सत्यमेव जयते

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

विषय: उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की **237** वी बैठक का कार्यवृत |

Subject: Minutes of the **237**th OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की **237** वीं बैठक दिनांक 17.11.2025 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट http://164.100.60.165 पर उपलब्ध है। यदि कार्यवृत पर कोई टिप्पणी हो तो कार्यवृत जारी करने के एक सप्ताह के अन्दर इस कार्यालय को भेजें |

The **237**th meeting of the Operation Co-ordination Sub-Committee (OCC) of NRPC was held on 17.11.2025. The Minutes of this meeting has been uploaded on the NRPC website http://164.100.60.165. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

संलग्नक:यथोपरि।

DHARMENDER KUMAR MEENA
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(डी. के. मीना)
अधीक्षण अभियंता (प्रचालन)

सेवा में,

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

List of addressee (via mail)

OCC Members for FY 2025-26			
S. No.	**OCC Member**	**Category**	**E-mail**
1	NLDC	National Load Despatch Centre	nomination awaited (susha@grid-india.in)
2	NRLDC	Northern Regional Load Despatch Centre	somara.lakra@grid-india.in
3	CTUIL	Central Transmission Utility	sandeepk@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	RAMESHSINGH@NTPC.CO.IN
6	BBMB		powerc@bbmb.nic.in
7	THDC		bhagatsingh@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	ce-ppr@pspcl.in

		Company & State owned Distribution Company	
32	DHBVN	State owned Distribution Company (alphabetical rotational basis/nominated by state govt.)	nomination awaited (md@dhbvn.org.in)
33	Ajmer Vidyut Vitran Nigam Ltd.		nomination awaited (md.avvnl@rajasthan.gov.in)
34	Purvanchal Vidyut Vitaran Nigam Ltd.		nomination awaited (mdpurvanchalvvnl@gmail.com)
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@apcpl.co.in
39	Apraave Energy Ltd.,		niraj.gupta@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	Transition Cleantech Services Private Limited	IPP having less than 1000 MW installed capacity (alphabetical rotational basis)	nomination awaited (kswamidoss@evrenenergy.com)
49	UT of J&K	From each of the Union Territories in the region, a representative nominated by the administration of the	sojpdd@gmail.com
50	UT of Ladakh		cepdladakh@gmail.com
51	UT of Chandigarh		seelo-chd@nic.in

		Union Territory concerned out of the entities engaged in generation/	
52	NVVN	Nodal Agency appointed by the Government of India for coordinating cross-border power transactions	ceonvvn@ntpc.co.in
53	Tata Power Delhi Distribution Limited	Private Distribution Company in region (alphabetical rotational basis)	nomination awaited (sandeep.k@tatapower-ddl.com)
54	Gurgaon Palwal Transmission Limited	Private transmission licensee (nominated by central govt.)	(samriddhi.gogoi@indigrid.com)
55	PTC India Limited	Electricity Trader (nominated by central govt.)	nomination awaited (bibhuti.prakash@ptcindia.com)
56	ReNew Power Private Limited	RE Generating Company having more than 1000 MW installed capacity	sumant@renew.com
57	NTPC Green Energy Limited		rajivgupta@ntpc.co.in
58	Azure Power India Pvt. Limited		sunil.gupta@azurepower.com
59	Avaada Energy Private Limited		kishor.nair@avaada.com
60	Adani Green Energy Limited		chaitanya.sahoo@adani.com

Contents

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 237 वीं बैठक का कार्यवृत्त

The 237th OCC meeting of NRPC was held on November 17, 2025, through video conferencing. MS, NRPC welcomed all the participants connected through VC, in the meeting from the power utilities of the Northern Region.

खण्ड-क:उ.क्षे.वि.स. PART-A:NRPC

A.1. Confirmation of Minutes

Minutes of the 236th OCC meeting were issued on 08.11.2025.

Representative of HP SLDC stated that the following replies submitted by HP SLDC regarding agenda items A.3, A.5 and A.6 have not been incorporated in the minutes:

A.3 Review of Grid operations of September 2025 - Anticipated vis-à-vis Actual Power Supply Position (Provisional) for September 2025:

Anticipation in Energy Requirement & Peak Demand in respect of Himachal Pradesh for the month of September, 2025 was on the lower side due to bad weather (heavy rainfall) conditions.

A.5 Anticipated Power Supply Position in respect of Himachal Pradesh for December 2025

State	Availability / Requirement	Energy (MU)	Peak (MW)
Himachal Pradesh	Availability	1126	2131
	Requirement	1135	2150
	Surplus / Shortfall	-9	-19
	% Surplus / Shortfall	-0.8%	0.89%

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

The category-wise Energy Consumption (MU) as available i.r.o. Himachal Pradesh for the month of August 2025 & September 2025 was submitted on 10.10.2025.

OCC forum noted the submissions of HP SLDC and confirmed the minutes of the meeting.

Decision of OCC Forum:

OCC confirmed the minutes of the meeting with the above modification.

A.2. Status of action taken on decisions of the 236th OCC meeting of NRPC

A.2.1. MS, NRPC conveyed that the agenda has been taken to track the status of action taken as per the decision of the last meeting. Accordingly, issues may be resolved at the earliest.

A.2.2. Concerned utilities submitted the status of action taken.

Decision of OCC Forum:

Concerned utilities submitted the status of action taken and the same has been complied as ***Annexure-A.I****.*

A.3. Review of Grid operations of October 2025

Anticipated vis-à-vis Actual Power Supply Position (Provisional) for October 2025

Reasons submitted by States/UTs for significant deviation of actual demand from anticipated figures during September 2025 are as under:

- **Delhi**

  Delhi witnessed below normal temperature in the month of October 2025 compared to October 2024, resulting in lower peak demand and energy consumption than anticipated.

- **Haryana**

  The actual consumption of rural load for the month of Oct-25 has been 39% (average) less than Oct-24 and consumption for Industry load for the second half of Oct-25 has been 13% (average) less than Oct-24.

- **Himachal Pradesh**

  Anticipation in Energy Requirement & Peak demand in respect of Himachal Pradesh for October, 2025 was on the lower side due to the extended rainy season this year, which has resulted in lower temperatures in the plains and consequently reduced air-conditioning load. Further, the extended festive season has also impacted demand due to lower industrial consumption during this month, leading to a drastic reduction in overall demand.

- **Punjab**

  Actual energy requirement and actual maximum demand are less as compared to anticipated energy requirement and anticipated maximum demand, respectively, because of rainfall in the first week of October 2025 in the state of Punjab.

- **Rajasthan**

  The Actual Peak Demand and Actual Energy requirement w.r.t. Anticipated Peak Demand and Anticipated Energy requirement for the month of October'2025 decreased by 14.6% and 20.4% respectively because of the agriculture demand not picked up due to good rains and early beginning of the cold weather in the state.

- **Uttar Pradesh**

  Reason for deviation in Projected and Actual Availability & Demand for October 2025 is due to mild temperature and good rainfall in October 2025 in comparison to October 2024.

- **Uttarakhand**

  The reason for the significant variation in Energy Requirement (decrease) for the month of Oct'25 against anticipated figures was due to pre-Deepawali maintenance of intra-state transmission systems.

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

A.4.1. The maintenance programme of generating units and transmission lines for the month of December 2025 was deliberated in the meeting on 13.11.2025.

A.4.2. EE(O), NRPC mentioned that POWERGRID has requested the shutdown of the following elements:

S. No.	OCC Approved No. Sr. No. If any	Name of the Element	Shut Down Date Range	Purpose of S/D	Continuous /Daily
1.	NA	400kV Dadri- Ballabhgarh line	17.11.2025 12:00 - 17.11.2025 16:00	for removal of by pass arrangement and connectivity of 400kV Dadri-Maharanibagh and 400KV Maharanibagh-Ballabhgarh at Maharanibagh.	**Daily**

2.	OCC-236/Sl. 618 RQ242636 & 606 RQ243004 & Approved in Delhi OCC(Mom Attached Pg.12-13)	400 KV BAWANA(DV)-MAHARANIBAGH(PG) (DTL) CKT-1 & 2	17.11.2025 16:00 - 25.11.2025 23:00	For Removing Jumper at Tapping Point to form 400 KV NARELA(PNTL)-MAHARANIBAGH(PG) M/C & reconnection jumper of 400 KV Mandola-Bawana D/C on dt 25.11.2025	Continuous
3.	OCC-236/Sl. 608 RQ243005 & 558 RQ242639 & Approved in Delhi OCC(Mom Attached Pg.12-13)	400 KV MANDOLA(PG)-MAHARANIBAGH(PG) (DTL) CKT-1 & 2	17.11.2025 16:00 - 25.11.2025 23:00	For Removing Jumper at Tapping Point to form 400 KV NARELA(PNTL)-MAHARANIBAGH(PG) M/C & reconnection jumper of 400 KV Mandola-Bawana D/C on dt 25.11.2025	Continuous

A.4.3. NRLDC representative stated that shutdown of 400kV Dadri- Ballabhgarh line may be allowed for connectivity of 400kV Dadri- Maharanibagh and 400kV Maharanibagh-Ballabhgarh at Maharanibagh. Subsequently, shutdown of 400 KV BAWANA(DV)-MAHARANIBAGH(PG) (DTL) CKT-1 & 2 and 400 KV MANDOLA(PG)-MAHARANIBAGH(PG) (DTL) CKT-1 & 2 may be allowed after charging of 400kV Dadri- Maharanibagh and 400KV Maharanibagh-Ballabhgarh.

Decision of OCC Forum:

OCC forum agreed for shutdown of 400kV Dadri- Ballabhgarh line as proposed by POWERGRID. Further, forum agreed that shutdown of 400 KV BAWANA(DV)-MAHARANIBAGH(PG) (DTL) CKT-1 & 2 and 400 KV MANDOLA(PG)-MAHARANIBAGH(PG) (DTL) CKT-1 & 2 may be allowed after charging of 400kV Dadri- Maharanibagh and 400KV Maharanibagh-Ballabhgarh.

A.5. Anticipated Power Supply Position in Northern Region for December 2025

The updated anticipated Power Supply Position for December 2025 is as below:

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
CHANDIGARH	Availability	120	350	No Revision submitted
	Requirement	127	325	
	Surplus / Shortfall	-7	25	
	% Surplus / Shortfall	-5.5%	7.7%	
DELHI	Availability	3275	5500	14-Nov-25
	Requirement	2400	5500	
	Surplus / Shortfall	875	0	
	% Surplus / Shortfall	36.5%	0.0%	
HARYANA	Availability	5240	9915	12-Nov-25
	Requirement	4921	9725	
	Surplus / Shortfall	319	190	
	% Surplus / Shortfall	6.5%	2.0%	
HIMACHAL PRADESH	Availability	1253	2282	12-Nov-25
	Requirement	1276	2320	
	Surplus / Shortfall	-23	-38	
	% Surplus / Shortfall	-1.8%	-1.6%	
J&K and LADAKH	Availability	1040	2400	No Revision submitted
	Requirement	2140	3473	
	Surplus / Shortfall	-1100	-1073	
	% Surplus / Shortfall	-51.4%	-30.9%	
PUNJAB	Availability	4790	11240	14-Nov-25
	Requirement	4753	9538	

State / UT	Availability / Requirement	Revised Energy (MU)	Revised Peak (MW)	Date of revision
	Surplus / Shortfall	37	1702	
	% Surplus / Shortfall	0.8%	17.8%	
RAJASTHAN	Availability	9120	19840	14-Nov-25
	Requirement	10230	18500	
	Surplus / Shortfall	-1110	1340	
	% Surplus / Shortfall	-10.9%	7.2%	
UTTAR PRADESH	Availability	10695	21000	06-Nov-25
	Requirement	10540	21000	
	Surplus / Shortfall	155	0	
	% Surplus / Shortfall	1.5%	0.0%	
UTTARAKHAND	Availability	1318	2500	10-Nov-25
	Requirement	1349	2550	
	Surplus / Shortfall	-31	-50	
	% Surplus / Shortfall	-2.3%	-2.0%	
NORTHERN REGION	Availability	36851	76200	
	Requirement	37736	72100	
	Surplus / Shortfall	-885	4100	
	% Surplus / Shortfall	-2.3%	5.7%	

A.5.1. Representatives of Rajasthan SLDC and J&K SLDC informed that the shortfall would be met through real-time exchanges and Banking arrangements.

A.5.2. Representative of J&K SLDC informed that banking arrangements of 400 MW have been made with UP for morning Peak and Evening Peak. Further, banking arrangements with Punjab have been made for 200 MW of power round the clock.

A.5.3. NRLDC representative stated that instead of relying on exchanges, Rajasthan may consider operating the Dholpur GPS to meet shortages. This would also help improve the voltage profile in the Rajasthan control area and reduce reactive drawl from the grid, thereby lowering reactive energy charges.

A.5.4. MS, NRPC advised the respective SLDCs to make requisite arrangements in advance to meet the demand, as power may not be available on exchanges during peak hours. She also emphasized that Rajasthan should consider operating the Dholpur GPS in view of the aforementioned benefits.

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

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

A.6.2. In 237th OCC, SLDCs were requested again to coordinate with respective Transmission Utilities of states/UTs and submit details about the updated status of the Down Stream network by State Utilities from ISTS Station (enclosed as ***Annexure-A.II.I***) before every OCC meeting.

A.6.3. Regarding ADMS implementation, MS, NRPC asked SLDCs to coordinate with Discoms of their respective control areas for reliable communication and visibility of the feeders identified for ADMS implementation at the SLDC level.

A.7. NR Islanding scheme

A.7.1. With regard to the Agra Islanding Scheme, the UPPTCL representative informed the forum that the proposal has been resubmitted to the PSDF Secretariat for funding under PSDF, following approval by the UPPTCL Board.

A.7.2. Regarding Lucknow-Unchahar Islanding Scheme, UPPTCL representative apprised the forum that 132 KV S/S Husainganj --- line is on H-pole; therefore, OPGW laying is not possible on this line. However, the data of 132 KV S/S Husainganj is made available through GPRS.

A.7.3. RRVPNL representative informed the forum that the proposal for the Jodhpur–Barmer–Rajwest Islanding Scheme was submitted to the PSDF Secretariat on 16.01.2025 for PSDF funding. A meeting regarding the scheme was held on 07.03.2025, during which certain queries were raised. The representative further stated that responses to these queries were submitted on 30.05.2025. However, the final decision from the PSDF Secretariat is still awaited by RRVPNL.

A.7.4. RRVPNL representative mentioned that DPR for the implementation of Suratgarh islanding scheme would be submitted after the confirmation of the decision from PSDF Sectt. for PSDF funding for Jodhpur-Barmer-Rajwest islanding scheme.

A.7.5. Punjab SLDC representative informed that two islanding schemes were approved by NRPC for the Punjab Control area as mentioned below-

- NPL Rajpura islanding scheme
- RSD islanding scheme (with only one machine)

These schemes were conceptualized and are based on PMUs and DPR (detailed project report). regarding PSDF funding for NPL Rajpura islanding scheme was

submitted for PSDF funding about a year ago and DPR regarding PSDF funding for RSD islanding scheme was submitted for PSDF funding recently. The total estimated cost of the scheme is around 20 crores based on re-evaluation done on the pattern of Raipur islanding scheme (similar to schemes proposed by PSTCL) as per directives of authorities sanctioning DPRs for PSDF funding. In 236th OCC meeting, MS, NRPC asked PSTCL to get the designing aspect of both the islanding scheme vetted by Punjab SLDC and thereafter submit the proposal to NRPC with the undertaking that earlier PSDF funding was not availed for these schemes. In the 237th OCC meeting, the Punjab SLDC representative informed that both schemes would be taken up for discussion in their State OCC meeting scheduled on 20.11.2025.

A.7.6. HPSLDC representative apprised that the Monitoring committee of State PSDF has provided approval for State PSDF funding for implementation of the proposed UFR scheme for Kullu-Manali islanding scheme and the Shimla-Solan Islanding scheme in the meeting held on 22nd April, 2025. In the 237th OCC meeting, the HPSLDC representative informed that HPSEBL has awarded the tender for implementation of both schemes on 27.10.2025, with a work completion period of six months.

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

A.8.1. In the meeting, the NRPC representative apprised the forum about the coal stock position of generating stations in the Northern Region during the current month (till 10th November 2025).

A.8.2. The coal stock position of generating stations in the Northern Region, having critical stock, during the first ten days of November 2025 is NIL.

A.9. Periodic Testing of Generators and FACTS/HVDC Devices (Agenda by NRPC Sectt.)

A.9.1 NRPC representative stated 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.

A.9.2 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.

A.9.3 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.”

A.9.4 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

A.9.5 In accordance with above, Generators and HVDC/FACT owners were supposed to furnish the Testing schedule for the next five financial years.

A.9.6 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-SystemElements-submitted-to-CERC.pdf. This may be used for testing.

A.9.7 In view of this, a Google sheet was prepared and it was requested that the testing plan for the next five financial years may be updated in the sheet provided at the earliest as per the requirement of IEGC 2023 and the decision of the 73rd NRPC meeting.

A.9.8 A letter has been issued in this regard to all the state generators and NR ISTS renewables for submitting their testing schedule for the next five financial years. All SLDCs were requested to take up this with all the generators in their control area to provide information at the earliest.

A.9.9 In the 235th OCC meeting, the forum asked all Generators and HVDC/FACT owners to furnish a Testing schedule for next five financial years in the format attached at Annexure-A.IV.a of the agenda to seo-nrpc@nic.in.

A.9.10 EE(O), NRPC informed that till date, data has been received only from Powergrid, NHPC, SJVN, THDC, JSW Hydro, Rosa Power Supply Co Ltd, LPGCL, NLC India Limited, ADHPL, Malana Power Company Limited, Singoli Bhatwari HEP and Clean Solar Power.

A.9.11 In the 237th OCC meeting NRPC Secretariat representative stated that the testing schedule for the next financial year needed to be submitted by 31st October as per IEGC 2023. However, the testing schedule is still awaited from most of the intra-state generating stations and NTPC.

A.9.12 MS, NRPC asked concerned utilities who have not yet submitted a testing schedule to furnish the Testing schedule at the earliest in the format attached at Annexure-A.IV.a of the agenda to seo-nrpc@nic.in at.

Decision of OCC Forum:

OCC forum asked concerned utilities who have not yet submitted a testing schedule to furnish a Testing schedule for the next five financial years in the format attached at Annexure-A.IV.a of the agenda to seo-nrpc@nic.in.

A.10. Implementation of the AUFLS scheme in accordance with the report of the Task Force on Automatic under Frequency Load Shedding (AUFLS) (Agenda by NRPC Secretariat)

A.10.1. In line with the report of the Task Force on Automatic under Frequency Load Shedding (AUFLS) and df/dt scheme, NPC Secretariat to communicate the region-wise relief quantum (based on Regional Peak Demand Met during the previous year) by 31st of May to RPCs for implementation in the next Financial Year (FY).

A.10.2. NPC Secretariat has communicated to RPCs that they have computed the quantum of load shedding in different stages of AUFLS based on the Peak Demand Met of the Region in the financial year (2024-25). The region-wise Peak Demand Met is considered by NPC Sectt. is as follows:

Region	**NR**	**SR**	**WR**	**ER**	**NER**
Peak Demand Met (MW)	80,548	68,094	72,556	29,299	3,678

A.10.3. The quantum of load shedding in different stages of the AUFLS region-wise is as follows:

Sr. No.	**Stage**	**Frequency (Hz)**	**Demand Disconnection (%)**	**Quantum of Load shed in MW**					
AUFLS Set Points and Percentage Quantum of Relief				NR	SR	WR	ER	NER	All India Load shed
1	Stage 1	49.4 Hz	5.00%	3801.7	3213.9	3424.5	1382.8	173.5	11996.55
2	Stage 2	49.2 Hz	6.00%	4562.04	3856.7	4109.4	1659.4	208.3	14395.86
3	Stage 3	49.0 Hz	7.00%	5322.4	4499.5	4794.3	1935.9	243.03	16795.17

4	Stage 4	48.8 Hz	7.00%	5322.4	4499.5	4794.3	1935.9	243.03	16795.17
	Total (in MW)			**19008.5**	**16069.5**	**17122.4**	**6914.3**	**867.9**	**59982.7**

A.10.4. After the receipt of the allocated load shedding quantum of the Region from NPC, AUFLS relief quantum should be distributed among the State/UT in the region by the RPCs in consultation with the stakeholders.

A.10.5. NRPC Sectt. has computed each State/UT Stage-wise AUFLS quantum for NR based upon the task force report and quantum of load shedding in different stages of AUFLS region-wise finalized by NPC. The details of which are mentioned in the table below:-

State/UT	**Stage-1 49.4 Hz (5%)**	**Stage-2 49.2 Hz (6%)**	**Stage-3 49.0 Hz (7%)**	**Stage-4 48.8 Hz (7%)**	**Total**	**Currently implemented relief as per 231st OCC**
	Stage-1 Relief	Stage-2 Relief	Stage-3 Relief	Stage-4 Relief		
Chandigarh	17	21	24	24	**86**	**Nil**
Delhi	334	400	467	467	**1668**	**1595**
Haryana	586	704	821	821	**2931**	**3177**
Himachal Pradesh	101	122	142	142	**507**	**1076**
UT J&K & Ladhak	140	168	196	196	**700**	**777**
Punjab	645	773	902	902	**3223**	**3012**
Rajasthan	853	1024	1194	1194	**4266**	**4066**
Uttar Pradesh	1297	1557	1816	1816	**6486**	**8537**
Uttarakhand	127	152	177	177	**633**	**865**
Total	**4100**	**4920**	**5740**	**5740**	**20499**	**23105**

A.10.6. States/UT shall identify the load relief for each stage, considering the Quantum of relief and their demand contribution, considering the intra-day, seasonality etc. 10% additional relief would be finalised considering the demand growth of the year, planned and forced outages, UFR and breaker issues etc. SLDC would communicate feeder-wise, Stage-wise details etc. to RPC/RLDC.

A.10.7. In the 234th OCC meeting, it was apprised that states like Chandigarh, Delhi, Punjab and Rajasthan need to plan load relief in comparison to actual load relief required (attached as Annexure-A.V of agenda). Further, as per the recommendation of task force, the planned relief should be 10% more than the actual estimated relief.

A.10.8. In the 235th OCC meeting, EE(O), NRPC requested States/UTs of NR to submit feeder-wise, Stage-wise AUFLS quantum to NRPC/NRLDC before the next OCC meeting.

A.10.9. EE(O), NRPC stated that the feeder-wise, Stage-wise AUFLS quantum is still awaited from the aforementioned states.

A.10.10. Delhi SLDC representative stated that they will submit the information within a week.

A.10.11. Punjab SLDC representative informed that they have taken up the matter with STU and they will expedite the process and submit the update shortly.

A.10.12. HP SLDC representative stated that they are meeting the requisite relief requirement of Stage-1 and 2.

A.10.13. MS, NRPC stated that separate stages are being made so that load shedding can also be done based on the requirement.

A.10.14. HP SLDC representative agreed to adjust to UFR relief from Stage-1 and 2 to Stage-3 and 4.

