbuilt time sync provision
37	220kV GIS S/S IITGNL	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	SAS Healthy
38	220kV S/S YEIDA SEC-18	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	No	GPS clock not available
39	220kV S/S YEIDA SEC-24	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	No	GPS clock not available

40	220 kV HYBRID S/S HAPUR	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
41	220 kV S/S SIMBHAOLI	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock is defective
42	220kV S/S KHURJA	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock not available
43	220kV S/S JAHANGIRABAD	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS clock is defective
44	220kV S/S DEBAI	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	Yes	
45	Shatabdinagar	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes (Partial)	Yes	--------
46	Partapur (Jagriti Vihar)	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes (Partial)	Yes	--------
47	Modipuram	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS Clock is not Healthy
48	Modipuram-2	220kV	DR is inbuilt in relays.(Yes). Centralised event logger is part of SAS.	Yes	No	GPS Clock is not Healthy
49	Charla	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS Clock is not Healthy
50	Baraut	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	Partially Synchronised	--------
51	Baghpat	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	Partially Synchronised	--------
52	Nirpura	220kV	DR and event logger are inbuilt in relays.(Yes) No centralised event logger is available.	Yes	No	GPS Clock is not Healthy

Note:- No station event logger is available in any of the conventional 220kV Sub-stations under Transmission west zone Meerut UPPTCL.

Status of recording instruments (220 kV & above station of PTCUL)

SR NO	Station name	Voltage level	Disturbance recorder /Station event logger healthy (Yes or No)	Standardisation (Yes or No)	Time sync (Yes or No)	Remarks
1	400KV S/s Kashipur	400 kV	Inbuilt in Numerical Relays	YES	YES	
2	400KV RISHIKESH	400 kV	Inbuilt in Numerical Relays	YES	YES	
3	400KV SRINAGAR	400 kV	Inbuilt in Numerical Relays	YES	YES	
4	220KV S/s Mahuakheraganj	220 kV	Inbuilt in Numerical Relays	YES	YES	
5	220KV S/s Pantnagar	220 kV	Inbuilt in Numerical Relays	YES	NO	
6	220KV S/s Jafarpur	220 kV	Inbuilt in Numerical Relays	YES	NO	
7	220KV S/s Kamaluaganja	220 kV	Inbuilt in Numerical Relays	YES	NO	
8	220KV Jhajra	220 kV	Inbuilt in Numerical Relays	YES	YES	
9	220KV Rishikesh	220 kV	Inbuilt in Numerical Relays	YES	YES	
10	220KV IIP Harrawala	220 kV	Inbuilt in Numerical Relays	YES	YES	
11	220KV Chamba	220 kV	Inbuilt in Numerical Relays	YES	YES	
12	220KV SIDCUL, Haridwar	220 kV	Inbuilt in Numerical Relays	YES	NO	
13	220KV Pirankaliyar	220 kV	Inbuilt in Numerical Relays	YES	YES	
14	220KV Roorkee	220 kV	Inbuilt in Numerical Relays	YES	NO	