A.10.15. MS, NRPC asked all States/UTs of NR to review their feeder-wise, Stage-wise AUFLS quantum and submit feeder-wise, Stage-wise AUFLS quantum to NRPC/NRLDC before the next OCC meeting. Also, if required, additional UFR may be purchased to implement the requisite AUFLS quantum. Further, she mentioned that bulk consumers are also required to provide UFR for load shedding in their respective systems.

Decision of OCC Forum:

OCC forum asked all states to plan the requisite load relief as mentioned in the attached as Annexure-A.V of the agenda and submit feeder-wise, Stage-wise AUFLS quantum to NRPC/NRLDC before the next OCC meeting.

A.11. Monthly Review of LGBR for the next 11 months (Availability & Requirement) (Agenda by NRPC Secretariat)

A.11.1. EE(O), NRPC informed the forum that in 236th OCC meeting matter regarding monthly Review of LGBR for the next 11 months (Availability & Requirement) was discussed and it was agreed that NR States/UTs shall submit the data for the monthly Review of LGBR for the next 11 months including the break-up of sources through which demand is proposed to be met, such as ISGS, internal generation, bilateral arrangements, DAM/RTM transactions, or other contracts, shall also be provided.

A.11.2. EE(O), NRPC informed that, other than Haryana no other state has submitted the data for the monthly Review of LGBR.

A.11.3. EE(O), NRPC enquired all the states whether they are facing an issue in providing the details.

A.11.4. HP SLDC representative informed the forum that they have requested HPSEBL to share the data as per the format. Upon receipt of the same, it will be shared with the NRPC Secretariat.

A.11.5. MS, NRPC enquired whether the information is not available with HP SLDC.

A.11.6. HP SLDC representative informed that for availability and requirement, DISCOM will be doing LDC and bilateral contract so the details will be available with DISCOMs.

A.11.7. Representatives of Rajasthan SLDC, Uttarakhand SLDC and UP SLDC informed that they will share the data shortly.

A.11.8. MS, NRPC suggested that, for the time being, data on availability and requirement may be requested from all NR States. The breakup into various components can be sought from the states at a later stage. She further suggested that Google Sheet may be shared with SLDCs so that the data can be updated by all the states in the sheet monthly.

Decision of OCC Forum:

OCC Forum requested the NR States/UTs to submit the data for the monthly Review of LGBR for the next 11 months in the google sheet to be shared by NRPC Secretariat.

A.12. Interim charging (rated voltage) of 765 kV D/C Bhadla III Ramgarh line and Ramgarh SS (PS) (Agenda by Powergrid NR-1)

A.12.1. EE(O), NRPC apprised forum that Powergrid NR-1 has submitted that the transmission system for evacuation of power from Ramgarh PS & Bhadla-III PS is under implementation as part of the transmission system for evacuation of power from REZ in Rajasthan (20GW) under Part B1 & Part C1 package Phase-III.

A.12.2. As part of the Ph-III, Part C1 scheme, 765 kV D/C Bhadla III-Ramgarh line and Ramgarh PS substation construction is completed and Anti-theft charged as given per the arrangement given below:

- Antitheft charging of 80 km of 765 kV D/C Bhadla III-Ramgarh line with tapping from RRVPNL's 132 kV Bajju-PSP 1 line (58 km) at 132 kV was carried out on 26.09.2025. The entire 186 km route length couldn't be charged due to the limitation of 50 kA bus charging, breaking the current capacity of the circuit Breaker provided at both ends of the 132 kV line.

A.12.3. As part of the Ph-III, Part B1 scheme, 765kV Bhadla-III PS – Sikar-II D/c line and Bhadla-III PS is being implemented with a commissioning schedule of Dec'25 (Ant. SCOD)

A.12.4. Ramgarh PS is to be charged from Bhadla III PS with the interconnecting 765 kV D/C Bhadla III-Ramgarh line between these two PS and Bhadla III is to be charged

from Sikar II PS with the interconnecting 765 kV D/C Bhadla III-Sikar II line between these two PS.

A.12.5. POWERGRID has informed that as per the latest Status provided by RE applicants, RE generation is expected to be commissioned from Feb'26 onwards at Bhadla-III PS and Dec'25 onwards at Ramgarh PS.

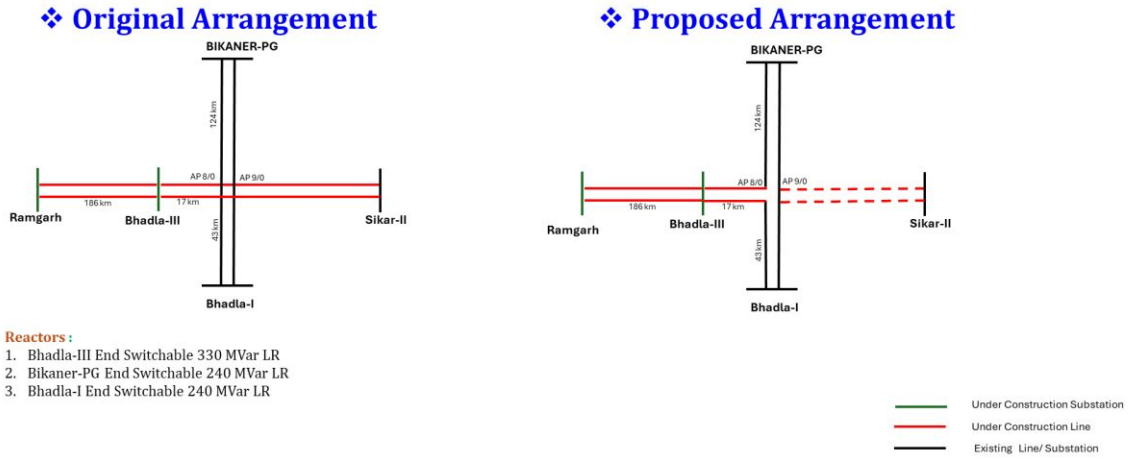
A.12.6. POWERGRID has further mentioned that, considering the anticipated delay in commissioning of 765 kV D/C Bhadla III-Sikar II line and Bhadla III PS, it is thought prudent to make an interim arrangement to charge Ramgarh PS and 765 kV D/C Bhadla III-Ramgarh line at rated 765 kV voltage to commission these two elements.

A.12.7. POWERGRID's 765 kV D/C Bhadla- Bikaner line (Under O&M) is being over-crossed by under construction 765 kV D/C Bhadla III-Sikar II line at approximately 17.578 km from Bhadla III PS in between AP8/0 and AP9/0.

A.12.8. As part of proposed interim arrangement, one ckt of 765kV Bhadla-III PS -Sikar -II D/c line is tapped to one ckt of 765kV Bhadla (PG) – Bikaner (PG) line to form 765kV Bhadla (PG)-Bhadla-III-Bikaner (PG) line (one ckt) and 765kv Bhadla (PG) – Bikaner (PG) line (other ckt).

A.12.9. Considering the above, studies have been carried out by CTU for the immediate evacuation of power from Ramgarh PS/Bhadla-III PS through an interim arrangement as proposed with different case scenarios. (Report is attached as Annexure-A.VII of the agenda. A schematic diagram of the proposed interim arrangement is as under:

Interim arrangement for charging of 765kV Bhadla-III & Ramgarh Substation



A.12.10. Considering the expected RE generation and delay in commissioning of 765 kV D/C Bhadla III-Sikar II line and Bhadla III PS, Powerrgid has proposed to make an interim arrangement to charge Ramgarh PS and 765 kV D/C Bhadla III-Ramgarh line to facilitate RE power evacuation, as per the above arrangement.

A.12.11. The NRLDC representative asked POWERGRID when they are planning for this LILO arrangement.

A.12.12. POWERGRID representative informed that they are planning to make this interim charging arrangement by December first week.

A.12.13. NRLDC representative stated that the proposal has been studied at the NRLDC end. As the interim arrangement does not provide any additional evacuation margin, any generation from Bhadla-3 and Ramgarh will evacuate through the existing lines. Accordingly, the present RE generation restrictions will remain in effect until any associated transmission system element is commissioned. Further, based on simulation studies:

- Under N-1 of 765 Ajmer-Bhadla-II, one ckt angular separation is going up to 22.78 with the interim arrangement, a marginal increase from 22.39
- Under N-1 of 400kV Jodhpur-Kankroli ckt, loading of 400kV Kankani-Merta is reaching 1000+MW (Limit: ~970MW@40°C)
- Under N-1 of 765 Ajmer-Bhadla-II one ckt, angular separation is going up to 25 with the simultaneous shutdown of 765kV Bhadla-Bikaner ckt1 and 400kV Bhadla-Bikaner D/C. Additional RE curtailment of roughly 1500-2000MW shall be required to maintain the voltage profile, SCR and to improve angular separation under N-1 conditions

A.12.14. NRLDC representative suggested that the proposal may be further discussed after commissioning of 765kV Khetri-Narela and other 400kV lines from Narela. Moreover, as the 400kV Bhadla-Bikaner line of RRVPNL is also under shutdown, it would be better if shutdowns are proposed after the shutdown of the 400kV Bhadla-Bikaner line of RRVPNL is returned.

A.12.15. EE(O), NRPC asked POWERGRID about the status of charging of 765 kV D/C Bhadla III-Sikar II line and Bhadla III PS.

A.12.16. POWERGRID representative informed that around 140 km of stringing is balanced for the complete line and they are facing a severe ROW issue at Sikar End. The ROW issue has been started to resolve after review from the Pragati Portal, but it will take some time.

A.12.17. MS, NRPC enquired about the revival of the 400 kV Bhadla(RS) – Bikaner(RS) D/C line.

A.12.18. NRLDC representative informed that it is expected to be revived by mid-December 2025.

A.12.19. NRLDC representative asked about the expected timeline of 300 MW Generation at Ramgarh III.

A.12.20. CTUIL representative informed that generation at Ramgarh-III is expected from Dec’2025 and generation at Bhadla-III is expected from Feb’2026 and 500-600 MW generation is expected by Feb’ 2026. From March 2026 onwards, more generation is expected from Bhadla III.

A.12.21. CTUIL representative stated that the 765 KV Khetri- Narela DC line is expected by November end. Further, the study has been done considering the simultaneous shutdown of 400 kV Bhadla(RS) – Bikaner(RS) D/C line and no issues have been observed in base case. However, during N-1 contingency RE curtailment may be required.

A.12.22. NRLDC representative mentioned that after the shutdown of 400kV Bhadla-Bikaner D/C, there have also been oscillations observed on few days, due to a decline in SCR. The STATCOMs were required to be taken in Manual mode on these occasions to mitigate oscillations.

A.12.23. NRLDC representative also mentioned that for future scenarios, the NOC or curtailment requirements will be assessed after commissioning of the associated transmission system elements, considering the prevailing load-generation balance, similar to the current practice.

A.12.24. MS, NRPC stated that the proposal may be reviewed after the charging of 765 KV Khetri- Narela DC line.

Decision of OCC Forum:

OCC forum agreed that the proposal may be reviewed after the charging of 765 KV Khetri- Narela DC line.

A.13. Construction of Residential buildings in Ajmer city for 765/400 KV Ajmer Substation through Additional Capitalization in Tariff Block 2024-29 (Agenda by Powergrid NR-1)

A.13.1. EE(O), NRPC apprised the forum that Powergrid NR-1 has submitted that 765/400 KV Ajmer substation was constructed under Green Energy Corridors: Inter State Transmission Scheme (ISTS)- Part A". and commissioned in Dec-2017. As of now the asset commissioned and under O&M at Ajmer S/S is as follows:-

1. 765/400 KV 1500 MVA ICT-02 Nos.
2. 765 KV 240 MVAR Bus reactor-01 Nos
3. 765 KV 240 MVAR switchable Line reactor-04 Nos
4. 400 KV 125 MVAR Bus Reactor-01 Nos
5. 765 KV Bays-12
6. 400 KV Bays-08
7. 400 KV D/C Ajmer (PGCIL)Ajmer (RRVPNL) T/L
8. 765 KV D/C Ajmer-Chittorgarh T/L
9. 765 KV D/C Ajmer-Bhadla-II T/L
10. 765 KV D/C Ajmer-Phagi T/L

A.13.2. Establishment of 400 KV Ajmer S/S was envisaged in 1999 under the evacuation of power to be generated by Anta Gas power Plant. Accordingly, 41 hectares of Land for 400 KV Ajmer S/S was purchased by acquiring from the Rajasthan Govt. in the year 1999. However, 400 KV Ajmer has not come up with Anta system.

A.13.3. Later, the New 765/400KV substation has been envisaged under Green Energy Corridor Part-A and the same was commissioned in Dec-2017 on the aforesaid land.

A.13.4. POWERGRID has acquired a piece of Land (approx. 02 Hectare) in Ajmer City for the establishment of a residential colony for employees posted for the Ajmer Transmission system (Substation as well as Transmission Line). At the time of the construction and commissioning of Ajmer S/S, the land was not handed over to POWERGRID by Ajmer Development Authority due to a dispute and the case against the same was registered in the Rajasthan High Court (Jaipur Bench). The Case has been resolved recently in Aug-25.

A.13.5. As planned, it is required to construct a residential township for employees engaged in maintenance activities of Ajmer substation and transmission line to accommodate all employees at a single location for timely mobilization of the maintenance team for effective asset Management of Ajmer Substation & Associated Transmission Lines.

A.13.6. In view of the above, an estimate has been prepared by POWERGRID for a residential township for employees engaged in maintenance activity pertaining to 765/400 KV Ajmer Substation & associated transmission line on land made available by the authority, in Ajmer city. The total estimated cost for the construction of 21 nos. Quarters, 01 Nos. Transit camp and 01 Nos. recreation club comes out to be Rs. 21.77 Crore /- only. The summary of the estimated cost is attached herewith at Annexure-A.VIII of the agenda.

A.13.7. Powergrid NR-1 has submitted a proposal for the construction of Residential buildings on land available in Ajmer city for 765/400 KV Ajmer Substation, for effective O&M of Ajmer Substation & associated Transmission Lines, at an estimated cost of ₹21.77 crore under ADD-CAP (2024-29).

A.13.8. ED, NRLDC stated that since this is a commercial matter it may be taken up in the Commercial Sub-Committee Meeting.

A.13.9. MS, NRPC suggested POWERGRID to bring this agenda for discussion in the upcoming Commercial Sub-Committee meeting of NRPC. Further, she suggested that POWERGRID may bring this proposal in any new scheme instead of ADD-CAP.

A.13.10. NRLDC representative enquired whether this proposal was not approved along with the original package in which the transmission system was approved.

A.13.11. POWERGRID representative stated that this proposal was not approved along with the original package. However, they will review these aspects before bringing the agenda to the Commercial Meeting.

Decision of OCC Forum:

OCC forum asked POWERGRID to put up this agenda for discussion in the upcoming Commercial Sub-Committee meeting of NRPC.

A.14. Deemed Availability for outages in respect of retrofitting work of the existing conventional control and protection system at 400/220KV Kanpur Substation (Agenda by Powergrid NR-3)

A.14.1. EE(O), NRPC apprised the forum that Powergrid NR-3 has submitted that as per existing CERC regulations, the useful life of substation equipment is 25 years and that of transmission lines is 35 years. Complete control and protection assets of the 400/220kV Substation Kanpur have completed their useful life. The equipment are periodically monitored/tested to ensure healthiness and reliable operation of the system. Even though condition monitoring and residual life assessment have been carried out, equipment needs to be replaced due to the breakdown failures or on account of obsolescence in technology and uneconomical operation before/after completion of life.

A.14.2. Towards bringing operational efficiency and digitalization, the development of a digital substation using Process Bus Technology has been introduced as a pilot project at 400/220kV Substation Kanpur. It has facilitated a significant reduction in copper cable requirement, commissioning time, downtime, as well as advanced diagnostics with provision of online testing of protection schemes.

A.14.3. Keeping in view of the above, 400/220kV Substation Kanpur is under upgradation of the existing conventional control and protection system with new IEC 61850 Process Bus-based Substation Automation System and Control & Protection System.

A.14.4. During installation and commissioning (complete retrofitting work), each associated feeder will undergo a shutdown for a minimum of 5 consecutive days except ICTs, which will require 07 days of Shutdown. The outages of the respective feeders shall be submitted to the OCC for approval.

A.14.5. POWERGRID has requested deemed availability for the planned long outages for the retrofitting work of the existing conventional control and protection system with a Process Bus-based system, as these outages are being utilized for system improvements.

A.14.6. POWERGRID representative stated that with the adoption of Process Bus technology, the requirement of huge copper cables from yard equipment to control panels will be eliminated. Analog signals from the yard will be converted into optical

format using merging units, also reducing the number of I-Bridges required. He also highlighted additional advantages of Process Bus technology, such as reduced chances of maloperation and the provision for centralized testing.

A.14.7. POWERGRID representative mentioned that in view of these benefits, POWERGRID is planning to convert the 400/220 kV Kanpur Substation into a Digital Substation using Process Bus Technology under their R&D budget. He requested that deemed availability may be provided by considering the outages required for the execution of this work under system improvement.

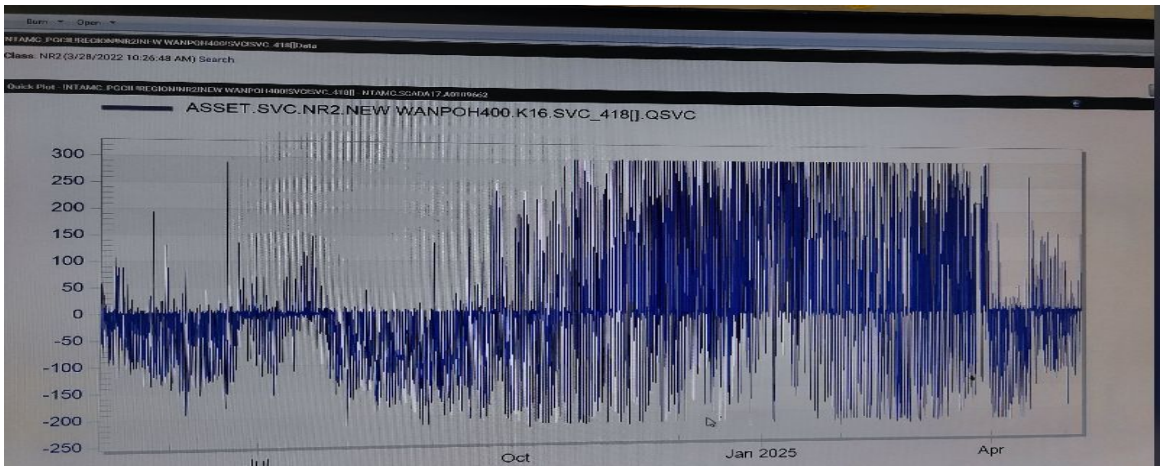
A.14.8. MS, NRPC appreciated POWERGRID for adopting modern technologies in the power system. However, she stated that the matter regarding deemed availability would be discussed separately and availability would be decided as per the CERC Tariff Regulations, 2024.

A.15. Utilisation of dynamic capability of SVCs and STATCOM to maintain GRID voltage (Agenda by Powergrid NR-2)

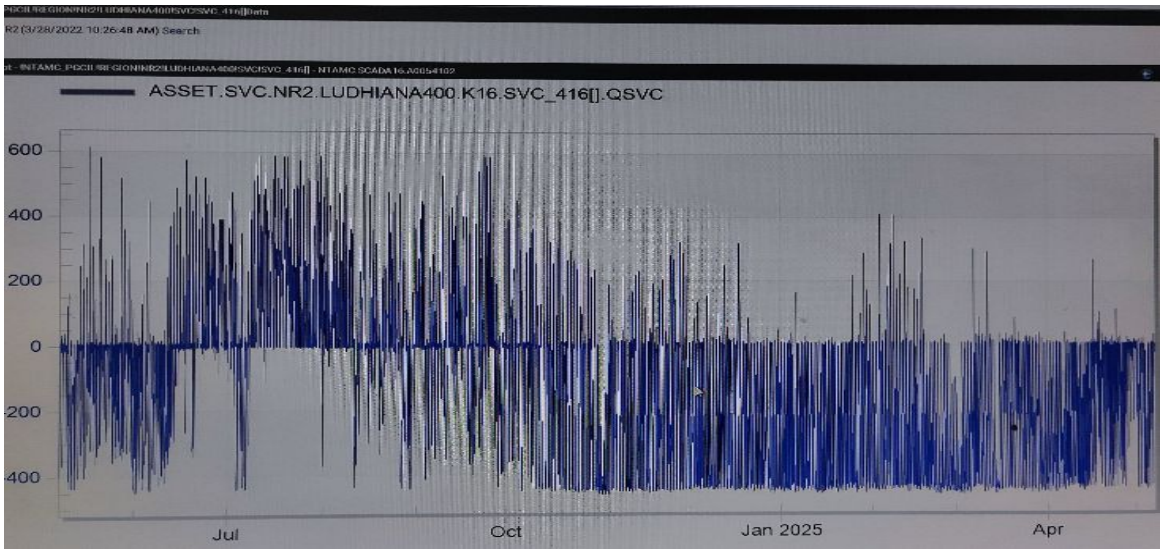
A.15.1. EE(O), NRPC apprised the forum that Powergrid NR-2 has submitted that SVCs and STATCOM have been installed to provide dynamic stability to GRID during extreme conditions.

A.15.2. However, for most of the period in a year, SVC/STATCOM full capacity is consumed to maintain GRID voltage and during the above period, there will be no dynamic compensation in case of any GRID instability.

New Wanpoh SVC (+300- 200MVAR)



Ludhiana SVC (+600- 400MVAR)



A.15.3. EE(O), NRPC informed that this matter was also discussed in the 231st OCC Meeting, wherein the forum asked states to take necessary steps for reactive power management so that the dynamic reserve of SVC/STATCOM remains available.

A.15.4. MS, NRPC enquired whether J&K and Punjab have conducted studies regarding the requirement of reactive power devices in their respective control areas. No response was provided by J&K and Punjab in this regard.

A.15.5. MS, NRPC stated that, as discussed in NRPC meetings, the states may plan to install STATCOM/SVC at the 220 kV level, which will help in managing reactive drawl.

A.15.6. NRLDC representative stated that the issue of installing SVC at New Wanpoh has already been discussed previously, wherein it was informed that there is no space available for the installation of an SVC/STATCOM at New Wanpoh. J&K has been requested to install capacitor banks as significant reactive drawl occurs during winter, and low voltages up to 360 kV are observed at the Uri substation.

A.15.7. NRLDC representative added that the main purpose of an SVC is to maintain dynamic reserve and not to provide reactive power; however, they are predominantly being used for reactive power support, which is causing these issues.

A.15.8. NRLDC representative suggested that CTUIL may conduct a study on the high-voltage issue in Punjab, which may worsen during the winter season, necessitating the opening of several lines at night in the Punjab area.

A.15.9. CTUIL representative informed that seven reactors of 125 MVAR capacity each have recently been approved for Punjab in the CMETS meeting. They are in the process of obtaining board approval, and these reactors are expected to be commissioned within two years, which will address the overvoltage issue at Ludhiana.

A.15.10. CTUIL representative further stated that the Capacitor is the better solution for J&K.

A.15.11. NRLDC representative suggested that POWERGRID may discuss with J&K and IndiGrid and provide inputs to CTUIL for long-term planning, particularly regarding suitable locations for installing SVCs based on space availability.

A.15.12. MS, NRPC asked POWERGRID to provide inputs to CTUIL regarding suitable locations for installing SVCs based on space availability for long-term planning. She further asked CTUIL to carry out the study in coordination with J&K and POWERGRID to assess the requirement of reactive power devices in J&K.

Decision of OCC Forum:

OCC forum asked POWERGRID to provide inputs to CTUIL regarding suitable locations for installing SVCs based on space availability for long-term planning. Further, the OCC forum agreed that CTUIL may carry out the study in coordination with J&K and POWERGRID to assess the requirement of reactive power devices in J&K.

A.16. Increase in fault level at 400/220KV Substation Ludhiana and Moga Substations (Agenda by Powergrid NR-2)

A.16.1 Powergrid NR-2 has submitted that on 02.05.2025 at 00:00:01:826 Hrs, in 220KV Shanewal ckt-1 of Ludhiana Substation, LBB operated due to a blast in 214 bay CB, resulting in tripping of 220KV Bus 2. Fault current was above 40KA, which persisted for about 250 milliseconds.

A.16.2 Fault current in different feeders was as under:

Feeders connected to Bus-1 at the time of fault

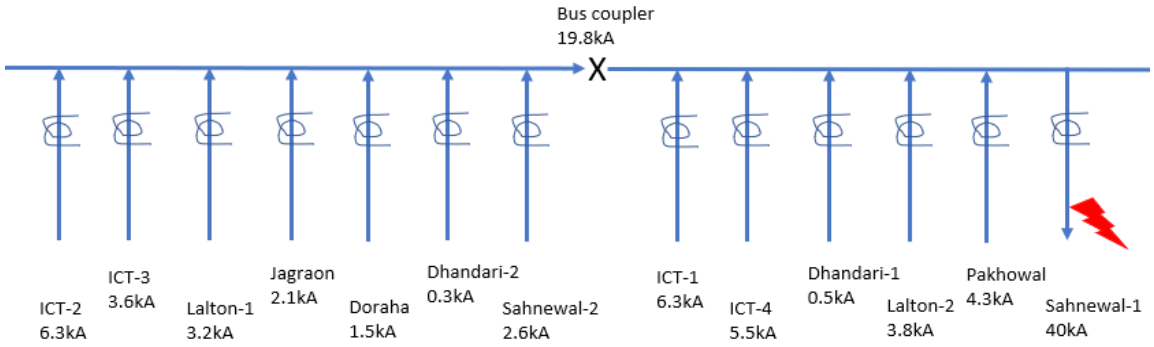
Bay	Feeder	Current	Remarks
202	ICT-2	6269	
204	ICT-3	3624	
209	Lalton-1	3213	
210	Jagraon	2126	
212	Doraha	1503	
213	Dhandari-2	348	
215	Sahnewal-2	2626	
203	Bus coupler	19753	

Feeders connected to Bus 2 at the time of fault

Bay	Feeder	Current	Remarks
201	ICT-1	6279	
206	ICT-4	5464	
207	Dhandari-1	488	
208	Lalton-2	3787	
211	Pakhowal	4299	
214	Sahnewal-1	40084	Faulty feeder

203	Bus coupler	19753	

Fault current distribution in SLD:



A.16.3 In view of the above, POWERGRID has proposed to keep 220KV Bus Coupler CB open at Ludhiana as a temporary measure.

A.16.4 EE(O), NRPC informed that this matter was also discussed in the 231st OCC Meeting, wherein the forum asked Powergid, PSTCL and NRLDC to jointly study the bus split operation at Ludhiana and Moga Substations and CTUIL to conduct a study for necessary measures for fault level control at these substations.

A.16.5 MS, NRPC asked CTUIL to update the status of whether they have done any study for fault level control.

A.16.6 CTUIL representative informed that space is not available for the Bus sectionalizer in 400/220KV Ludhiana Substation. He suggested that a site visit may be planned with representatives from CTUIL, NRLDC and POWERGRID to assess the feasibility of the installation of Bus sectionalizer at Ludhiana and Moga Substations. Based upon that, CTUIL will do the planning.

A.16.7 NRLDC representative stated that the existing fault levels are already being shared with CTUIL and CEA through quarterly operational feedback.

A.16.8 MS, NRPC asked CTUIL, NRLDC and POWERGRID to conduct a site visit before next OCC meeting to assess the feasibility of the installation of Bus sectionalizer at Ludhiana and Moga Substations. Further, NRLDC and CTUIL may study jointly and suggest necessary measures for fault level control at these substations. She requested POWERGRID to coordinate and facilitate the site visit.

Decision of OCC Forum:

OCC forum asked CTUIL, NRLDC and POWERGRID to conduct a site visit before the next OCC meeting to assess the feasibility of the installation of Bus sectionalizer at Ludhiana and Moga Substations. Forum requested POWERGRID to coordinate and facilitate the site visit. Further, the forum asked NRLDC and CTUIL to study jointly and suggest necessary measures for fault level control at these substations.

AA.1 Action Taken Report with respect to the past recommendations of the Standing Committee of Experts on EHV Tower Failures (Agenda by NRPC Secretariat)

AA.1.1 EE(O), NRPC apprised forum that CEA has a Standing Committee of Experts in the field of design and operation of EHV transmission line towers from CEA, various transmission utilities and research/academic institutes to investigate the failure of 220 kV and above voltage class transmission line towers and recommend measures to avert recurrence of such failures in future.

AA.1.2 The objective of the Standing Committee is to investigate the causes of failures, deliberate the failures of transmission line towers of various Power utilities, suggest remedial measures to prevent recurrence of such events in future and prepare a report that would serve as a repository of case studies of failures and suggested remedial measures for future.

AA.1.3 In this regard, minutes of the meeting of the Standing Committee of Experts on failure of EHV transmission towers failed during the period from January 2025 to June 2025 is enclosed (Annexure-III). Details of events pertaining to Northern Region is attached as Annexure-IV. List of events since July 2025 is also attached as Annexure-V.

AA.1.4 Further, Central and State transmission utilities of the Northern region were requested vide email dated 07.11.2025 to furnish the action taken on the past recommendations of the Standing Committee of Experts on EHV Transmission Line Tower Failures. However, the response is still awaited (except AESL).

AA.1.5 EE(P), NRPC informed the forum that they have sent an email to submit their reply on the action taken report based on the committee recommendations.

AA.1.6 EE(P), NRPC further informed the forum that list at Annexure-V contains tower collapses after July 2025 which is yet to be discussed in Standing Committee, it is prepared in advance so that the concerned states can submit their reply to Standing Committee as per standard format available on CEA Website and to give a status update to ministry regarding restoration of tower collapse after July 2025.

AA.1.7 EE(O), NRPC requested all concerned entities to update the status regarding action taken on the past recommendations of the Standing Committee of Experts on EHV Transmission Line Tower Failures.

AA.1.8 POWERGRID representative informed the forum that for SambaChowadhi-I/Smbahiranagar -I Line they have submitted the reply to CEA for utilising the higher span and for checking restored tower strength as per IS:802:2015 they will submit the reply shortly.

AA.1.9 POWERGRID representative informed the forum that for the Fatehpur-Agra-2 Line they have submitted their reply to CEA recently.

AA.1.10 EE(O), NRPC requested RVPNL and UPPTCL to update their status.

AA.1.11 Representatives of UPPTCL and RVPNL stated that they will submit a reply

shortly.

AA.1.12 MS, NRPC stated that if the standing committee has given recommendations so all concerned entities, including STUs, have to take actions based on the recommendations to reduce the number of tower collapses.

AA.1.13 MS, NRPC further added that a high number of tower collapses have been observed this year in NR region. Therefore, all the states, including PGCIL should take action based on the recommendations.

AA.1.14 MS, NRPC asked UPPTCL, RVPNL, NTPC, NRSS XXXVI and PGCIL to submit their reply to PSETD Division, CEA and NRPC. She mentioned that the Action Taken Report with respect to the past recommendations of the Standing Committee would be discussed at MoP level shortly.

Decision of OCC Forum:

OCC Forum asked UPPTCL, RVPNL, NTPC, NRSS XXXVI and PGCIL to submit an Action Taken Report with respect to the past recommendations of the Standing Committee to PSETD Division, CEA and NRPC at the earliest.

AA.2 Maintaining reserves and implementation of Automatic Generation Control for improving the grid frequency profile (Agenda by NRPC Secretariat)

AA.2.1 A meeting was taken by the Secretary (Power) on 22.10.2025 to discuss the deployment of Battery Energy Storage System (BESS) for Ancillary services. (copy of MoM attached at Annexure-VI)

AA.2.2 In the meeting, the following action point was decided:

"SLDCs and Intra-state generating stations shall be pursued to maintain adequate reserves and implement Automatic Generation Control for balancing and improving the grid frequency profile."

AA.2.3 MS, NRPC asked all the SLDCs to update the status of AGC implementation in Intra State generating station.

AA.2.4 UP SLDC representative informed that currently, Bara TPS and Khurja TPS have implemented AGC by configuring at NLDC level. He mentioned that for the implementation of AGC at SLDC level there is a requirement of software at the Generating station end, at SLDC level and a proper communication channel and relevant regulations at SLDC Level. Presently, AGC software at SLDC and relevant regulations in the state are not there. Therefore, these generating stations are participating in AGC at the NLDC level.

AA.2.5 MS, NRPC stated that performance-related incentives are also there for generating stations participating in AGC. Therefore, all intrastate generating stations should participate in AGC.

AA.2.6 UP SLDC representative further added that, as per updates received from Bara and Khurja plants, the incentive received from AGC performance will help in recovering capital cost faster.

AA.2.7 ED, NRLDC informed the forum that under the ongoing ULDC Phase-III implementation, there is a provision for AGC at the state level as well. He further stated that the IEGC Regulations also provide for coordination between intra-state generators and NLDC for AGC implementation. He added that the payback period for generators is only a few months.

AA.2.8 ED, NRLDC informed that NRLDC is planning to host a workshop on AGC implementation in the first week of December. He requested all SLDCs and intra-state generating stations, particularly IPPs, to participate in the workshop. He further requested representatives from Bara TPS and Khurja TPS to share their experiences during the workshop.

AA.2.9 MS, NRPC requested all SLDCs and intra-state generating stations to participate in the workshop to be organised by NRLDC.

Decision of OCC Forum:

OCC forum requested all SLDCs and Intra-state generating stations to maintain adequate reserves and implement Automatic Generation Control for balancing and improving the grid frequency profile. Further, the OCC forum requested all SLDCs and intra-state generating stations, particularly IPPs, to participate in the workshop to be organised by NRLDC.

AA.3 Table Agenda - Details of allocation of Power to States and UTs of NR and tie-ups from Long Term arrangement for FY 2026-27 (Agenda by NRPC Secretariat)

AA.3.1 EE(O), NRPC informed the forum that the energy requirement and peak demand for FY 2026–27, along with the planned maintenance schedule of generating stations in the Northern Region, were discussed in the 31st LGBR Sub-Committee meeting and subsequently communicated to the GM Division, CEA.

AA.3.2 The generation targets for FY 2026-27 for the generating stations are also under finalization by the OPM Division, CEA, which will be available shortly.

AA.3.3 Therefore, details of power allocations tied up with the States/UTs of the Northern Region are required for the preparation of the LGBR 2026–27.

AA.3.4 EE(O), NRPC requested that all SLDCs of NR are requested to submit the details of allocation of Power to their control area and tie-ups from Long-Term and Medium-Term arrangements for FY 2026-27.

AA.3.5 SE(O), NRPC suggested that banking and bilateral arrangements may also be submitted along with Long-Term and Medium-Term arrangements.

AA.3.6 MS, NRPC asked all SLDCs to submit the requisite information within a week.

Direction of the forum:

OCC forum asked all SLDCs of NR to submit the details of allocation of Power to their control area and tie-ups from Long Term and Medium-Term arrangements along with banking and bilateral arrangements for FY 2026-27 within a week.

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

B.1 NR Grid Highlights for October 2025 and demand forecasting related

NRLDC representative presented grid highlights for the month of October 2025:

Demand met details of NR

S.No.	Constituents	Max Demand met (in MW)	Date & Time of Max Demand met	All time Max. Demand	Date & Time of All time Max Demand met
1	Chandigarh	323	01-10-2025 15:00	482.0	18.06.24 at 15:28
2	Delhi	5956	01-10-2025 15:12	8656.0	19.06.24 at 15:06
4	Haryana	11372	01-10-2025 15:00	14662.0	31.07.24 at 14:30
3	H.P.	2003	29-10-2025 07:00	2273.0	17.01.25 at 09:00
5	J&K	2759	30-10-2025 19:00	3200.0	07.01.25 at 10:00
6	Punjab	12989	01-10-2025 12:00	16754.0	28.06.25 at 15:00
7	Rajasthan	14165	26-10-2025 10:00	19165.0	12.02.25 at 11:00
9	U.P.	26269	01-10-2025 19:17	31486.0	11.06.25 at 00:45
8	Uttarakhand	2466	03-10-2025 19:00	2910.0	11.06.25 at 22:00
10	**Northern Region**	74215	01-10-2025 19:00	91234.0	19.06.24 at 14:37

S.No.	Constituents	Max Consumption (in MUs)	Date of Max Consumption	Average Demand met (in MUs)	All time Max consumption	Date of All time Max Consumption
1	Chandigarh	6.5	01-10-2025	4.2	9.3	12.06.2025
2	Delhi	123.4	01-10-2025	91.9	177.7	18.06.2024
4	Haryana	240.2	01-10-2025	176.1	293.4	30.07.2024
3	H.P.	35.9	01-10-2025	31.6	42.6	11.06.2025
5	J&K	54.9	29-10-2025	51.1	70.3	04.02.2025
6	Punjab	282.3	03-10-2025	175.5	366.8	21.07.2024
7	Rajasthan	302.4	01-10-2025	258.8	388.0	11.06.2025

9	U.P.	507.7	01-10-2025	404.7	658.7	17.06.2024
8	Uttarakhand	47.3	04-10-2025	40.0	62.1	14.06.2024
10	**Northern Region**	**1590.8**	01-10-2025	**1234.1**	2022.9	12.06.2025

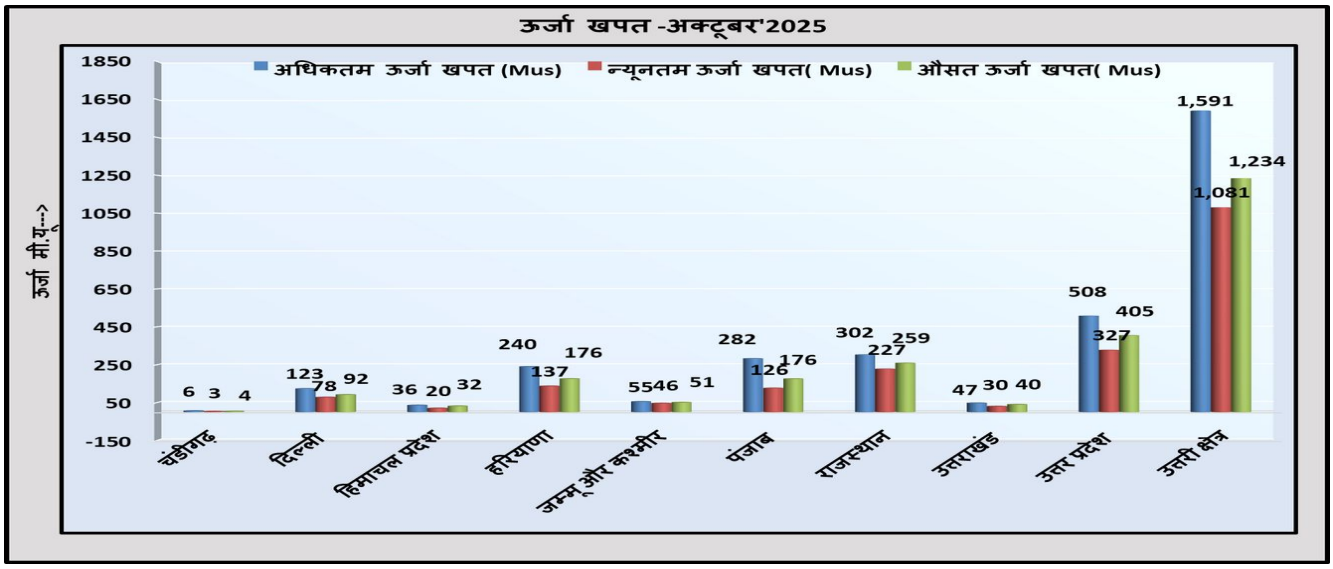
In October'25,

- Maximum energy consumption of Northern Region was 1590.8 MUs on 01st October'25 and it was 4.49% lower than October'24 (1665.67 MU 04th October'24)
- Average energy consumption per day of the Northern Region was 1234.1 MUs and it was 12.96% lower than October'24 (1417.79 MUs/day)
- Maximum Demand met of Northern Region was 74215 MW on 01st October'25 @19:00 Hrs as compared to 73686 MW on 04th October'24 @20:00 Hrs.

Comparison of Average Energy Consumption (MUs/Day) – Oct '24 vs Oct'25

क्षेत्र/राज्य	अक्टूबर- 2024	अक्टूबर - 2025	% अंतर
चंडीगढ़	4.7	4.2	-0.4
दिल्ली	104.8	91.9	-12.9
हरियाणा	34.4	31.6	-2.8
हिमाचल प्रदेश	198.8	176.1	-22.7
जम्मू और कश्मीर	49.9	51.1	1.3
पंजाब	204.4	175.5	-28.9
राजस्थान	317.6	258.8	-58.7
उत्तराखंड	44.2	40.0	-4.2
उत्तर प्रदेश	459.0	404.7	-54.3
उत्तरी क्षेत्र	1417.8	1234.1	**-183.7**

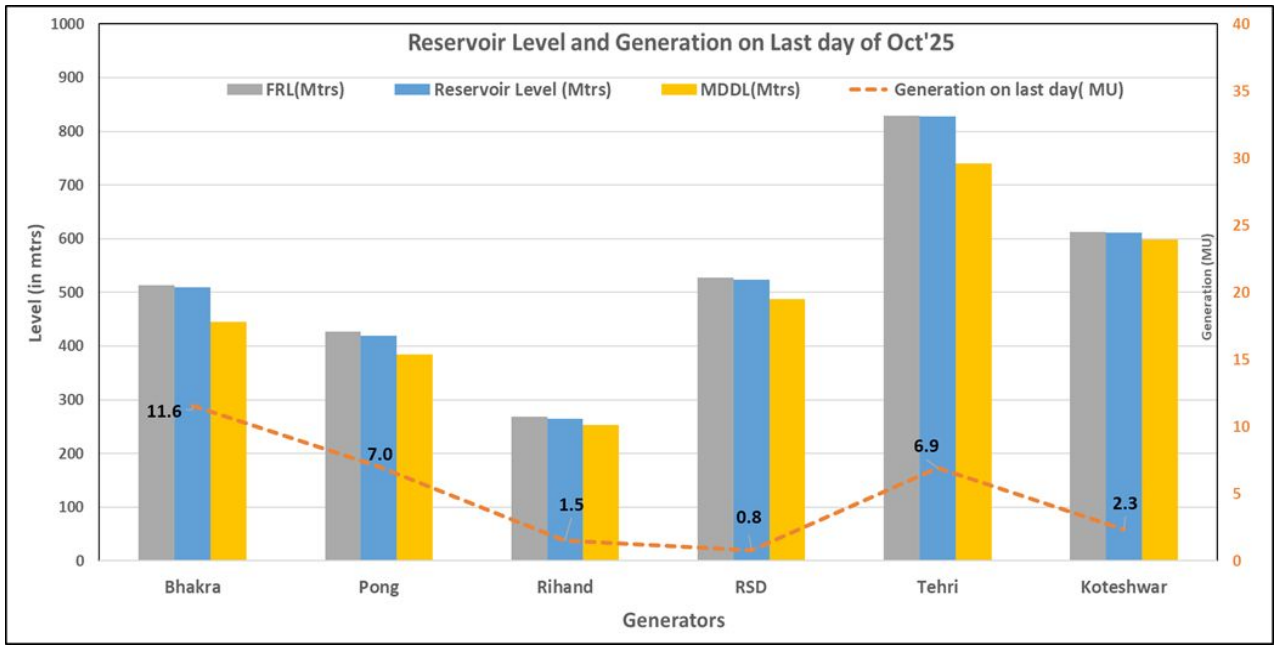
Energy Consumption



Frequency profile

Month	Avg. Freq. (Hz)	Max. Freq. (Hz)	Min. Freq. (Hz)	<49.90 (% time)	49.90 – 50.05 (% time)	>50.05 (% time)
Oct'25	49.999	50.305 (06.10.25 at 11:13:10 hrs)	49.419 (31.10.25 at 17:51:20 hrs)	6.60	78.59	14.81
Oct'24	50.00	50.388 (25.10.24 at 13:03:30 hrs)	49.585 (16.10.24 at 17:58:20 hrs)	4.9	80.3	14.8

Reservoir Level and Generation on Last Day of Month



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

Year	Bhakra	Pong	Rihand HPS	RSD	Tehri	Koteshwar
2025	510	420	265	524	827	612
2024	501	415	264.24	497	835	606
Diff (in m)	8.7	5.1	0.3	27.5	-7.6	6.0

Detailed presentation on grid highlights of Oct'2025 as shared by NRLDC in OCC meeting is attached as Annexure-B.I.

B.2 Demand forecasting and resource adequacy related: CERC order dated 05.10.2025

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.

Subsequently, a meeting was taken by Hon'ble CERC on 14.02.2025 with all NR SLDCs, NRLDC and NRPC to review the actions being taken at SLDC end on measures related to resource adequacy.

It is to be noted that CERC has also released "Report on 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 Order dated 07.10.2024 in Suo-Moto Petition No. 9/SM/2024" on 29.04.2025.

With reference to Clause 31(2) of the 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 Oct-2025 as per Clause 31(4) (a) & (b) of IEGC-2023 as presented in OCC meeting is shown below:

State/Entity	Day Ahead (As on Sep-25)	Week Ahead	Month Ahead	Year-Ahead(2026-27)
Punjab	As per Format	As per Format	As per Format	Only Demand
Haryana	As per Format but irregular	As per Format but irregular	Not received	Not received
Delhi	As per Format	As per Format	As per Format	As per Format
Rajasthan	As per Format	As per Format	As per Format but irregular	As per Format
Uttar Pradesh	As per Format	As per Format	As per Format	As per Format
Uttarakhand	As per Format	As per Format	As per Format	Only Demand
Himachal Pradesh	As per Format	As per Format	As per Format	Not received
J&K and Ladakh (UT)	As per Format	Not received	Not received	Only Demand
Chandigarh (UT)	As per Format	Not received	Not received	Not received

During 237 OCC meeting, NRLDC representative stated that as per CERC RNOD issued on 23.10.2025, demand forecasting and resource adequacy aspect was one of the crucial area and there needs to be major improvement starting from the data submission part. Haryana SLDC was especially asked to regularly share the data as per the approved CERC timelines.

Haryana SLDC representative stated that they have taken up the matter with concerned wing of Power purchase deptt. at senior level. Power purchase deptt. has agreed to share the data as per approved formats.

In accordance with above, all SLDCs were 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 the above timeline.

All SLDCs need to take actions at their end for timely submission of demand forecasting and resource adequacy data on a day-ahead, week-ahead, month-ahead ahead and year-ahead basis.

The portal has been prepared for the submission of data by states. The user credentials have been provided to all states of the Northern region.

NRLDC representative stated that NRLDC has also carried out month month-ahead resource adequacy analysis on a regional basis for Nov 2025 as per data available at NRLDC through PRAS software. The results are attached as Annexure-B.I of the agenda.

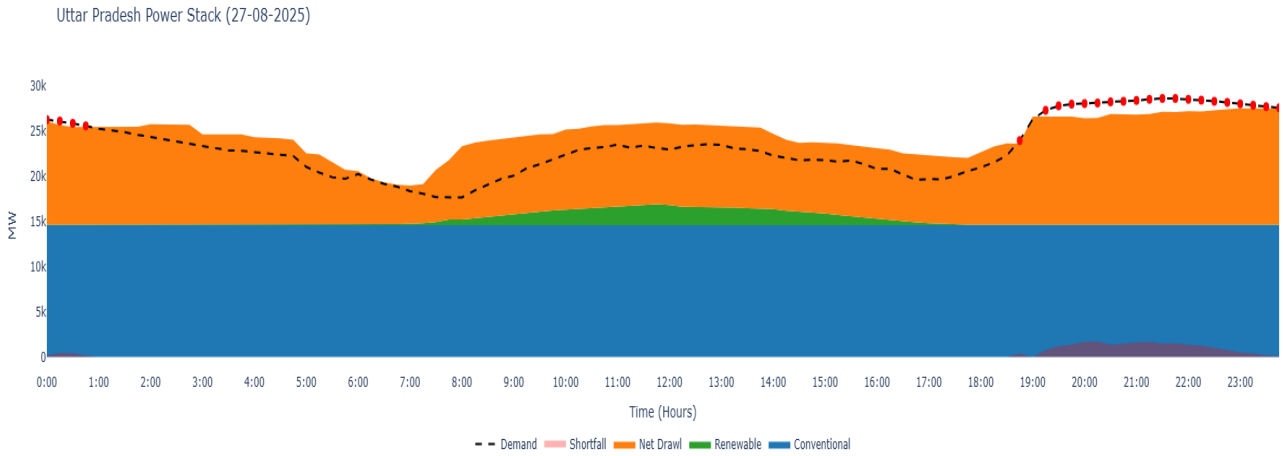
As per IEGC clause 31

Quote

(4) Adequacy of Resources (a) SLDCs shall 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.

Unquote

Accordingly, NRLDC is also regularly sending emails based on day day-ahead resource adequacy exercise being carried out at NRLDC end. In case of a major shortfall seen for a state based on demand forecast and generation adequacy data submitted by the state, NRLDC communicates the actions required from the state side in real-time also. Some sample snapshots emailed to respective states are shown below for reference:



NRLDC representative stated that it is being observed that states are only submitting the generation availability and not the actual internal generation schedule. This leads to a situation wherein only surplus/shortage values are checked. This does not take into account the schedule changes in internal thermal generation, which may be happening based on merit order to accommodate high solar generation during daytime.

NRLDC representative further stated that the Probabilistic Resource Adequacy Study (PRAS) for the month of November 2025 has been carried out for the Northern Region to assess the sufficiency of available generation resources to meet the projected

demand under varying scenarios. The study was conducted using 1000 probabilistic scenarios, with median results presented to reflect expected system behaviour under typical conditions.

To evaluate the net load that must be met by dispatchable thermal generation, the projected regional demand for November 2025 was first estimated. From this demand, the expected contribution from non-thermal resources solar, wind, hydro, and nuclear, was subtracted, based on historical generation profiles observed for these sources during the same period in past years. This approach ensures that the inherent variability and diurnal patterns of renewable generation are accurately captured in the analysis.

For thermal generation, a detailed availability assessment was carried out using the following assumptions:

Planned Outages:

- Unit-wise planned outages for the month of November 2025 were incorporated as per the data available in the latest LGBR. This reflects scheduled maintenance and other operational constraints known in advance.

Forced Outages:

- A Monte Carlo simulation approach was adopted to model forced outages of thermal generating units. This stochastic simulation utilized historical outage and revival rates specific to each unit and capacity. The probabilistic nature of this method allows for the modelling of unplanned events, enhancing the robustness of the adequacy assessment.

Scenario with Past-Year IR Flow Profile

- In the second scenario, the actual inter-regional power flow patterns from Nov 2024 were incorporated as a proxy for expected support in Nov 2025. This approach reflects realistic inter-regional exchange behaviour under comparable seasonal conditions and operating constraints.
- This demonstrated a notable reduction in LOLP and EUE values, indicating enhanced adequacy due to the implicit support from neighbouring regions.

During 237 OCC meeting, the OCC forum discussed that:

- Data on day ahead basis received from some of the states (as shown in table) is not as per NRLDC format. It was further mentioned that NRLDC has developed a code/program for the automation of day-ahead resource adequacy. In case data is not received in formats circulated by NRLDC, it would not be possible to map/utilize the data submitted by states in the internal program being developed at NRLDC end.
- States should submit an actual generation schedule and not generation availability as flat/constant value throughout the day.

- ***It was discussed that PRAS is open source tool and can be utilised at SLDC level also similar to being used at NRLDC end. It was discussed that already one training program on resource adequacy and PRAS was done by NRLDC and another training program would be planned before the next OCC meeting.***
- ***Further, it was discussed that one representative from SLDC may visit NRLDC and develop code for each SLDC during one/two day interaction with the concerned SLDC.***

Further, CERC vide has issued a final order dated 05.10.2025 regarding 9/SM/2024. CERC has also issued Consolidated Record Notes of discussions held during the Workshop on addressing various challenges faced by the states in Operational Planning for safe, secure, and reliable integrated operation of the power system, dated 23.10.2025. The meeting for the Northern region was held on 11.08.2025. The RNOD mentions the discussions held in the meeting on various points, such as:

(i) Adequacy of workforce: The issue of the shortage of manpower across all the SLDCs in the northern region was discussed. SLDCs have submitted that they are taking up the issue of additional manpower as per the MoP Guidelines. HPSLDC mentioned that their manpower position has been restricted to 42 by the HPERC. Rajasthan SLDC mentioned that with the higher renewable penetration in Rajasthan, they are facing issues specifically in the field of cybersecurity, market operation and IT Logistics.

Representative of UPSLDC submitted that UPSLDC has framed an HR Management and Development Policy, which aimed to structure the movement of officers in specialised functions without disrupting operations.

Punjab SLDC suggested that the minimum tenure of staff in SLDCs should be at least 5 years. It was discussed that all the SLDCs may develop a separate HR policy and a transfer policy for the SLDC staff.

(ii) Training and Certification of the SLDC staff: It was discussed that all the executives of SLDCs are required be adequately trained and certified. Representative of UPSLDC pointed out that basic-level training is good, but there are some gaps in advanced-level training due to the unavailability of slots. UPSLDC has around 20 staff who are to be trained. Punjab SLDC also added that they have the same number of staff who are to be trained. Grid-India was asked to take up the issue with the NPTI.

It was also suggested during the discussion that ideally, the trained staff should not be shifted from the SLDCs, and to attract the staff for working in SLDCs, incentive provisions can be incorporated under the Fee and Charges of the SLDCs.

In addition to the above, it was also suggested that cybersecurity is a critical area and with the growing concerns of cybersecurity threats, adequate staff are required to be trained in this area.

(iii) Backing down of intra-state thermal generating units: Haryana SLDC submitted that the Panipat old units are not able to operate at MTL of 55%. Rajasthan SLDC mentioned that they have started giving the schedule of 55% in some thermal generating stations. In this regard, it was suggested that representatives of intra-state thermal generating stations may visit NTPC plants, as even the older units of NTPC are able to operate at a MTL of 55%.

It was also suggested that the states should come up with a part-load compensation mechanism for thermal power plants and also explore the possibilities for the two-shift operation of the thermal generating stations, keeping in view the large RE integration.

(iv) Demand estimation and Resource Adequacy data submission: State SLDCs have submitted that there was some lag in data submission, and they are trying to improve.

(v) Alignment of the State Grid Code with IEGC 2023: It was discussed that CERC has notified the new Grid Code, which contains the various provisions with respect to AGC, Reserve requirement and part load compensation for the thermal generating stations. The state SERCs may align their respective Grid Code with the 2023 Grid Code of CERC.

(vi) Implementation of SAMAST: It was discussed that wherever the SAMAST has not been implemented yet, there is a need to speed up its implementation.

(vii) Fee and Charges Regulations for SLDCs: It was discussed that SERCs may formulate separate Fee and Charges Regulations for State Load Despatch Centers wherein the provision regarding training of the SLDC staff, as well as incentive provisions, can be incorporated.

MS NRPC stated that all concerned SLDCs may take necessary actions as discussed in previous OCC meetings. It was mentioned that special attention may be given by SLDCs on demand estimation and Resource Adequacy data submission and ensuring adequate manpower in SLDCs.

It was suggested that, as per IEGC clauses, SLDCs also carry out day-ahead, week-ahead and month-ahead resource adequacy exercises and share their results with NRLDC. Further, all may take note of the recent CERC order dated 05.10.2025. All concerned SLDCs were asked to submit the actions taken at their end after the workshop organized by CERC.

OCC forum asked all concerned SLDCs to take necessary actions at their level.

B.3 Procedure for Scheduling Metering Accounting Deviation Settlement Transmission Charges Waiver and REC mechanism related to REGS and ESS

NLDC vide IOM dated 06.10.2025 has communicated that representations were received from stakeholders seeking clarity on the aspects of Scheduling, Metering, Accounting, Deviation Settlement, Transmission Charge Waiver, and the REC mechanism related to Renewable Energy Plants and Energy Storage Systems.

Accordingly, a detailed procedure was prepared in consultation with RLDCs and NLDC to address the issues raised by the stakeholders. The procedure was presented before the Hon'ble Central Commission on 30th July 2025. Based on the inputs received during the Commission's meeting, the revised procedure was circulated for stakeholder consultation on 6th August 2025. A workshop on the procedure was conducted for stakeholders on 11th August 2025.

Comments on the procedure were received from several stakeholders, including Renewable Energy developers and Regional Power Committee. The comments received have been suitably incorporated, and the finalised procedure is prepared.

Accordingly, the Procedure for Scheduling, Metering, Accounting and Deviation Settlement, Transmission Charge Waiver and REC mechanism related to ESS is attached as Annexure-B.II of agenda for reference of all members.

OCC forum noted the same.

B.4 Database of transmission lines having terminal equipments rating lower than the transmission line conductor capacity

NRLDC representative stated that for conducting studies for assessment of inter-control-area transfer capability or any other related simulation studies, thermal ratings of lines as specified in CEA's Manual on Transmission Planning Criteria 2023 are being considered as the safe capacity limit of lines based on anticipated ambient temperature.

However, it is being observed in number of cases, such as in RVPN control area, that the rating of terminal equipment is lower than the thermal capacity of the transmission line. This is leading to under-utilisation of line capacity due to limited switchgear rating and even leading to constraints in RE evacuation from the Western Rajasthan RE complex.

Some of the lines in RVPN control area wherein this issue was observed are listed below:

- 400kV Bhadla-Bikaner D/C
- 400kV Jaisalmer-Kankani S/C
- 400kV Akal-Kankani S/C
- 400kV Akal-Jaisalmer S/C
- 400kV Suratgarh SCTPS-Babai D/C.

For these lines, thermal capacity is 1700MVA for design @ 75deg & 2180MVA for design @85deg. However, equipment rating is only 2kA which translates to 1.732*400*2= 1385MVA only, thus limiting line power transfer capacity to 1385MVA only.

Similar issues were earlier observed at 400kV Mahendragarh, Dhanonda and Nawada substation in HVPN control area.

Further as per information available with NRLDC in case of Vishnuprayag, terminal equipment of only 1kA has been installed, whereas the line is having twin moose conductor. Therefore, the conductor can safely carry around 890MW of power, but due to a terminal equipment rating issue, the line can only be loaded upto 400*1.732*1 = 693MVA only thereby reducing line capacity in difficult hilly terrain.

Similar terminal equipment rating issues were also observed in 400kV lines from NJPC and Rampur wherein the lines, such as 400kV NJPC-Panchkula D/C (further LILOed) and 400kV Rampura-Nallagarh sections of lines, have equipment rating is only 2kA, which translates to 1.732*400*2= 1385MVA only, whereas transmission line has triple snowbird conductor.

The issue of lower line equipment rating has also been discussed in the past in 2018 in NRPC-OCC level wherein NPC had asked RPCs to furnish such details. It was requested that the terminal equipment ratings of STUs and other transmission licensees' transmission lines in region may be compiled and furnished to Grid-India with a copy to NPC Division, CEA on a priority basis. Communication is attached as Annexure-B.III of the agenda.

Subsequently, the agenda was discussed in number of OCC meetings and transmission utilities were asked to submit the data.

As per the data available at NRLDC, the following are a few transmission lines in Northern region having terminal equipments of lower capacity than conductor capacity:

Name of Transmission line	Line length (km)	Owner	Conductor Type	Conductor Rating @45deg for 75deg design	Switch gear rating End-1 (MVA)	Switch gear rating End-2 (MVA)
400kV Bhadla-Bikaner D/C	189	RRVPNL	Quad Moose	1701	1386	1386
400kV Jaisalmer-Kankani S/C	177	RRVPNL	Quad Moose	1701	1386	1386
400kV Akal-Kankani S/C	223	RRVPNL	Quad Moose	1701	1386	1386
400kV Akal-Jaisalmer S/C	61	RRVPNL	Quad Moose	1701	1386	1386

400kV Suratgarh SCTPS-Babai D/C	245	RRVPNL	Quad Moose	1701	1386	1386
400kV Manhendragarh-Dhanonda D/C	5	ATIL	Quad Moose	1701	1386	1386
400kV Gr. Noida-Nawada D/C	30	POWER GRID	Quad Bersimis	1978	1386	1386
400kV Vishnuprayag-Muzaffarnagar S/C	280	UPPTCL	Twin Moose	850	693	NA
400kV Vishnuprayag-Alakhnanda D/C	109	UPPTCL	Twin Moose	850	693	NA
400kV Rampur-Nallagarh D/C	128	POWER GRID	Triple Snowbird	1275/ 1625*	1386	1386
400kV Jhakri-Gumma D/C	55	POWER GRID	Triple Snowbird	1275/ 1625*	1386	NA
400kV Gumma-Panchkula D/C	112	POWER GRID	Triple Snowbird	1275/ 1625*	NA	1386
400kV Jhakri-Rampur D/C	21	POWER GRID	Triple Snowbird	1275/ 1625*	1386	1386

*Considering ambient temp of 40deg (lower in Hilly areas)

During 237 OCC meeting, MS NRPC stated that the lines listed above from NRLDC side are based on operational experience and accordingly concerned transmission licensees may strongly take up for upgradation of terminal equipments. It was also mentioned that line for which loading restriction has not been observed till date, their terminal equipment upgradation may be taken up subsequently.

POWERGRID NR-2 representative stated that they are ready for switchgear upgradation but SJVNL has expressed inability to upgrade switchgear at their end due to GIS substation.

HVPNL representative stated that terminal equipment at their substations, such as Nawada, Dhanonda is being planned and likely to be completed before summer 2026.

Given the issues arising due to limited switchgear rating in lines that have higher thermal capacity, OCC forum:

- ***Advised all utilities to furnish the details of lines having terminal equipments of lower capacity to Grid-India /CTUIL/NRPC for consideration in future studies and planning of actions well in advance.***

- ***Plan for uprating switchgear ratings in existing lines to avoid issues in RE evacuation/ facilitating shutdowns may be studied by concerned transmission line and bay equipment owners.***
- ***Asked for written reply through email/letter may be submitted by the concerned transmission licensees to NRPC/NRLDC.***
- ***Advised for special attention by transmission utilities & CTUIL in this regard so as to avoid such issues in future, including for the cases of conductor upgradation.***

OCC forum asked all concerned to take necessary actions as discussed above.

B.5 Shifting of Rihand-3 generation to WR

NRLDC representative stated that the agenda for the opening of 400kV Singrauli-Anpara line and shifting of Rihand Stage-III generating units to Northern region was discussed in 50th TCC & 74th NRPC meetings held in Raipur on 28.06.2024 & 29.06.2024, respectively. In the meeting, UP SLDC and UPRVUN expressed concern regarding the possibility of major grid event in case of multiple element outage (N-2/N-3) in UP Control area. Further, NTPC expressed concern on the healthiness of the bus coupler at Rihand and also stated it would increase stress on Stage-1 & 2 switchyard equipment. Accordingly, the forum decided that joint meeting would be convened with participants from NRPC, WRPC, CEA-PSPA I, CTUIL, NRLDC, WRLDC, NLDC, NTPC, POWERGRID, UP SLDC, UPPTCL, UPRVUN and Lanco Anpara.

After detailed deliberations in meeting on 09.07.2024, all members agreed for shifting of Rihand-3 to NR temporarily and discussed that as similar demand and line loading pattern is expected when NR imports high power from WR during summer 2025 & summer 2026 months, that there may be requirement of such changeovers for next 2-3 high demand seasons till approved transmission system of establishment of 765/400kV Prayagraj and 765/400kV Robertsganj is implemented. (approved by 52nd TCC & 77th NRPC Meeting held on 27-28 December 2024)

Shifting of Rihand-III generation to Northern region reduced loading of 765kV Vindhaychal-Varanasi D/C, due to which NR was able to import higher power from WR without major constraint. ATC/TTC limits on WR-NR corridor and NR import were increased after shifting exercise which facilitated NR states to import higher power during summer months.

Sl No	Corridor	Time Period	TTC with Rihand-III in NR (MW)	TTC with Rihand-III in WR (MW)	Increase in TTC due to shifting of Rihand from WR to NR (MW)

1	NR Import	00-09	28400	25700	2700
		09-15	20650	20250	400
		15-16	21750	21750	0
		16-24	28400	25700	2700
2	WR->NR	00-09	24800	22350	2450
		09-15	19450	19050	400
		15-16	20550	20550	0
		16-24	24800	22350	2450

In 53rd TCC 78th NRPC meetings held in Mar 2025, the forum granted approval for the shifting of Rihand-III to NR during the summer/monsoon 2025 & 2026 based on the requirement in Northern region upon discussion in OCC forum/separate meeting by NRPC so that in case of requirement, the exercise is carried out swiftly for the benefit of NR states.

Accordingly, a separate meeting was convened on 22.05.2025 by NRPC to discuss the shifting of Rihand-3 to NR for the summer/monsoon season. Rihand-3 was successfully shifted from WR to NR on 27.05.2025 w.e.f. 09:25 hrs. with support from all stakeholders and evacuated its power in NR for 5 months.

Since major shutdowns are also planned in the upcoming weeks for generating units as well as transmission lines in Rihand-Singrauli area, it was proposed that shifting of Rihand-3 to NR may be carried out after discussion in this OCC meeting.

During 237 OCC meeting, the WRLDC representative stated that the agenda has already been discussed in the WR-OCC meeting held on 14.11.2025 wherein all WR stakeholders have agreed for the same. Protection setting coordination would be required and accordingly, intimation for shifting of Rihand-III may be given at least 2 days in advance.

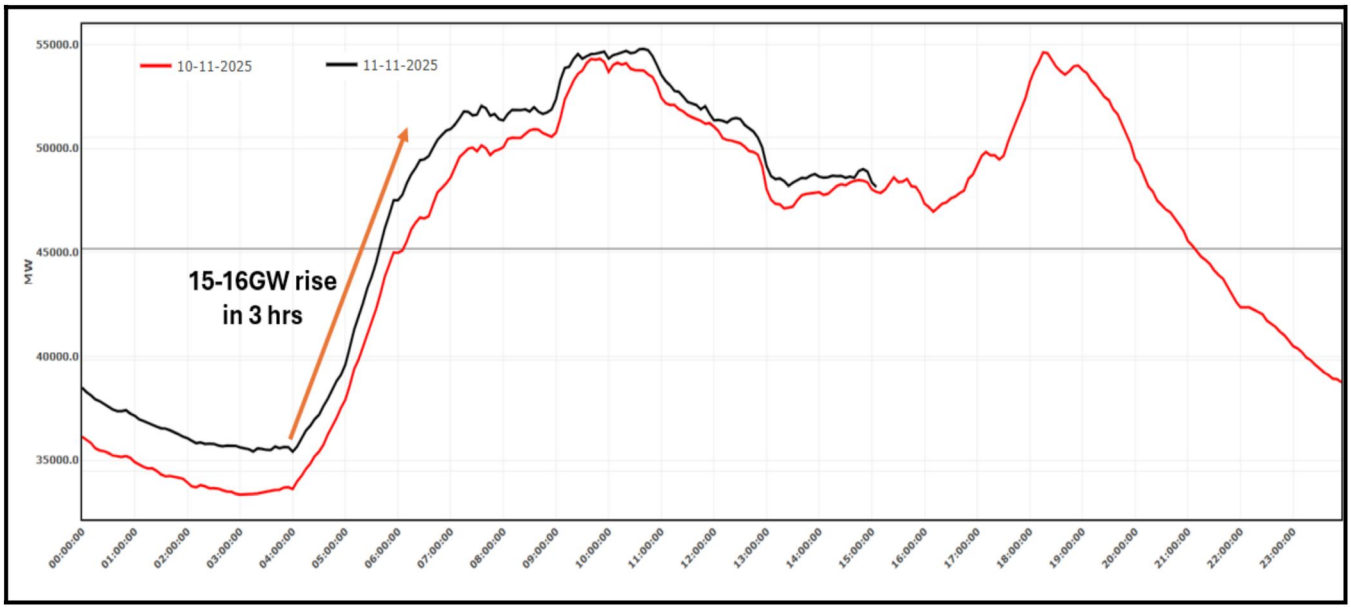
All NR members agreed that shifting of Rihand-III to WR as agreed earlier can be approved. It was agreed that shifting exercise may be carried out within next one week.

OCC forum approved the shifting exercise of Rihand-III to WR to be carried out at the earliest.

B.6 Winter preparedness measures 2025-26

Winter in the Northern region is likely to start from mid of October till February end, and the challenges faced during these months are well known to all the utilities. During winter, the demand of NR states except Rajasthan and hilly states is on the lower side.

With decreasing temperatures and festivals, the onset of winter also brings some severe challenges to NR grid operators. High ramp rate in demand during morning peak and evening peak is being observed which is likely to get further steeper.



Based on the detailed discussion held in 237 OCC meeting, following actions were suggested:

- To carry out tap change exercise at 220kV and below voltage level. NRLDC has also reviewed tap position of 400/220kV Abdullapur, 765/400kV Mainpuri and 220/132kV Chandigarh (PG) substation. Further, study based on voltage profile of 400/220kV substations in NR for the month of Oct 2025 are in progress and would be carried out shortly.
- ***SLDC UP stated that they have shared all measures discussed in NR-OCC meetings with state transmission and generation utilities for taking necessary winter preparedness measures .***
- ***SLDC Delhi confirmed that they have carried out tap change exercise at intrastate substations as winter preparedness measure.***
- To ensure that all overflux settings of transformers and overvoltage settings of transmission lines are as per the approved protection philosophy of NRPC. ***HVPNL, PSTCL (partial implementation), NTPC, ADANI, Uttarakhand, J&K were asked to confirm the implementation of revised overvoltage settings (latest PSC deliberations)***
- It was requested that any planned commissioning of bus reactors may please be expedited before winter 2025.
- OCC expressed concern on the lack of progress of DTL reactors and asked them to expedite their work.
- Utilities to submit feedback on NRLDC reactive power document, including for line reactors, which can be used as bus reactors as per requirement.

- Utilities to ensure maximum availability of bus reactors and line reactors including provision of using line reactors as bus reactors incase of opening of lines on high voltage
- Regarding synchronous condenser mode of operation in 237 OCC meeting it was discussed that,
  - NRLDC representative requested THDC, BBMB and Punjab SLDC to confirm the availability of their machines for synchronous condenser support.
  - ***THDC representative confirmed the availability of both Tehri Hydro Power Plant and Tehri Pumped Storage Plant generating units for synchronous condenser mode of operation. It was also confirmed that machines from both can be operated in synchronous condenser mode of operation simultaneously.***
  - ***BBMB representative confirmed through email regarding the availability of Pong Hydro plant for synchronous condenser mode of operation.***
  - ***Punjab SLDC confirmed availability of RSD Unit-3 for synchronous condenser mode of operation, as per grid requirement. It was mentioned that RSD is taking measures for including other units also under synchronous condenser mode of operation and one more unit is likely to be available starting from next winter season.***
  - ***NHPC representative stated that Chamera-II HEP is having ability to run as synchronous condenser mode of operation. Mock testing would be planned shortly in coordination with concerned HEP.***
  - ***MS NRPC and CGM NRLDC stated that as now incentive is also being provided for reactive power support as per IEGC 2023, more hydro generators should come up for synchronous condenser mode of operation which would also help to control grid voltages.***
  - ***OCC forum asked NRLDC and all concerned hydro stations to carry out mock testing in synchronous condenser mode of operation at the earliest.***

OCC forum asked all concerned utilities to take necessary actions as discussed above.

B.7 Insulator cleaning and replacement of damaged insulators/ porcelain insulator with polymer insulators

The importance of carrying out insulator cleaning and replacement of damaged insulators was discussed in past OCC meetings and recently in 56 TCC and 81 NRPC meetings held on 30th and 31st Oct 2025. Northern Regional power transmission lines are exposed to the high pollution levels along their routes. Such pollution levels with the onset of the winter season, lead to the frequent tripping and finally to breakdown

and long outages of the transmission lines. These outages make the grid weak, thereby endangering the grid reliability and security.

Therefore, in order to avoid/mitigate tripping of lines during foggy (smog) weather in winter season, preventive actions like cleaning/washing of insulators, replacement of conventional insulators with polymer insulators have been recommended and are being taken every year.

This being a regular activity, all the transmission licensees in the Northern Region are being requested in monthly OCC and NRPC meetings to update line wise data for insulator replacement and cleaning in the format attached as Annexure-B.IV of agenda. NRLDC has already requested vide letter dated 22.09.2025 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..

These tripping were also discussed in past OCC and protection subcommittee meetings, wherein actions being taken at utility end were also discussed.

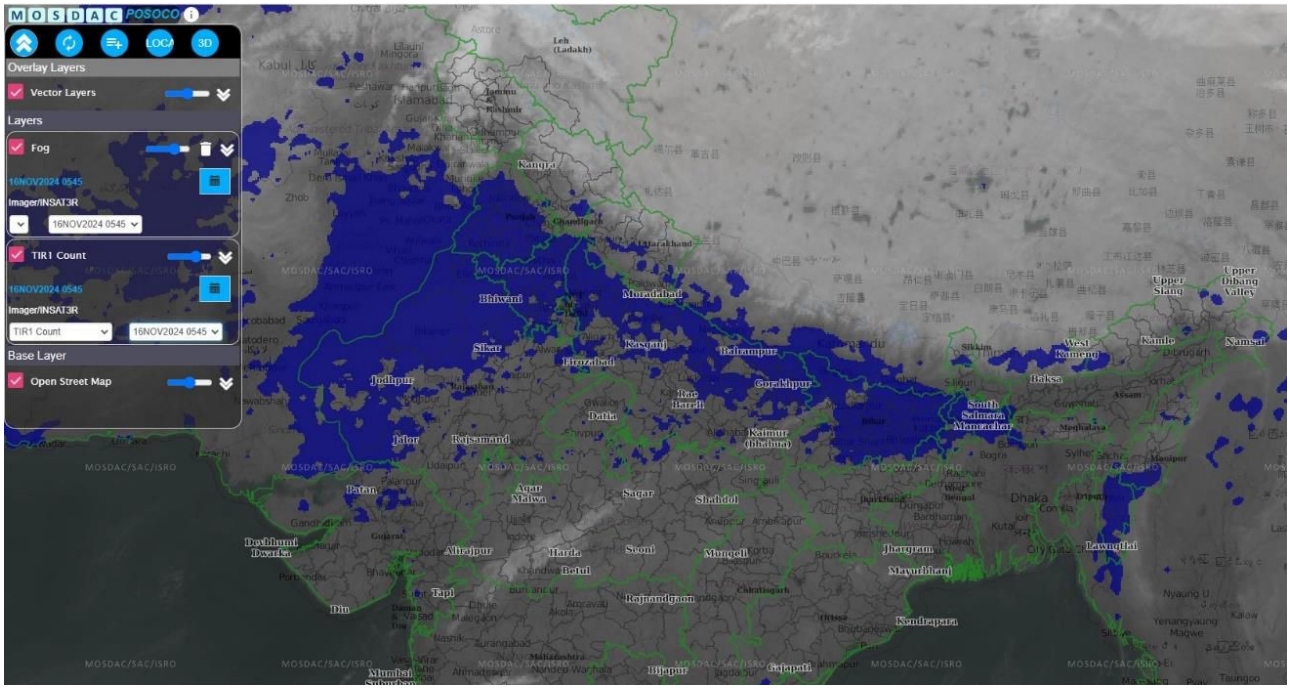
OCC forum asked all concerned transmission licensees to ensure:

- ***Priority wise cleaning & replacement is carried out. Priority to be given to the lines that have historical record of tripping during foggy weather.***
- ***Progress on cleaning & replacement of porcelain insulator with polymer insulator to be monitored and latest status may be furnished to NRPC/NRLDC. NRLDC will also try and prioritize shutdowns for crucial lines having past instances of tripping during foggy weather.***
- ***Examination of Disturbance record/Event log data including analysis of any issues related to auto-reclosure operation (details also to be shared with NRLDC)***
- ***Adequate manpower in control room during night shift of winter (vigilant and alert)***

Utilities were requested to prepare plan for measures to be taken by them for carrying out pre-winter maintenance activities. Same may be shared by utilities via mail with NRPC/NRLDC before OCC meeting.

B.8 Multiple tripping during fog timing in Punjab state control area: Nov 2024

Snapshot of fog observed on 15 Nov 2024 is shown below:

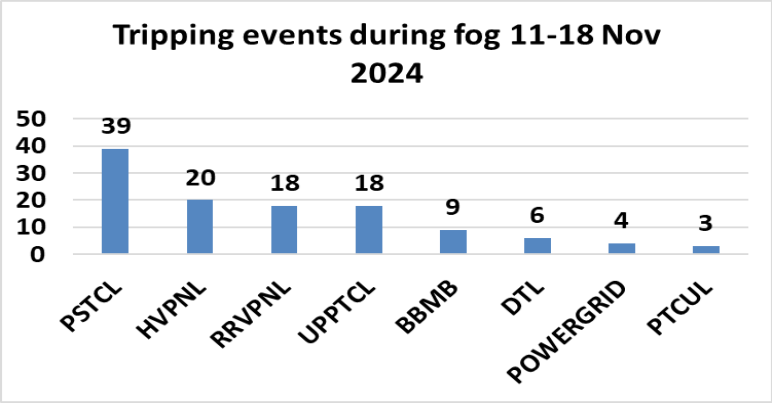


During 10-17 Nov 2024, fog was observed in November month itself, by which cleaning and washing of insulators was not done by several utilities. This resulted in numerous tripping during this week during 21:00-09:00hrs period of this week. List of lines which tripped on 3 or more occasions during this week are listed below:

(a) 400 KV Talwandi Saboo(PSG)-Nakodar(PSG) (PS) Ckt-1
(b) 220 KV RAPS_A(NP)-Sakatpura(RS) (RS) Ckt-1
(c) 400 KV Aligarh-Sikandrabad (UP) Ckt-1
(d) 220 KV Panipat(BB)-Chajpur(HV) (HVPNL) Ckt-2
(e) 400 KV Hindaun(RS)-Chhabra(RVUN) (RS) Ckt-1
(f) 400 KV Talwandi Saboo(PSG)-Dhuri(PS) (PS) Ckt-1

It is being seen that there is higher number of tripping in lines passing through UP, Rajasthan, Punjab and Haryana.

During this week, major tripping (220kV & above) were reported in Punjab, Haryana and Rajasthan control area as shown below:



Number of PSTCL lines (under NRLDC jurisdiction) tripped from 12.11.2024 to 16.11.2024 during 21:00hrs to 10:00hrs

Date	Number of lines tripped
12-11-2024	9
13-11-2024	11
14-11-2024	10
15-11-2024	4
16-11-2024	2

During 237 OCC meeting, PSTCL was asked to share their preparedness for this winter season to minimize tripping of lines during fog.

PSTCL representative stated that washing and cleaning of transmission lines is under progress and the updated status would be shared with NRLDC through email.

OCC forum asked PSTCL to take necessary actions as discussed above.

B.9 Reactive power performance of thermal generators in Northern region

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 10 days (01 Nov 2025 – 10 Nov 2025) is shown below:

S.No.	Station	Unit No.	Capacity	Geographical location	MVAR capacity	MVAR performanc	Voltage absorptio

					as per capability curve (on LV side)	e (-) Absorption (+) Generation (HV side data)	n above (in KV)
1	Dadri NTPC	1	490	Delhi-NCR	-147 to 294	Not on bar	Not on bar
		2	490		-147 to 294	-150 to 100	**411**
2	Singrauli NTPC	1	200	UP	-60 to 120	-20 to 5	404
		2	200		-60 to 120	-20 to 10	408
		3	200		-60 to 120	0 to 20	**411, 416**
		4	200		-60 to 120	-25 to 25	406, 412
		5	200		-60 to 120	Not on bar	Not on bar
		6	500		-150 to 300	-50 to 5	404
		7	500		-150 to 300	-60 to 0	402
3	Rihand NTPC	1	500	UP	-150 to 300	-65 to 15	402
		2	500		-150 to 300	-35 to 35	400
		3	500		-150 to 300	-130 to -40	396
		4	500		-150 to 300	Not on bar	Not on bar
4	Kalisindh RS	1	600	Rajasthan	-180 to 360	-80 to 80	402
		2	600		-180 to 360	-100 to 0	402
5	Anpara C UP	1	600	UP	-180 to 360	-90 to 50	775, 780
		2	600		-180 to 360	-90 to 40	775
6	Talwandi Saboo PB	1	660	Punjab	-198 to 396	-210 to -50	410
		2	660		-198 to 396	-210 to 0	410
		3	660		-198 to 396	-	-
7	Kawai RS	1	660	Rajasthan	-198 to 396	-70 to 30	404, 407
		2	660		-198 to 396	-80 to 10	402,406
8	IGSTPP Jhajjar	1	500	Haryana	-150 to 300	-125 to 75	**412**
		2	500		-150 to	Not on bar	Not on bar

					300		
		3	500		-150 to 300	-	-
9	Rajpura (NPL)	1	700	Punjab	-210 to 420	Not on bar	Not on bar
		2	700		-210 to 420	0 to 15	405
10	MGTPS	1	660	Haryana	-198 to 396	Not on bar	Not on bar
		2	660		-198 to 396	-130 to 70	**410**
11	Bawana	1	216	Delhi-NCR	-65 to 130	Not on bar	Not on bar
		2	216		-65 to 130	Not on bar	Not on bar
		3	216		-65 to 130	Not on bar	Not on bar
		4	216		-65 to 130	Not on bar	Not on bar
		5	253		-65 to 130	Not on bar	Not on bar
		6	253		-65 to 130	Not on bar	Not on bar
12	Bara PPGCL	1	660	UP	-198 to 396	-60 to 50	768, 775
		2	660		-198 to 396	0 to 80	775
		3	660		-198 to 396	-50 to 80	775
13	Lalitpur TPS	1	660	UP	-198 to 396	-70 to 20	755, 760
		2	660		-198 to 396	-40 to 60	762
		3	660		-198 to 396	-100 to 30	755, 760
14	Anpara D UP	1	500	UP	-150 to 300	-240 to 0	-
		2	500		-150 to 300	Not on bar	Not on bar
15	Chhabra TPS	1	250	Rajasthan	-75 to 150	5 to 60	416
		2	250		-75 to 150	-60 to 60	-
		3	250		-75 to 150	-80 to 40	-
		4	250		-75 to 150	-	-
		5	660		-198 to 396	-	-
		6	660		-198 to 396	-50 to 100	414

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

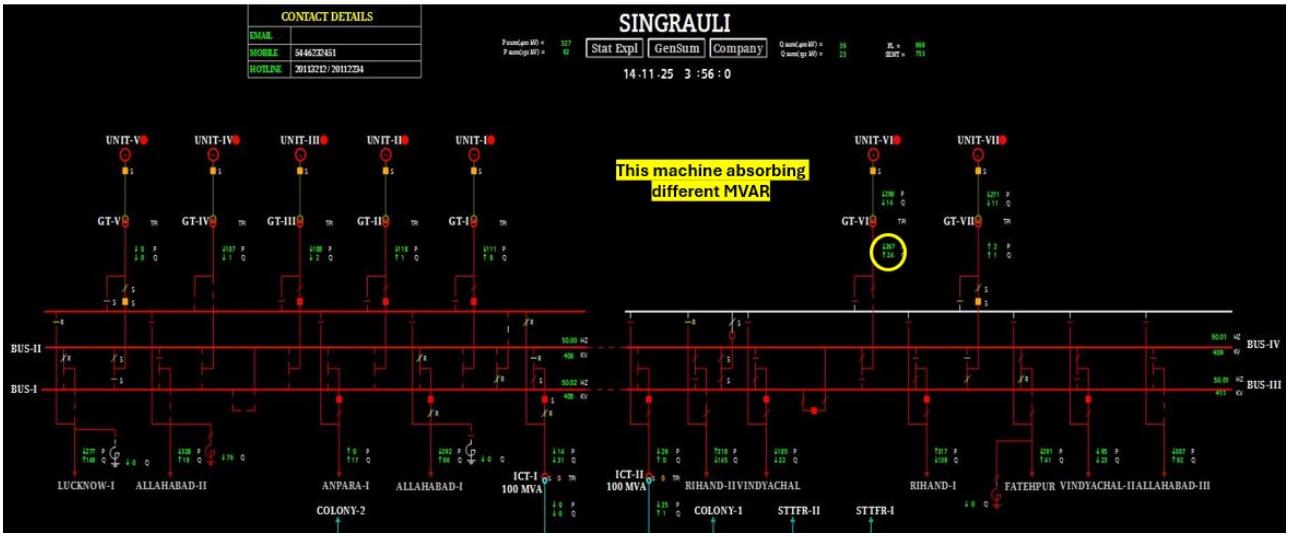
Since with IEGC 2023 implementation, reactive energy performance also has financial impact, it is desirable that all generating stations continue to support grid voltages by having reactive power performance as per their capability curve and grid requirement.

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.

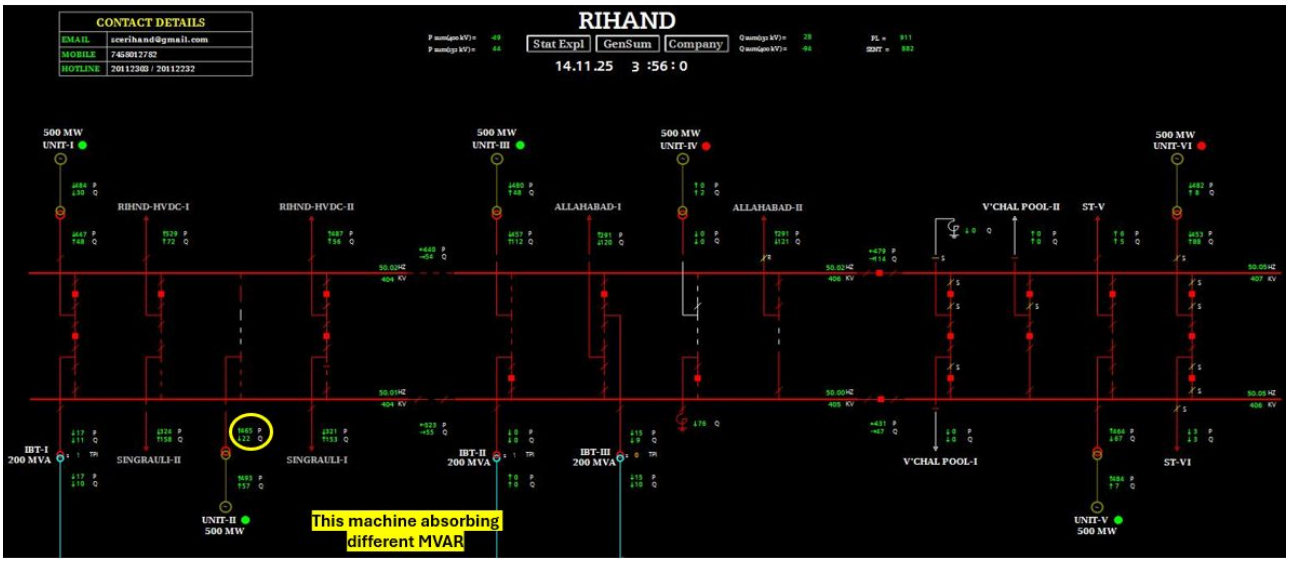
NRLDC representative stated that following are few observations based on data of 01Nov-10Nov 2025 analysed at NRLDC end:

- Machines at NTPC Singrauli & Rihand are generating different MVAr compared to other machines at same location.

Singrauli SLD 14.11.2025 @03:56hrs

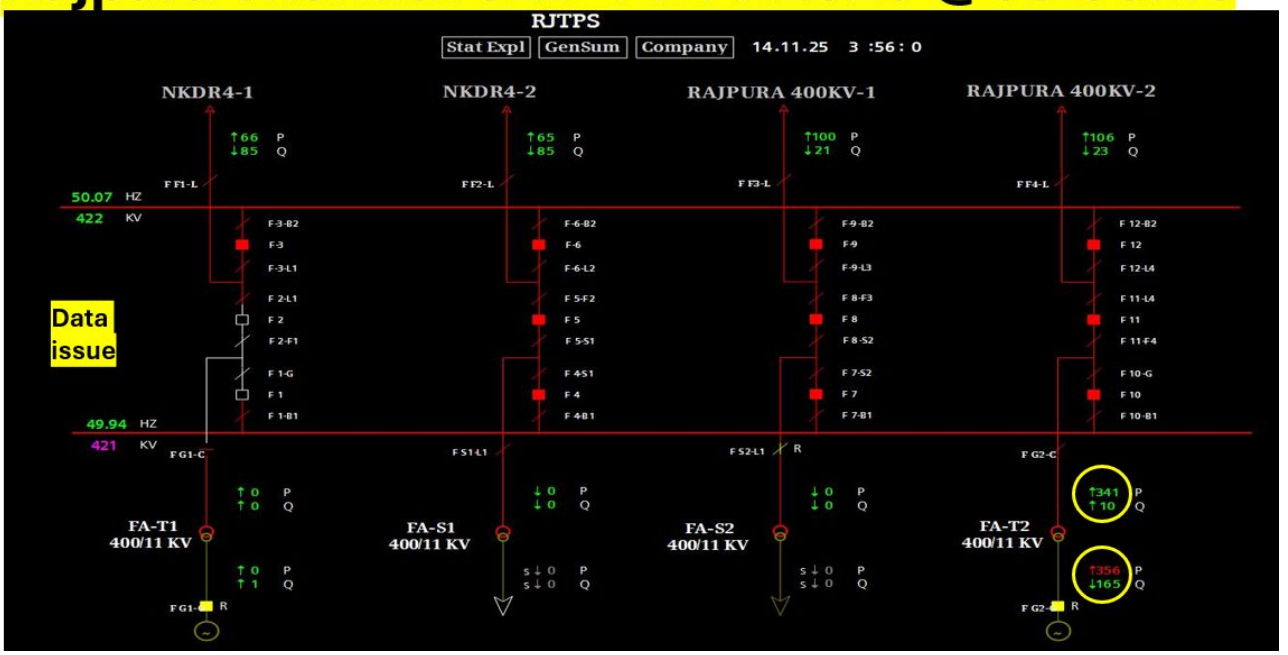


Rihand SLD 14.11.2025 @03:56hrs



- Data of Rajpura TPS needs review.

Rajpura Thermal SLD 14.11.2025 @03:56hrs



- Unit-1 at MGTPS Jhajjar & IGSTPP Jhajjar performance needs review.
- Frequent GT tap position changes seem to be done at Chhabra TPS.
- Rajasthan SLDC to monitor performance of intrastate thermal units to obtain better voltage support during low voltage conditions in the grid.

All generating stations were 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 Critical operation of Rajasthan Grid during upcoming winter season

Issues related to grid operation in Rajasthan state control area have been highlighted from NRLDC side in last several OCC/TCC/NRPC meetings. It is to be noted that such issues get aggravated during winter months when agricultural demand in state is on the higher side. Several issues were encountered in Rajasthan control area during last winter season. The major issues in Rajasthan transmission network include:

1. Augmentation in transformation capacity of 11 number of the intra-state stations to meet the increased drawl and RE absorption requirements. List is mentioned subsequently.
2. Augmentation of intrastate transmission network for relieving the constraints (power flow and voltage) and improving reliability. Necessary strengthening to relieve 220 kV Bassi (PG)-Sikar (RRVPN), 220 kV Kankroli (PG)-Kankroli(RRVPN), Kankroli (PG)-Amberi (RRVPN), Sikar (PG)-Dhod(RRVPN), Bhiwadi (PG)-Khuskhera (RRVPN) etc. may be planned and implemented on priority.
3. Augmentation of shunt compensation capacity near load centres like Bikaner, Jodhpur, Kankani, Merta, Hindaun, Alwar etc. to improve the voltage profile as well as reduce transmission losses. List of 400/220 kV substations in Rajasthan where power factor is enclosed.

ICTs MW drawl, MVAr drawl, Power factor and S/s voltage for Solar hours (10:00-14:00hrs)

for Rajasthan Control area (01-08 Dec 2024)

400/220 Sub-Station ICTs	ICTs Capacity (MVA)	MW Drawl	MVAr Drawl	Power factor	Voltage(kV)
Bikaner (RVPN)	2*315	100-300	150-300	0.40-0.65	375-390
Jodhpur (RRVPN)	315	400-500	200-300	0.85-0.90	375-385
Kankani (RRVPN)	(315+500)	500-700	200-300	0.87-0.90	370-385
Merta (RRVPN)	2*315	400-500	200-250	0.85-0.89	380-395
Bhinmal (PG)	2*315	500-600	200-300	0.87-0.90	360-370

4. Enforcement of adequate dynamic reactive support from RE plants connected to STU system as mandated in CEA technical standards. Further other compliances of CEA technical standards with respect to fault ride through, harmonics, flicker, etc. for the existing and upcoming RE capacity in the intrastate network may be ensured for reliable operation of the integrated grid. The compliance verification process being followed by CTUIL and Grid-India for the interconnection of ISTS RE plants may be considered for adoption by STU/SLDC.

List of constrained 400/220kV ICTs in Rajasthan

Constrained location	Status as available with NRLDC
N-1 contingency of 3*315=945 MVA ICT at Bhiwadi(PG)	Additional 500MVA ICT approved in 29 CMETS on 17.05.2024
N-1 contingency of 2*315+500=1130 MVA ICT at Bassi(PG)	Additional 500MVA ICT has been approved. Same is anticipated by 14.12.2025.
N-1 contingency of 315+500=815 MVA ICT at Neemrana(PG)	Additional 500MVA ICT has been approved in 36 NR CMETS held on 15.01.2025.
N-1 contingency of 2*500=1000 MVA ICT at Jaipur South(PG)	Additional 500MVA ICT has been approved in 36 NR CMETS held on 15.01.2025.
N-1 contingency of 2*315+500=1130 MVA ICT at Sikar(PG)	Additional 500MVA ICT has been approved in 38 NR CMETS held on 28.05.2025..
N-1 contingency of 3*315=945 MVA ICT at Kankroli(PG)	ICT-4 has been approved and is expected to be commissioned by Dec 2025.
N-1 contingency of 2*315=630 MVA ICT at Kotputli(PG)	Augmentation by 400/220 kV 500 MVA (3rd) ICT at Kotputli (PG) is expected by 31.12.2025
N-1 contingency of 2*315=630 MVA ICT at Deedwana(RVPN)	As per latest status shared by Rajasthan SLDC order for 10 no. ICT has been placed recently. New 500MVA ICTs are expected to be commissioned at 400/220kV Merta, Ajmer and Bikaner by Nov 2025. SPS has been implemented as temporary measure for some of the stations such as Chittorgarh (RVPN), Ajmer (RVPN), Merta
N-1 contingency of 3*250+315=1065 MVA ICT at Heerapura(RVPN)	
N-1 contingency of 3*315 =945 MVA ICT at Chittorgarh (RVPN)	
N-1 contingency of 2*315 =630	

MVA ICT at Ajmer (RVPN)	(RVPN), Bikaner (RVPN), Jodhpur (RVPN), Suratgarh(RVPN), Ratangarh(RVPN)
N-1 contingency of 2*315 =630 MVA ICT at Merta (RVPN)	
N-1 contingency of 2*315 =630 MVA ICT at Bikaner (RVPN)	
N-1 contingency of 2*315 =630 MVA ICT at Jodhpur (RVPN)	
N-1 contingency of 2*315=630 MVA ICT at Suratgarh(RVPN)	
N-1 contingency of 3*315=945 MVA ICT at Ratangarh(RVPN)	
N-1 contingency of 1*500+1*315 =815 MVA ICT at Bhilwara (RVPN)	

In 56 TCC and 81 NRPC meetings held on 30th and 31st Oct 2025, RRVPNL representative informed that:

- ICT at Bikaner (Raj) would be commissioned by December 2025 and at Merta end of October, Jodhpur erection and commissioning under progress..
- 151 Capacitor banks under installation and covered areas which have low power factor viz. Bikaner(Raj).
- RRVPNL informed that DISCOMs have also planned the installation of capacitor but may not come up this winter.
- 880 MVAR capacitor bank installation by Dec 2025.
- NRLDC representative highlighted that 400 KV Hindaun –Alwar sub-station, Voltages reaching lows of 320 KV.
- MS (NRPC) advised RRVPNL to run Dholpur plants and take up with their higher management in view of the present grid condition
- Low Voltages in the system also lead to huge payment under reactive energy account.
- Capacitor bank should also be installed in Bhinmal area in view of low voltages.
- SPS implementation to be expedited in priority where SPS has not been installed.
- At Heerapura ICT would be commissioned this year and SPS may not be required.
- PGCIL informed that bay construction work is under progress at various locations and ICTs would be commissioned in next year.
- SPS can be installed at PGCIL sub-stations in one month time line with feeders emanating from PG.
- Non-essential load may be shifted to Non-solar hours

Rajasthan SLDC provided following updates during 237 OCC meeting:

- ***New 400/220kV ICT at Merta is expected by end of Nov 2025***
- ***New 400/220kV ICT at Bikaner is expected by end of Nov 2025***
- ***New 400/220kV ICT at Heerapura is expected by end of Nov 2025***
- ***New 400/220kV ICT at Jodhpur is expected by end of Dec 2025***
- ***151 Capacitor banks under installation and covered areas which have low power factor viz. Bikaner(Raj) would be commissioned by Dec 2025.***
- ***RE generators are supporting grid and now injecting MVAr during day time to support grid voltages.***
- ***RREC is also taking up with intrastate RE generators to comply with existing CEA regulations and provide reactive power support.***

Shutdown of 400kV Bhadla-Bikaner D/C

400 KV Bhadla(Raj)-Bikaner(Raj) D/C lines were approved for planned outage from 16:00 hrs of 06.11.2025 (continuous for 40 days). Shutdown is for Rectification of defects of 400 KV Bhadla-Bikaner Quad moose D/C line. RRVPNL has availed the shutdown on evening of 10.11.2025.

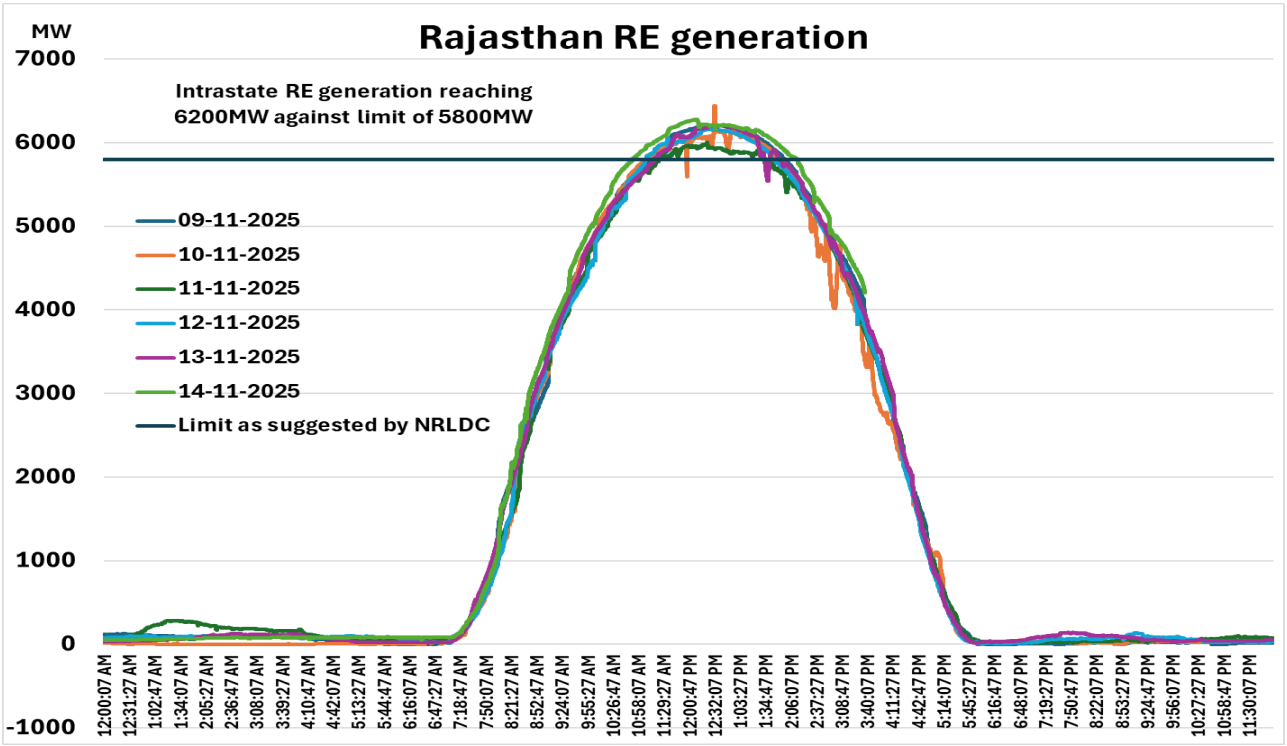
NRLDC has earlier requested RRVPNL in 235 & 236 OCC meetings to expeditiously plan shutdown of this line so that shutdown period does not coincide with the high demand season of Rajasthan. When Rajasthan network also draws huge MVAR from the grid.

As discussed in the meeting held on 4.11.2025 attended by NRPC, NLDC, NRLDC, CTU and SLDC-Rajasthan following decisions were made:

- RE generation (solar + wind) will be restricted to a maximum of 5800MW between 11:30 to 13:30 (based on real-time conditions) till SPS is implemented by RRVPNL.
- SLDC-Rajasthan agreed to implement SPS of 1000MW solar generation tripping with N-1 of 400kV Jodhpur Kankroli S/C before 19th November (15days). After which RE generation (solar + wind) will be restricted to a maximum of 6800MW between 11:30 to 13:30 (based on real time conditions).
- 400kV Bikaner-Sikar D/C will remain in service normally and may be opened by NRLDC control room as per system requirement.
- STATCOMs connected at various RE pooling stations may be kept in fix Q mode as per system requirement.
- SLDC-Rajasthan agreed to complete all works within 40 days, and all compliances to be completed before Shutdown period if required to prevent any delays.

- SLDC-Rajasthan will manage their voltage profile and limit their MVAr grid from ISTS points by taking various measures such as: MVAr support from RE generators, managing heavy MVAr drawing loads from the grid, etc.
- Members agreed on Rajasthan proposal of considering MVA capacity of 400kV Kankani-Merta Twin moose to be 979MVA with 40 degrees ambient temperature and 75 degrees conductor temperature.
- RE generation quantum allowed will be reviewed by NRLDC on the basis of observations after availing shutdown and may be updated as per actual grid scenarios.
- During the shutdown period, SLDC-Rajasthan has agreed to implement all instructions issued by NRLDC control room.
- 400kV Bikaner-Bhadla D/C (under shutdown) will be anti-theft charged from both ends.
- During this period during solar hours, no planned outage as well as non-auto reclosure will be allowed.

NRLDC representative stated that intrastate RE generators are injecting more power and Rajasthan SLDC is not managing intrastate RE generation to level of 5800MW as agreed in previous meeting.



It may be noted that just one day after shutdown i.e. on 11.11.2025, when there was no reduction in ISTS solar generation due to TRAS down and ISTS-RE generation was close to 17000MW, there were oscillations of 3.5-4Hz with 35-40kV observed at 765kV voltage level. These oscillations immediately died down after taking STATCOMs at Fatehgarh-2 in Manual (Fixed-q) mode of operation as had been seen earlier also.

OCC forum asked Rajasthan SLDC to ensure measures as agreed on 04.11.2025 during planned shutdown of 400kV Bhadla-Bikaner D/C to ensure smooth grid operation.

SPS proposals in Rajasthan

Majority of 400/220kV ICTs in Rajasthan state (both interstate as well as intrastate are N-1 non-compliant).

For intrastate substations, where SPS have not been planned and implemented, the same may be taken up. List of N-1 non-compliant substations is shown below:

Subsequently, NRLDC vide email dated 01.08.2025 had communicated to share simulation studies carried out at RRVPNL side for feeders identified for SPS at the earliest. Further, it was mentioned that NRLDC has also simulated feeders for SPS and need further discussion for feeders identified for Bassi SPS.

Rajasthan SLDC has shared the study results with NRLDC which have been reviewed at NRLDC end.

OCC forum approved following feeder list for wiring in SPS:

Annexure-1

List of 220 kV lines/transformers for installation of Special Protection Scheme (SPS) to avoid over loading tripping of 400/220 kV transformers at PGCIL 400 kV GSS in Rajasthan Control area

S. No.	Name of 400 kV GSS	400/220 kV transformers capacity(MVA)	Stage-1 SPS 220 kV Transmission Lines /220 kV Transformers	Stage-2 SPS 220 kV Transmission Lines /220 kV Transformers
1	Kankroli(PG)	3x315 MVA	i. 2x100 MVA, 220/132 kv transformers at 220 kV GSS Kankroli	i. 220 kV S/C Kankroli(PG)-Bhilwara line
2	Bassi(PG)	2x315+500 MVA	i. 220 kV S/C Bassi(PG)-Bagru line ii. 2x100 MVA, 220/132 kv transformers at 220 kV GSS Bagru	i. 220 kV S/C Bassi(PG)-IG Nagar line ii. 2x160 MVA, 220/132 kV transformers at 220 kV GSS IG Nagar
3	Kotputli(PG)	2x315 MVA	i. 220 kV S/C Kotputli(PG)-Manoharpur line ii. 2x100 MVA, 220/132 kv transformers at 220 kV GSS Manoharpur	i. 220 kV S/C Kotputli(PG)-Kotputli(220 kV GSS) line
4	Neemrana(PG)	500+315 MVA	i. 220 kV D/C Neemrana(PG)-Behrore line ii. 160 MVA, 220/132 kV transformer at 220 kV GSS Behrore	i. 220 kV S/C Neemrana(PG)-Neemrana line ii. 3x100 MVA, 220/132 kV transformers at 220 kV GSS Neemrana
5	Bhiwadi(PG)	3x315 MVA	i. 220 kV S/C Bhiwadi(PG)-Khushkhera line ii. 2x160 MVA, 220/132 kV transformer at 220 kV GSS Khushkhera	i. 220 kV D/C Bhiwadi(PG)-Bhiwadi line ii. 3x100+160 MVA, 220/132 kV transformer at 220 kV GSS Bhiwadi
6	Sikar(PG)	2x315+500 MVA	i. 220 kV S/C Sikar(PG)-Dhod line ii. 2x100 MVA, 220/132 kV transformers at 220 kV GSS Dhod	i. 220 kV D/C Sikar(PG)-Ratangarh line
7	Jaipur(South-PG)	2x500 MVA	i. 220 kV S/C Jaipur(South-PG)-Duni line	i. 220 kV D/C Jaipur(South-PG)-Vatika line

Further, it was discussed that the logic for SPS based on stage-1 and stage-2 operation may be discussed in upcoming protection subcommittee meeting of NRPC. POWERGRID was asked to implement SPS at the earliest.

OCC forum asked Rajasthan SLDC and RRVPNL to take necessary actions as discussed above. Further, SPS proposal from Rajasthan SLDC side was approved by OCC forum.

B.11 State-wise transmission constraints during high demand season of 2025 and SPS proposals

During the high demand season, the transmission system in Northern region remains heavily loaded. Transmission constraints observed in the grid during high demand period are regularly being highlighted in OCC meetings. Same is also being submitted to CTUIL and CEA through quarterly operational feedback.

Even after several follow-ups, it is observed that progress of several transmission elements are not upto the mark and expeditious actions from transmission utilities are required so that minimal issues are observed at transmission level during the high demand season.

State-wise issues and measures required thereof are listed below. Concerned transmission utilities are requested to provide update and ensure that these transmission elements are expeditiously commissioned.

Punjab:

During OCC 237,

NRLDC proposed to increase ATC/TTC limits of Punjab state control area by 300MW presently and keeping it under observation and in case no issues are observed with ATC/TTC limits of 10700/11200MW, decision on further increase of ATC/TTC by 200MW would be taken by NRLDC in consultation with Punjab SLDC.

Punjab SLDC representative stated that they are reassessing the ATC/TTC limit for paddy 2026. After review of ATC/TTC limits by Punjab SLDC, revised figures would be shared with NRLDC at the earliest.

Haryana:

SPS proposals in Haryana

For SPS at 400/220kV Hissar(PG) ICTs:

During 237 OCC meeting,

NRLDC representative asked POWERGRID to plan & implement SPS in such a manner that SPS is surely implemented by Apr 2026.

POWERGRID representative stated that only one offer has been received for DTPC panel procurement and the work is expected to be completed in next 3-4 months.

For SPS at 400/220kV Panipat ICTs:

During 237 OCC meeting, Haryana SLDC stated that they have taken up the matter with their TS-wing and would provide update on SPS implementation at 400/220kV Panipat(BBMB) shortly after the meeting.

OCC forum expressed concern on slow progress and asked Haryana SLDC to expedite SPS implementation at 400/220kV Panipat(BBMB).

Uttar Pradesh:

In 237 OCC meeting,

POWERGRID representative stated that 500MVA ICT-4 at Allahabad is expected to be commissioned by Dec 2025.

It was also informed by UPPTCL representative that old 240MVA ICT at Obra is expected to be revived by Nov 2025 whereas 315MVA ICTs at Obra would be revived after some time due to requirement of procurement of ICTs.

SPS proposals in Uttar Pradesh

UP SLDC informed that work order for SPS logic of 400/220kV Bareilly S/s has been placed. SPS at both 400/220kV Panki and Bareilly substation are expected to be commissioned by Dec 2025.

OCC forum asked POWERGRID to implement SPS scheme at Agra(PG) at the earliest.

POWERGRID representative stated that SPS at Agra(PG) would be commissioned by Dec 2025 end.

It was discussed that 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" which requires SLDCs to submit network data as well as PSSE basecases on M-12, M-6, M-1 basis. The monitoring of submission of these data by SLDCs is being done in OCC meetings on monthly basis where response of some of the states needs improvement.

June 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (July-25)		M-12 (June-26)		M-6 (December-25)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh	No	No	No	No	No	No
Delhi	No	No	Yes	No	No	No
Haryana	Yes	Yes	Yes	Yes	Yes	Yes
Himachal	Yes	Yes	Yes	Yes	Yes	Yes
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	Yes	Yes	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

July 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (August-25)		M-12 (July-26)		M-6 (January-26)	
	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	Yes	Yes	Yes	Yes
Himachal	Yes	Yes	Yes	Yes	Yes	Yes
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	Yes	Yes	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

August 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (Sep-25)		M-12 (August-26)		M-6 (February-26)	
	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	Yes	Yes	Yes	Yes
Himachal	Yes	Yes	Yes	No	Yes	No
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	Yes	Yes	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

September 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (Oct-25)		M-12 (September-26)		M-6 (March-26)	
	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	Yes	Yes	No	No
Himachal	Yes	Yes	Yes	Yes	Yes	Yes
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	Yes	Yes	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

Submitted after 8th of current month

Submitted in next month

October 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (Nov-25)		M-12 (October-26)		M-6 (April-26)	
	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	Yes	Yes	Yes	Yes	Yes
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh	No	No	No	No	No	No
Punjab	Yes	Yes	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

November 2025 Mails						
	ATC/TTC Declaration				Interconnection Studies	
	M-1 (Dec-25)		M-12 (Nov-26)		M-6 (May-26)	
	Data Values	Basecases	Data Values	Basecases	Data Values	Basecases
Chandigarh						
Delhi						
Haryana						
Himachal						
J &K	Yes	Yes	Yes	Yes	Yes	Yes
Ladakh						
Punjab	Yes	Yes			Yes	Yes
Rajasthan	Yes	Yes	Yes	Yes	Yes	Yes
Uttar Pradesh	Yes	Yes	Yes	Yes	Yes	Yes
Uttarakhand						

During 237 OCC meeting, Uttarakhand SLDC submitted that they had recently shared basecase file with NRLDC.

NRLDC representative stated that basecase need to submitted for four scenarios as per IEGC approved procedure. Only two scenario basecase has been received by NRLDC from Uttarakhand SLDC which was also submitted after due date.

Further, states submitting basecase with one month delay may note that the changes given by them do not get reflected in the All India/regional basecase file, as NRLDC prepares the basecase as per CERC approved timelines and goes ahead as per the data available as on date.

ATC/TTC limits of states for the month of December 2025 are attached as Annexure-B.V of agenda. Utilities are requested to go through these limits and provide comments.

OCC forum asked all utilities to take necessary actions as discussed above.

B.12 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 Unchahar Islanding Scheme (Uttar Pradesh).

During 237 OCC meeting, NRLDC representative presented the latest status of actions required on various islanding schemes.

Scheme	UFR testing done	Basecase shared	SCADA display made
NAPP Islanding scheme (UP)	✓ Yes	✓ Yes	✓ Yes
RAPP Islanding scheme (Raj)	✓ Yes	✓ Yes	✓ Yes
Bawana Islanding scheme (Delhi) (Need Review)	✓ Yes	✓ Yes	✓ Yes
Unchahar Islanding scheme(UP)	✓ Yes	✗ **No**	✓ Yes

UP SLDC representative stated that Unchahar islanding scheme basecases are being prepared. Data has been requested from field and some data is pending. Basecases would be shared with NRLDC at the earliest.

NRLDC representative further stated that Bawana islanding scheme of Delhi needs review with upcoming network changes due to commissioning of 765/400kV Narela substation.

DTL representative stated that the scheme changes required due to reconfiguration would be implemented at site.

MS NRPC stated that the proposed reconfiguration of islanding scheme by DTL may be shared with NRLDC/ NRPC by next OCC meeting and thereafter changes may be done in islanding scheme.

OCC forum asked all utilities to take necessary actions as discussed above.

B.13 Self-audit as per IEGC

As per IEGC Clause 56.2(c),

Quote

"The self-audit reports by users, QCAs, and SNAs shall be submitted to the concerned RLDC or SLDC, as the case may be."

Unquote

Failure to submit the self-audit report within the stipulated timeframe would be considered a non-compliance with IEGC regulations.

During 235 OCC meeting, it was discussed that Self-audit report has been received from NHPC and Koteshwar THDC only for F.Y. 2023-24. As F.Y. 2024-25 has also completed recently, all utilities in Northern region are requested to carry out self-audit exercise and share report with NRLDC as per IEGC Clause 56.2(c).

As 31.07.2025 has already past, it is requested that all concerned users of NRLDC may carry out their self-audit and submit report to NRLDC at the earliest.

NRLDC communication in this regard to all concerned is attached as Annex B.VI of agenda for reference.

The self-audit report should inter alia include the following details:

1. Sufficient information on any instances of non-compliance, explaining how and why they occurred.
2. Extent of impact or damage caused by such non-compliance.
3. Corrective steps planned along with a timeline for rectification.
4. Measures taken to prevent recurrence in the future.

NRLDC representative stated that self-audit reports are being received from some of the RE developers and Qualified Coordinating Agencies (QCA) but are still pending for NRLDC users which are part of OCC forum.

OCC forum asked all concerned to provide carry out self-audit and share report with NRLDC at the earliest in compliance with IEGC.

B.14 Multiple element tripping events in Northern region in the month of October 2025

A total of **13** grid events occurred in the month of October 2025 of which **8** are of GD-1 category **03** are of GI-2 Category and **02** are of GI-1 Category. The tripping reports of all the events have been issued from NRLDC. A list of all these events along with the status of DR/EL & tripping detail submission is attached at Annexure-B.VII of agenda.

Maximum delayed clearance of fault observed in event of tripping event at 400/220kV Daulatabad(HR) at 06:02 hrs on 31st October 2025 (As per PMU at Gurgaon(PG) end, B-N phase to earth fault with delayed clearance of ~660 msec is observed).

Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **04** events out of **13** grid events occurred in the month. In **02** (no.) of grid events, there was no fault in the grid.

NRLDC representative presented the reporting status of DR/EL & tripping reports w.r.t. grid events occurred in October 2025. It was highlighted that detailed reports of some of the tripping events have not been received. In some of the grid events, complete DR & EL have also been not received.

Members agreed to share the tripping details at the earliest and assured to submit the tripping details as per timeline specified in IEGC.

NRLDC requested utilities to start preparing the detailed report of the tripping events as per timeline mentioned in IEGC 2023 and share the report with NRLDC, NRPC and PSC forum. Remedial actions taken by constituents to avoid such multiple elements tripping may also be included in the detailed report.

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.

OCC forum requested members to 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.

B.15 Status of submission of DR/EL and tripping report of utilities for the month of October 2025

The status of receipt of DR/EL and tripping report of utilities for the month of **October 2025** is attached at Annexure-B.VIII of agenda. It is to be noted that as per the IEGC provision under clause 37.2 (c), the tripping report along with DR/EL has to be furnished within 24 hrs of the occurrence of the event.

NRLDC representative stated that on the basis of status of October month it is evident that reporting status of some of the constituents i.e., RE stations, SLDC-PS, SLDC-HR, SLDC-Delhi, SLDC-J&K, BBMB, NTPC, NHPC and RAPS are not satisfactory and need improvement. Further, persistent unsatisfactory reporting status of Punjab & J&K was also highlighted.

NRLDC representative requested utilities to improve the status of submission of DR/EL & tripping reports. Timely submission of tripping details (DR, EL, tripping report etc.) helps in detailed analysis of the grid event and further remedial actions.

OCC forum emphasized the importance of DR/EL & tripping report data for analysis of the tripping. In addition, these data are also the base for availability verification. The unavailability of these details delays the availability verification process also. Hence, timely submission of DR/EL & tripping report is necessary. Members were requested to comply with IEGC 37.2(c) and submit the details in time. Members agreed to take necessary follow-up actions to improve the reporting status.

Members may please note and advise the concerned for timely submission of the information. It is requested that DR/EL of all the tripping shall be uploaded on Web Based Tripping Monitoring System (TMS) "https://postda.nrldc.in/Default.aspx" within 24 hours of the events as per IEGC clause 37.2(c) and clause 15.3 of CEA grid standard.

B.16 Frequency response performance for the reportable events of month of October 2025

During the months of **October 2025, 1 no. of reportable event** was notified by NLDC for which FRC/ FRP was calculated. Description of the event is as given in the Table below:

S. No.	Event Date	Time (In hrs.)	Event Description	Starting Frequency (in Hz)	Nadir Frequency (in Hz)	End Frequency (in Hz)	*Δf(Hz)*	NR FRP during the event
1	15-Oct-25	12:11 hrs	As reported, at 12:11 Hrs on 15th October 2025, and event of RE generation loss of ~1855 MW occurred in Rajasthan RE	50.023	49.833	49.959	-0.064	0.62

			complex. Hence generation loss of 1855 MW was considered for FRC/FRP Calculation.					

As per IEGC 2023 Clause 30.8, "The primary response of the generating units shall be verified by the Load Despatch Centres (LDCs) during grid events. The concerned generating station shall furnish the requisite data to the LDCs within two days of notification of reportable event by the NLDC."
As per IEGC 2023 Clause 30.10.(n), "Each control area shall assess its frequency response characteristics and share the assessment with the concerned RLDC along with high resolution data of at least 1 (one) second for regional entity generating stations and energy storage systems and 10 (ten) seconds for the state control area."
As per sub-clause (a(v)) of clause (9) of IEGC 2023 Annexure-2, "All the SLDCs shall work out FRC for all the intra-state entities (for events indicated by the Regional Load Despatch Centres) based on the HDR available at their respective SLDCs and submit the same to respective RLDC within six (6) working days after the event. (Format as per Table-B)."

As per sub-clause (a(vi)) of clause (9) of IEGC 2023 Annexure-2, "All regional entity generating stations shall also assess the FRC for their respective stations and submit the same to respective RLDC within six (6) working days. (Format as per Table-B). The high-resolution data (1 second or better resolution) of active power generation and frequency shall also be shared with RLDC."

Members were requested to share the FRC/FRP computation of their respective control area as per the timeline specified in IEGC 2023.

Status of details received from constituents and FRP values as considered for the events of **October 2025** are attached as Annexure-B.IX of agenda.

NRLDC representaitve higlighted the list of generating stations and control area who haven't shared the FRC/FRP computation details. Details are pending from SLDC-Rajasthan, SLDC-Delhi, SLDC-J&K, APCPL Jhajjar TPS, Shree Cement TPS, NTPC (Singrauli TPS, Anta GPS, Auraiya GPS, Dadri GPS), NHPC (Sainj HEP, Uri-2 HEP), BBMB (Dehar HEP, Bhakhr HEP) Budhil HEP, N. Jhakri HEP and Sorang HEP. Members were requested to share the FRC/FRP computation as per timeline.

Further it was also highlighted that only UP, Punjab and Haryana are submitting FRC/FRP computation of generating stations of their respective control area. Other SLDCs were also requested to compute FRC/FRP of their respective control area and submit the FRC/FRP computation to NRLDC as per timeline specified in IEGC.

NRLDC requested SLDCs and generating stations to share the FRC / FRP compuation of their respecive control area as per stipulated timeline.

NRLDC member also highlighted the persistent issue of partial data submission from Singrauli TPS. NTPC was requested to share the complete plant data of Singrauli TPS otherwise it can't be consisdered for FRP computatuion. Presently, data of only 2 units are being submitted by Singrauli TPS.

Frequency Response Performance (FRP) of generating stations for each reportable event are calculated based on the submitted high resolution data from generating stations. However, the generating stations for which data is not received **till 06th November 2025**, FRC/FRP as per NRLDC HDR data is used for computation of Average Monthly Frequency Response Performance, Beta 'β' for Generating Stations.

From the FRP data, it is observed that FRP of many of the control areas are not satisfactory. Therefore, it is requested to review the FRC/FRP, governor actions of your respective control area, necessary actions may be taken for improvement in the FRC/FRP.

Memebers were 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.

NRLDC highlighted the unsatisfactory response of some of the generating stations during the event. As per FRC/FRP computation details received from SLDCs, it was highlighted that FRP of most of the generating stations of UP control area is poor or unsatisfactory. Necessary remedial actions need to be taken to improve the FRP of generating stations.

Members were requested to take necessary remedial actions to improve the governor response. PFR testing (governor tuning) may also be conducted if required. The IEGC clause 40.2(c) also mendates governor testing once every five (5) years or whenever major retrofitting is done.

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

Sl. No.	Entity	Governor Mode (FGMO as per IEGC 2023) Yes or No	Droop setting (%)	Remarks (if any)
1	**Dadri -1 (TH)**	Yes	6%	
2	**Dadri -2 (TH)**	Yes	6%	
3	**Jhajjar (TH)**	Yes	5%	
4	**Rihand-1 (TH)**	Yes	5%	
5	**Rihand-2 (TH)**	Yes	5%	
6	**Rihand-3 (TH)**	Yes	5%	
7	**Shree Cement (TH)**			
8	**Singrauli (TH)**	Yes	5%	
9	**Tanda-2 (TH)**	Yes	6%	
10	**Unchahar-I (TH)**	Yes	5%	
11	**Unchahar-II (TH)**	Yes	5%	
12	**Unchahar-III (TH)**	Yes	5%	
13	**Unchahar-IV (TH)**	Yes	5%	
14	**Anta (G)**			
15	**Auraiya (G)**			
16	**Dadri (G)**			
17	**AD Hydro (H)**	Yes	4%	
18	**Bairasiul (H)**	Yes	4%	
19	**Bhakra (H)**			
20	**Budhil (H)**			
21	**Chamera-1 (H)**	Yes	5%	
22	**Chamera-2 (H)**	Yes	5%	
23	**Chamera-3 (H)**	Yes	4%	
24	**Dehar (H)**			
25	**Dhauliganga (H)**	Yes	5%	
26	**Dulhasti (H)**	Yes	5%	
27	**Karcham (H)**	Yes	5%	
28	**Kishenganga**	Yes	4%	
29	**Koldam (H)**	Yes	9%	
30	**Koteshwar (H)**			
31	**Malana-2 (H)**			
32	**Nathpa Jhakri (H)**	Yes	9%	
33	**Parbati-2 (H)**	Yes	4%	
34	**Parbati-3 (H)**	Yes	4%	
35	**Pong (H)**			
36	**Rampur (H)**			
37	**Sainj (H)**			
38	**Salal (H)**	Yes	5%	
39	**Sewa-II (H)**	Yes	4%	
40	**Singoli Bhatwari (H)**			
41	**Sorang (H)**	No	4%	ROR, no storage
42	**Tanakpur (H)**	Yes	4%	
43	**Tehri (H)**	Yes	4%	

44	**Uri-1 (H)**	Yes	6%	
45	**Uri-2 (H)**	Yes	5%	

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

Further, memebers were requested to share the data and analysis of FRC of their control area. ISGS stations were requested to share the FRC/FRP calculations of each reportable event and also share the 01 sec data of respective generating stations. It was further requested to take remedial actions to improve the governor response if necessary. States were also requested to follow-up with the generating stations of their respective control area and share the unit wise 01 sec data of respective generating stations along with the anaysis of FRC response for the aforementioned event.

OCC forum requested members to share the FRC/FRP compuation data as per timeline and also analyse the FRC response of their respective control area. Necessary action for imporvement in governor respeonse need be taken to ensure the propoer frequency response in complaince w.r.t. IEGC 2023.

B.17 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 58 numbers of System Protection Scheme (SPS) approved in Northern Region. These SPS are implemented at major generation complexes, important evacuating transmission lines and ICTs which are N-1 non-complaint. System Protection Scheme Document of Northern Region has been revised/updated on 31st January, 2025. Revised version of the document is available on the NRLDC website.

NRLDC representative stated that in this regard, communication has already been sent to constituents through NRLDC letter dated 01.05.2024, 21.02.2025, 05.03.2025, 04.04.2025 & 28.05.2025 *for conducting mock testing of SPS in their control area and continuous follow up is also being done in OCC & PSC meeting since May 2024.*

Further it was stated that during 2024-25, mock testing of 14 SPS out of total 55 SPS were not conducted. In view of high demand scenario during summer 2025-26, NLRDC vide letter dated 04.04.2025 requested all the concerned utility to conduct the mock testing of pending SPS by the end of April 2025. However, as reported, mock testing of 03 SPS out of pending 14 SPS have been done. In this regard, discussion was also held in 60th, 61st , 62nd & 63rd PSC *meeting. PSC forum requested all the members to conduct the mock testing of all the SPS in their respective control area at the earliest.*

Status of mock testing of all the SPS in NR is attached as Annexure-B.X of agenda.

NRLDC requested concerned members to conduct the mock testing SPS in their respective control area and share the mock test report.

UPPTCL representative informed following w.r.t. status of SPS mock testing in their respective control area:

- *Regarding SPS at Rosa TPS, SLDC-UP agreed to review the SPS.*
- *Mock testing of SPS of Anpara TPS has been conducted, details of event logger is pending, necessary follow-up is being done for the same.*
- *Regarding SPS at Nehtaur(UP), shutdown of ICTs is required for SPS mock testing. Further, intimation shall be given before SPS testing of Nehtaur(UP).*
- *SPS mock testing of Agra and Moradabad has been conducted. Date of SPS mock testing shall be shared.*
- *SPS at Sultanpur is healthy now, details w.r.t. mock testing report of the same shall be shared.*
- *Timelines of implementation of recently approved SPS shall be shared.*

POWERGRID(NR-III) stated that they will conduct mock testing of SPS of Allahabad(PG) at the earliest possible.

NRLDC also highlighted the following points related to SPS schemes in NR:

i. **SPS of HVDC Rihand-Dadri:** During mock testing of SPS of HVDC Rihand-Dadri on 20.03.2025, issues i.e., faulty SPS hardware at Singrauli TPS (NTPC) and no receipt of SPS signal at 220/132kV Ratangarh(RS) were identified. Further, during recent operation of SPS on 21.05.2025 in incident of outage of both poles, desired SPS actions i.e., generation backdown at Singrauli TPS and load relief in UP, Delhi, Haryana & Punjab were not observed. Desired load /

generation relief is important to ensure the security and reliability of grid during such contingency. As per details received, SPS signal was sent to all the mapped stations from POWERGRID end however either due to non receipt of signal or error in SPS system at load / generation, SPS action didn't occur. NRLDC vide letter dated 02.07.2025, requested POWERGRID and Singrauli NTPC to take necessary remedial measures and make complete SPS system healthy.
During 233rd OCC meeting, POWERGRID representative stated that the equipment's at Singrauli TPS end is owned by NTPC and need to be revived by them. SPS system at Rihand(PG) is healthy and operational. NTPC representative stated that as per details received from site, NTPC Singrauli team have initiated necessary actions in coordination with the POWERGRID. SPS operation is crucial as it is planned for special contingencies, and its unavailability may lead to cascade tripping or major grid disturbance especially in case of high demand period.

***During 237th OCC meeting, NRLDC requested NTPC Singrauli and POWERGRID to share the details of necessary corrective actions taken / planned to be taken to ensure healthiness of SPS system at Singrauli TPS and load stations*.**
Representative from NTPC informed that existing SPS system at Singrauli TPS is defective, procurement work has been initiated. NRLDC requested NTPC to share the tentative timeline for completion of work and to expedite the remedial actions for early restoration of SPS system at Singrauli TPS.

Regarding issues at load stations, POWERGRID agreed to take necessary actions in coordination with the site stations.
Further, NRLDC also informed that mock testing of SPS of HVDC Rihand-Dadri has been scheduled tentatively on 19.11.2025. Concerned members were requested to ensure the readiness and share the details of coordinators.

ii. **SPS of Anta, Kawai, Chhabra generation complex:** In one of the SPS cases i.e., N-1-1/ N-2 of 765kV Anta-Phagi 1 & 2, instantaneous generation backdown of ~2100 MW is designed as SPS action. In such scenario, to avoid overloading of WR-NR corridor and over drawl by Rajasthan, it was agreed that RVPNL shall implement the automatic load shedding of ~750 MW by 28.02.2018. However, as per details available, implementation of automatic load shedding as per SPS hasn't been done yet. This matter has already been discussed in PSC as well as OCC meetings on regular basis. The concern of grid security and reliability was also raised during request of shutdown of 765kV Anta-Phagi line. is requested to expedite implementation of the automatic load shedding of ~750 MW as per SPS (N-1-1/ N-2 contingency of 765kV Anta-Phagi-1 & 2).

During 235th OCC meeting, SLDC-Rajasthan representative informed that automatic load shedding of ~750 MW has been implemented.
During 236th OCC meeting, SLDC-Rajasthan confirmed that mock testing of automatic load shedding part of the SPS has been conducted.

NRLDC representative requested Rajasthan to share the mock test report of the automatic load shedding part of the SPS..
RVPNL agreed to share the mock test report w.r.t. automatic load shedding part of the SPS at the earliest.

iii. **SPS of N.Jhajkri, Karcham, Rampur hydro generation complex:** Status of implementation of case-6(i) and corrective actions w.r.t case-6 (ii) need to be shared.
During 235th OCC meeting, HPPTCL representative informed that faulty communication card at Wangtoo S/s is to be replaced with new card. The case is at procurement stage, and it is estimated that work will be completed by the end of December 2025.
NRLDC requested Karcham(JSW) and HPPTCL to share the update in this regard.
SLDC-HP representative stated that no further update have received from HPPTCL.

iv. **SPS of 765kV Agra-Gwalior D/C:** Mock testing of the SPS was conducted on 10.10.2025. During the testing, it was observed that there is communication issue at Bhiwadi(PG), Bamnauli(DTL), Kota, Debari, Chittorgarh, Ratangarh, Nunamajra, Safidon, Ajitwal, Dandhari-II, Ablowal substations.
NRLDC requested all the concerned states to submit the mock test report of their respective control area. Details have been received from Delhi, Rajasthan and Punjab. UP, BBMB, Haryana and POWERGRID have shared the partial details.
Further, POWERGRID was requested to share the details of actions taken / planned to be taken to resolve the issues in SPS system.
Representative from POWERGRID(NR-1) were not present during the discussion of this agenda point.
POWERGRID was requested to take expeditious corrective actions to rectify the issues and make the SPS healthy and operational at all the stations.

Further, Clause 16.2 of IEGC 2023 also mandates the mock testing of SPS for reviewing SPS parameters & functions, at least once a year. Mock testing of all the SPS needs to be conducted in 2025-26. In view of this NRLDC representative requested the following to the members:

i. ***Concerned constituents / utility are requested to conduct the mock testing of pending SPS (whose mock testing was not conducted in 2024-25) at the earliest.***

ii. ***Utilities are also requested to conduct the mock testing of SPS schemes in their respective control area w.r.t. year 2025-26.***

iii. ***In compliance with IEGC clause 16.2, users shall ensure that mock testing along with the review of SPS logic of all the SPS is conducted at least once a year.***

iv. ***Further In compliance with IEGC clause 16.3, users shall also share the detailed report of SPS operation in their respective control area within 3 days of its operation. Presently, no such report is being received.***

OCC forum requested members to conduct the mock testing of SPS in their respective control area, share the report of the mock testing conducted. Members were also requested to review the SPS scheme in their respective control area if there is any change in network configuration and load profile.

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 are requested to share the annual schedule plan for conducting dead bus charging / mock black start exercise of generating stations / sub-systems during 2025-26. The present status of mock black start of generating units is attached as Annexure-B.XI of agenda. Constituents are also requested to share the test report of diesel generators / auxiliary supply on a quarterly basis.

NRLDC representative presented the status of mock black start exercises in NR and requested ISGS and SLDCs to take the following actions:

- ***Share the report of testing of DG sets.***
- ***The plants that have not conducted the mock black start exercise since 2024 were requested to conduct the mock black exercise on priority.***
- ***Share the tentative schedule of mock black start exercise of generating stations in their respective control area.***
- ***SLDCs were requested to share the tentative schedule plan of mock black start exercise of generating stations in their respective control area.***
- ***conduct dead bus charging after self-starting the generating station if a schedule with the load is not available.***
- ***Share the test report of mock black start exercise conducted along with weekly DG testing on monthly/quarterly basis.***

OCC forum requested all the concerned generating stations and States to conduct the mock black start exercise of black start facilities in your respective control area. Members were also requested to share the report of mock black start exercises after conducting and testing of DG sets on a quarterly basis.

C.1 Presentation by Solvina on Simulated Island Operation Testing

M/s Solvina gave a presentation sharing their experience and capability in conducting simulated island operation tests on generating units participating in islanding schemes.

M/s Solvina informed the forum that their testing methodology enables validation of island operation performance across the full operating range and helps identify operating limits, safety margins, and potential weak components of the units. NLDC requested to discuss the feasibility of conducting a pilot test at one of the generating units in the Northern Region, at no cost.

M/s Solvina representative suggested that pilot testing of simulated island operation for one of the existing islanding schemes may be carried out in NR on no no-cost basis.

MS, NRPC requested all constituent states to provide their views on selecting one of the generating stations for pilot testing. However, no comments were received from the states.

MS, NRPC stated that one of the generating stations in NR Region for pilot testing would be decided in consultation with the states and NRLDC and same would be conveyed to M/s Solvina separately.

Status of action taken on decision of 236th OCC meeting of NRPC

S.N.	Agenda	Decision of 236th OCC meeting of NRPC	Status of action taken
1.	Agenda. Rectification of the breaker and charging of the 220kV Sunam (PS)-Patran (IndiGrid) Circuit (Agenda by Punjab SLDC)	Representative of IndiGrid informed that OEM has dispatched circuit breaker after replacing power cord. He assured that circuit breaker would be replaced by 30th October, 2025.	The representative of IndiGrid informed that the power cord replacement has been completed. However, to resolve the drive-mechanism failure, the presence of the OEM's Engineer is required. IndiGrid has requested the OEM's availability, and the OEM has indicated that they can provide a date in the third week of November. MS, NRPC expressed concern over the prolonged pendency of the issue and directed IndiGrid to resolve the matter within one week.
2.	A.15. ICT Installation and Connectivity at PGCIL Kankroli Substation – Hindustan Zinc Ltd (Dariba – 200 MW) (Agenda by Hindustan Zinc Ltd.)	OCC forum asked CTU to carry out a study before the next OCC meeting to explore the possibility of providing part GNA to Hindustan Zinc Limited. Further, the possibility of SPS may be explored by HZL in coordination with RRVPNL so that some non-essential load is shed in case of N-1 contingency.	CTU representative stated that they have requested Grid India to share the margin available at Kankroli (PG). After receipt of the reply, CTU will convene a meeting to decide the quantum of part GNA that can be operationalized. RVPN representative stated that the HZL load is presently being fed from the 220 kV Kankroli (RVPN) system, which draws power from the 400 kV Kankroli(PG) S/s. Therefore, no additional load is expected except for the incremental change in RVPN load. Considering

			the recorded peak of 650 MW, no overloading issues are anticipated under normal operating conditions; however, issues may arise during N-1 contingencies. Regarding SPS, he mentioned that out of the four 220 kV feeders emanating from Kankroli (PG), the 220 kV Kankroli–Bhilwara line may be considered for wiring in SPS, though it may not provide significant load relief.
3.	A.17. LILO of 400 kV Delhi Ring main Ckt. at 400 kV switchyard of 765/400 kV Narela Substation for relieving the load of 765/400 kV Jhatikra Substation (Agenda by Powergrid NR-1)	OCC forum asked CTUIL to study the proposal in coordination with CEA, DTL and NRLDC before the next OCC meeting. Further, the forum requested DTL to provide their comments on the proposal in writing.	CTU representative stated that they would study the proposal after the commissioning of the Narela substation. SE(O), NRPC asked DTL to submit their comments on the proposal in writing to CTU.
4.	A.22. Over-voltage condition at Orai (GIS), Aligarh (GIS) and Agra Substations (Agenda by Powergrid NR-3)	OCC forum asked CTU to carry out a comprehensive study to examine the requirement of further reactive power devices for voltage control in this area.	CTU representative informed that a detailed study is underway to assess the requirement of reactive power devices in Uttar Pradesh, Punjab, and Haryana. Report would be submitted to the NRPC forum in approximately two months.
5.	A.23. Charging of dead D/C 400kV Dadri-Harsh Vihar Circuits from Dadri end in case of any 400kV lines tripping (Agenda by DTL)	OCC forum decided that in case of future tower collapse events, NTPC shall submit in writing in specific format that patrolling and testing has been carried out and line is healthy and ready for	In 237th OCC meeting, forum decided that a committee with members from Delhi SLDC, DTL, NTPC, PGCIL and NRLDC may be constituted by Delhi SLDC to prepare an

		charging. Assistance from POWERGRID may be taken for format for sharing data. DTL and NTPC would jointly prepare the format. Further, charging attempt is to be taken from Harsh Vihar side in case of outage of both ckts of 400kV Dadri-HarshVihar D/C only after due confirmation from NTPC side.	standard operating procedure to be followed for charging of dead D/C 400kV Dadri-Harsh circuits in future. The committee shall finalize the SOP within two months.

Follow up issues from previous OCC meetings

Annexure-A.II

<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 colspan="3">List of downstream networks is enclosed in Annexure-A.II.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 colspan="3">Data upto following months, received from various states / UTs:
◎ CHANDIGARH Sep-2019
◎ DELHI Sep-2025
◎ HARYANA Sep-2025
◎ HP Oct-2025
◎ J&K and LADAKH Not Available
◎ PUNJAB Jul-2025
◎ RAJASTHAN Oct-2024
◎ UP Sep-2025
◎ UTTARAKHAND Oct-2025
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 colspan="3">Data upto following months, received from various states / UTs:
◎ CHANDIGARH Not Available
◎ DELHI Sep-2025
◎ HARYANA Sep-2025
◎ HP Sep-2025
◎ J&K and LADAKH Not Available
◎ PUNJAB Sep-2025
◎ RAJASTHAN Sep-2025
◎ UP Sep-2025
◎ UTTARAKHAND Sep-2025
◎ BBMB Sep-2025
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 colspan="3">Status:
◎ CHANDIGARH Not Available
◎ DELHI Increased
◎ HARYANA Increased
◎ HP Increased
◎ J&K and LADAKH Increased
◎ PUNJAB Increased
◎ RAJASTHAN Increased
◎ UP Increased
◎ UTTARAKHAND Increased
◎ BBMB Increased</td></tr>
</table>

<table>
<tr><td>4</td><td>Status of Automatic Demand Management System in NR states/UT's</td><td>The status of ADMS implementation in NR, which is mandated in clause 5.4.2 (d) of IEGC by SLDC/SEB/DISCOMs is presented in the following table:</td><td>The status of ADMS implementation in NR is enclosed in Annexure-A.II.II.<table><tr><td>◎</td><td>DELHI</td><td>Scheme Implemented but operated in manual mode.</td></tr><tr><td>◎</td><td>HARYANA</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>HP</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Scheme not implemented</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Under implementation.</td></tr><tr><td>◎</td><td>UP</td><td>Scheme implemented by NPCIL only</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Scheme not implemented</td></tr></table></td></tr>
<tr><td>5</td><td>Status of availability of ERS towers in NR</td><td>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.</td><td>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.II.III.</td></tr>
<tr><td>6</td><td>Submission of breakup of Energy Consumption by the states</td><td>All states/UTs are requested to submit the requisite data as per the billed data information in the format given as under:<table><tr><td>Category→</td><td>Consumption by Domestic Loads</td><td>Consumption by Commercial Loads</td><td>Consumption by Agricultural Loads</td><td>Consumption by Industrial Loads</td><td>Traction supply load</td><td>Miscellaneous / Others</td></tr><tr><td><Month></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></td><td>Status of the information submission (month) from states / utilities is as under:<table><tr><td></td><td>State / UT</td><td>Upto</td></tr><tr><td>◎</td><td>CHANDIGARH</td><td>Not Submitted</td></tr><tr><td>◎</td><td>DELHI</td><td>Oct-25</td></tr><tr><td>◎</td><td>HARYANA</td><td>Aug-25</td></tr><tr><td>◎</td><td>HP</td><td>Oct-25</td></tr><tr><td>◎</td><td>J&K and LADAKH</td><td>JPDCL- Mar'24
KPDCL- Not Submitted</td></tr><tr><td>◎</td><td>PUNJAB</td><td>Jul-25</td></tr><tr><td>◎</td><td>RAJASTHAN</td><td>Aug-25</td></tr><tr><td>◎</td><td>UP</td><td>Oct-25</td></tr><tr><td>◎</td><td>UTTARAKHAND</td><td>Feb-25</td></tr></table>Chandigarh is requested to submit the requisite data w.e.f. April 2018 as per the billed data information in the given format</td></tr>
</table>

9	Reactive compensation at 220 kV/ 400 kV level at 7 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	The Letter of Award for "Procurement of 125 MVAR Reactor, Online DGA, ODS, NIFPS along with its accessories at 400 KV Sub-station Kashipur" against Tender Specification no. PTCUL/E-Tender/C&P-II/SS-12/2024-25 has been issued to M/s Bharat Heavy Electricals Limited, New Delhi on 26.06.2025.

Annexure-A-II.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.	-	02 No. of bays shall be utilized for LILO-II of 220kV Jatwal-Bishnah Transmission Line, the work of which is expected to begin on 16th July 2025. Updated in 233rd 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	Commissioned	Updated by HVPNL in 235th OCC.
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'25	Issue related to ROW as intimated in 228th 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 31.03.2025. Foundation 209/212. Erection 193/212. Stinging 37.8/50.3 km
				• 220 kV Bhiwani (PG) - Dadhibana (HVPNL) D/c line.	Mar'26	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 234th 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	Sep'25	Erection and stringing work completed.The signing of Connection agreement amongst the Utilities is pending. Updated in 234th 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
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 - Pali D/C line Kadarpur - Sec-65	Commissioned	Updated in 232nd OCC by HVPNL **Status:-** A-formats for FTC of line submitted on FTC portal of NRLDC on dated 09.04.25.

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
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	Oct'25	Line work completed, but commissioning of 220kV substation Roj ka Meo is pending till now.. However, this arrangement will not lead to usage of additional bays i.e. no of utilitsed bays at Sohna road will remain same.Updated in 230th 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 228th 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	Dec'25	Contract awarded on 08.08.23 to M/s Skipper with completion in December 25.Updated in 230th 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	Dec'25	Issue related to ROW and Pending crossing approval from Northern Railways and DFCCIL. as intimated in 228th OCC by HVPNL.
				• Prithla - Sector 89 Faridabad 220kV D/c line	Dec'25	The work for construction of 220kV D/C Prithla-Sector-78 Faridabad line on multi circuit towers is delayed mainly due to severe resistance by local villagers & ROW problem at site during construction. Due to delay in construction of 220kV D/C Prithla-Sector-78 Faridabad line, the work for construction of 220kV D/C Prithla-Sector 89 Faridabad line might delay..Updated in 230th 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	Commissioned	Commissioned as updated by HVPNL in 233rd OCC
				• 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	Nov'25	Updated in 232nd 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.
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	• LILO of 220 kV BBMB Jalandhar - Butari line at 400 kV PGCIL Jalandhar	-	LILO of 220 kV BBMB Jalandhar - Butari line at 400 kV PGCIL Jalandhar being planned. Route plan and estimate of work sanctioned, DNIT has been sent to float tender as updated by PSTCL in 227th OCC
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	Nov'25	Revised target date as confirmed by concerned XEN TS, Panchkula.Updated in 234th OCC by HVPNL

Sl. No.	Substation	Downstream network bays	Status of bays	Planned 220 kV system and Implementation status	Revised Target	Remarks
26	400/220kV Amritsar S/s	Commissioned:7 Approved in 50th NRPC- 1 no. Total: 8	Utilized: 6 Under Implementation:2	• Amritsar – Patti 220kV S/c line	-	Draft connectivity agreements for 220kV Rashiana-Amritsar has been received from CTU and the same under processing. Draft connectivity agreements for 220kV Patti-Amritsar line is under consideration by CTU. CTU is processing the agreement and PSTCL has provided with the requisite inputs/data to CTU. Updated in 232nd 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)	-	Draft connectivity agreements for 220kV Rashiana-Amritsar & 220kV Patti-Amritsar lines are under consideration by CTU. CTU is processing the agreement and PSTCL has provided with the requisite inputs/data to CTU. Updated in 232nd 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	-	Proposal turned down by CEA.Updated in 230th OCC by HVPNL.
				• Bahadurgarh - METL 220kV D/c line (Deposit work of M/s METL)	15.06.2026	Updated in 230th OCC by HVPNL. **Status:** The work stands awarded to the M/s KRR and the execution work has been started at site. Partial route stands approved by the competant authority of the HVPNL. Further, 06 no. Foundation has been casted.
				• Bahadurgarh - Kharkhoda Pocket B 220kV D/c line	30.11.2025	Updated in 234th OCC by HVPNL. **Status:** RoW issues which are being resolved with the help of Duty Magistrate.
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.
32	400/220kV, Manesar	Commissioned: 8 Total: 8	Utilized: 4 Unutilized: 4	• Network to be planned for 2 bays	-	Status:- A proposal is being prepared for the creation of another 220kV D/C line from the 400kV substation Panchgaon (PG) to the 220kV substation Panchgaon (HVPNL), along with the LILO of one circuit of the 220kV D/C Panchgaon (PG) – Mau line at the 220kV substation Panchgaon to utilize two bays at the 400kV substation Panchgaon. The load flow study for this has already been completed.
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	• 400 kV PGCIL Patiala - 220 kV Bhadson (D/C)	-	2 Nos. bays for 400 kV PGCIL Patiala - 220 kV Bhadson (D/C) line being planned. Construction of boundary wall has started at 220 kv ss bhadson.yard work could not be started as approval for dismantaling existing 517 no tress is pending at district level committee which is competent for giving approval of dismantling of trees. Chairman of committee is DC pataiala.. as updated by PSTCL in 233th OCC meeting

Status of ADMS implementation in NR:

Sl. No.	State / UT	Status	Remarks
1	DELHI	Scheme Implemented but operated in manual mode.	In 236th OCC meeting, Delhi SLDC representative stated that as informed by BRPL and BYPL, SCADA upgradation work of would be completed by Dec'25. Further, SCADA upgradation work of TPDDL would be completed by Dec'26. MS, NRPC asked HPSLDC to expedite the finalization of feeders list.
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	In 237th OCC meeting, HPSDLC representative informed that vide letter dated 25.10.2025 they have requested HPSEBL to expedite the feeder list. However, reply of HPSEBL is awaited. Further, they have also requested MD, HPSEBL for a suitable date for a meeting in this regard.
4	PUNJAB	Scheme not implemented	In 236th OCC meeting, Punjab SLDC representative informed that testing of SCADA upgradation under ULDC phase III is underway. It is likely to be completed by Dec'25.
5	RAJASTHAN	Under implementation	RVPN has pilot tested the logic of ADMS which is to be implemented for Rajasthan. In 232th OCC meeting, RVPN informed that 351 nos. of circuit breakers have been mapped to ADMS, all 351 circuit breakers tested upto yard individually. Total 650CBs are to be mapped in phased manner.
6	UP	Scheme implemented by NPCIL only	In 236th OCC meeting, UP SLDC representative stated that 300 No. of 132 KV Substations have been integrated with SCADA. SCADA upgradation under ULDC phase III is likely to be completed in the next 3 to 4 months. List of 33kV feeders to be mapped under ADMS is required from the Discoms. In the meeting held in Aug'25, UPSLDC had requested Discoms to provide the feeders list. Reminders were also sent to Discoms. However, 33 kV feeder list is still pending from the Discoms. MS, NRPC asked UPSLDC to have and meeting with Discoms in its control areas and finalize of feeder list before next OCC meeting. In 237th OCC meeting, UPSLDC representative mentioned that they are planning to have a meeting with higher management of Discom's by the end of Nov'25.
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. v. First Phase- Data Acquisition of 32 interstate points completed. vi. Second Phase-95 distribution side Substation work is on progress. vii In 230th OCC meeting Uttarakhand SLDC representative informed that Harbour installation and communication establishment has been done on 35 11kV feeders out of total 195 11kV feeders. The work is expected to be completed by December, 2025.

Annexure-A.II.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 scraped due to single bidder.
		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 Ajmer.
		220 kV	16227.979		3		
		400 kV	6899.386		2		
		765 kV	425.498		1		

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
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 JKPTCL, Kashmir:10 tower procured (out of which 3 on loan to JKPTCL, Jammu)
15	HVPN						HVPN has apprised that purchase order for procurement of 2 sets of Emergency Restoration System (ERS) in HVPNL has been issued to M/s Jost's Engineering Company Ltd., Mumbai
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		Tied up with M/s INDIGRID for providing ERS on need basis.
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)

Annexure-III

भारत सरकार/Government of India
विद्युत मंत्रालय/Ministry of Power
केन्द्रीय विद्युत प्राधिकरण/Central Electricity Authority
विद्युत प्रणाली अभियांत्रिकी एवं प्रौद्योगिकी विकास प्रभाग
Power System Engineering & Technology Development Division

दिनांक: 15.10.2025

सेवा में,

<As per attached list>

विषय: Minutes of the meeting of Standing Committee of Experts on failure of EHV transmission towers failed during the period from January 2025 to June 2025-reg.

महोदया/महोदय,

You are kindly aware that a Standing Committee of Experts was constituted vide CEA Letter No -41/98/Secy/CEA/809 dated 24.09.1999 and reconstituted vide CEA letter no. CEA/5-41(18)/Secy-2012/166 dated 08.08.2012 under Section 73, Clause (I) of the Electricity Act, 2003 to investigate the failure of 220 kV and above voltage class transmission line towers and recommend remedial measures to avert failures in future.

2. In this connection, a meeting of the Standing Committee of the Experts was held under the chairmanship of Chief Engineer (PSE&TD), CEA on 08.09.2025 at CEA HQ, New Delhi to discuss the cause of failures of the transmission line towers reported by various utilities to CEA that had failed during the period from January 2025 to June 2025.

3. Minutes of the meeting of the Standing Committee are enclosed herewith kind reference and necessary action by all concerned.

Encl: as above

भवदीय,
Signed by Bhanwar Singh Meena
Date: 15-10-2025 17:30:25
(भंवर सिंह मीना /Bhanwar Singh Meena)
Director (PSE&TD) & Member Secretary of the Committee

Copy to:

1. SA to Chairperson, CEA
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Minutes of the meeting of Standing Committee of Experts on failure of EHV transmission towers failed during the period from January 2025 to June 2025

Table of Contents

1. Index for Tower failure reported for the period from January, 2025 to June, 2025

17	UPPTCL	15.06.2025	NR	220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers	17.06.2025	26.06.2025	83
18	RENEW	13.05.2025	SR	400 KV DC Gadag - Narendra (New) Line	16.05.2025	02.06.2025	87
19	KPTCL	17.05.2025	SR	220 kV SRS Huballi- Narendra Line	-	13.08.2025	91
20	NTPC	21.05.2025	NR	400 kV Dadri- Harsh Vihar Ckt-1&2	-	07.08.2025	95
21	NRSS XXXVI	13.06.2025	NR	400 kV D/C Babai-Bhiwani Transmission Line	16.06.2025	19.06.2025	99
22	ADANI	13.06.2025	NR	400kV Mahendragarh–Bhiwani Transmission Line	-	01.08.2025	102
23	STERLITE	30 & 31.07.2025	WR	Outage of 400 kV Line in Mumbai Area	30/31.07.2025	31.07.2025	105

2. Background

Under Section 73, Clause (l) of the Electricity Act, 2003, CEA vide office order no: 5-41/98/Secy/CEA/809 dated 24.09.1999 **(Annexure-IV)** constituted a Standing Committee of Experts in the field of design and operation of EHV transmission line towers from CEA, various transmission utilities and research/academic institutes to investigate the failure of 220 kV and above voltage class transmission line towers and recommend measures to avert recurrence of such failures in future. The Committee was reconstituted vide CEA office order no: CEA/5-41(18)/Secy-2012/166 dated 08.08.2012.

The objective of the Standing Committee is to investigate the causes of failures, deliberate the failures of transmission line towers of various Power utilities, suggest remedial measures to prevent recurrence of such events in future and prepare a report which would serve as a repository of case studies of failures and suggested remedial measures for future.

As per CEA (Measures relating to Safety and Electric Supply) Regulations, 2023, all utilities are required to report any event of failure of 220 kV & above voltage class transmission line towers within 48 hrs, and submit a detailed report to CEA as per stipulated format (available on CEA website and is enclosed at **Annexure-III**) covering reasons for failure and measures taken/ to be taken to avoid recurrence of such failures. As part of this activity, CEA has been receiving reports of failures of various Towers of 220 kV and above voltage class transmission lines from power utilities.

In this connection, a meeting of the Standing Committee of Experts to investigate the failure of 220 kV and above voltage class Transmission Line Towers period that occurred during the period from January, 2025 to June, 2025 was held on 08.09.2025 at CEA HQ, New Delhi under the Chairmanship of Chief Engineer (PSE&TD), CEA and Chairman of the Standing Committee. List of participants is given at **Annexure-I.**

3. Introduction

Sh. N.R.L.K. Prasad, Chief Engineer (PSE&TD), CEA and Chairperson of the Standing Committee, extended warm welcome to all the Members and Participants, and gave a brief background on the formation and mandate of the Standing Committee. He stated that to enable Standing Committee carry out its work, it is important that Utilities report the instances of tower failures in their network/ system well within time as per regulatory provisions and facilitate proper analysis of their respective events by the Committee by undertaking site visits, if required, in time.

It was informed that as per Regulation 48 (8) of CEA (Measures relating to Safety and Electric Supply) Regulations, 2023, failures of any 220 kV and above voltage level transmission line tower shall be reported by the owner utility within 48 hours of occurrence of the failure, to the Authority, and the

reasons for failure and measures to be taken to avoid recurrence of failure shall be sent to the Authority within one month of the occurrence as per stipulated formats, along with all the additional information (images, duly filled CEA Proforma, wind speed data, coordinates of failed towers, patrolling data, material test reports) with the approval of the HoD. He further requested all the utilities to furnish the closure report for the event within 3 months including all the details and records. All the utilities were requested to adhere to these timelines strictly.

He expressed concern that many utilities are not intimating/ notifying failure cases within 48 hours and are also failing to submit detailed failure reports within one month. He further highlighted the issue of tower failures occurring within 10 to 15 years of commissioning, whereas the design life of a tower is 35 years. It was noted that, out of 22 failure incidents, 16 were reported within 10 to 15 years of commissioning. Representatives from AEGCL, DVC and MSETCL informed that there have been no failures in their respective utilities for the period from January, 2025 to June, 2025. No representative from NRPC, SRPC, WRPC, ERPC and Delhi Technical University had attended the meeting.

He advised all utilities to develop in-house teams equipped with relevant tower design software to simulate, analyze, and address design issues in failed towers. He further informed that, in most tower failure incidents, the reasons reported by the utilities were high wind speeds, cyclonic winds, or heavy rainfall. Accordingly, while designing towers, due consideration must be given to terrain type, wind speed in the respective terrain, and areas prone to high wind activity to ensure longevity. Moreover, when citing wind speed as the cause of failure, utilities must substantiate the claim with supporting wind speed data.

It was highlighted in the meeting that IMD has already established a network of wind sensors at approximately 700 locations across India, each capable of capturing wind parameters, including speed, within a radius of 10 km. The website for accessing this data is **aws.imd.gov.in**. He further advised utilities to coordinate with the Indian Meteorological Department (IMD), Airports Authority of India (AAI), nearest wind farms, or the State Irrigation Department to obtain wind speed data at failure locations, as wind has been reported as a major contributing factor to tower collapses by the utilities.

He further suggested that all utilities must ensure that new towers erected in replacement of failed ones, as well as spare towers procured, conform to the prevailing regulations, applicable standards, and the wind speed conditions of the respective area.

Specific mention was made to the following points:

- Amendment to CEA (Technical Standards for Construction of Technical Standards for Construction of Electrical Plants and Electric Lines Regulations), 2022 is being brought out to specify RoW requirements for combinations of various towers and various conductors.
- The existing Type Test Guidelines and Model Quality Assurance Plan (MQAP) issued in March, 2022 are being revised, and a draft in this regard has been kept on CEA website on 18.08.2025 for

stake-holders comments by 17.09.2025. All Utilities were requested to furnish comments on the same so that their views are properly factored in.

- Digitization of Spares and Inventory Management of transmission system assets using suitable software like SAP shall be taken up on priority basis.
- Recommendations of the Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) Infrastructure in Coastal area [Report brought out in May, 2021) for appropriate adoption by the Utilities concerned.
- Guidelines for planning, deployment and procurement of ERS infrastructure [issued in December, 2015] and the Standard operating Procedure (SOP) for restoration of the transmission system including the Transmission Line [issued in May 2025) may be complied with.
- Operation and maintenance practices may be strengthened.

He then requested Sh. Bhanwar Singh Meena, Director (PSE&TD), CEA and Convener of the Standing Committee to take up the Agenda**.**

Director (PSE&TD), CEA welcomed all participants and urged all utilities to promptly report tower failure incidents to facilitate timely site visits by the committee. He stressed on the importance of analyzing and identifying the root causes of these failures while submitting detailed reports. He also advised utilities to coordinate with the Indian Meteorological Department (IMD), Airport Authority of India (AAI) nearest wind farms, or the State Irrigation Department to obtain wind speed data at the failure locations, as wind has been reported as a major factor in tower collapses. Obtaining wind speed data from an authentic observatory is crucial to determining whether wind speed exceeded the design specifications of the towers. Such data can inform necessary modifications in design parameters to prevent future failures. He encouraged active participation in the deliberations to determine the causes of these failures and to propose remedial measures to prevent future occurrences.

He informed that for the period of January 2025 to June 2025, a total of 22 incidents of failure of EHV transmission line towers were reported to CEA by 11 Utilities (PGCIL, RVPN, THDCIL, GETCO, MPPTCL, UPPTCL, RENEW, KPTCL, NTPC, NRSSXXXVI and ADANI) which included failure of 58 Nos. of Suspension Type Towers and 17 Nos. of Tension Type Towers. It was also added that failure of only Three (3) Nos. of Transmission Lines of Two (2) Nos. of utilities had been intimated within 48 hours and detailed failure report of only Ten (10) Nos. of Transmission Lines of Six (6) utilities had been submitted within one month.

He further clarified that for Tower failures, STUs and TSPs shall report the incidents to CEA. However, any tripping events shall be intimated to the SLDC.

Thereafter presentations by Utilities for their respective failure incidents were held. The failure incidents and their subsequent findings were deliberated upon by the members of the committee

4. Deliberations held during Standing Committee Meeting

1. A total of 22 Nos. of EHV Transmission Line tower failure incidences consisting 59 Nos. are of Suspension Type Tower and 16 Nos. are of Tension Type Towers between 1st January 2025 and 30th June 2025 were reported by 11 Utilities (PGCIL, RVPN, THDCIL, GETCO, MPPTCL, UPPTCL, RENEW, KPTCL, NTPC, NRSSXXXVI and ADANI). Complete details of all the reported EHV Transmission Line Tower failures are given at **Annexure-II**. The details of the deliberations of the standing committee meeting are presented in the ensuing paragraphs.

2. The Representative of **PGCIL** presented failures of 2 nos. of transmission lines covering total 2 nos. of Towers (1 no. of Suspension Type Tower and 1 no. of tension Type Tower). The transmission line wise deliberations are as under:

(i) 220 kV D/C Samba- Chowadhi-I/ Samba-Hiranagar-I Line (within 10 years): In 220 kV D/C Samba- Chowadhi-I/ Smba-Hiranagar-I Transmission Line, 1 no. of tension type tower (DD+18) collapsed at tower location number 26. The line was commissioned in the year 2016 and the line length is 14.043 km. The reported cause of the failure is high speed localized cyclonic wind.

PGCIL representative mentioned that the tower at location no. 26 (D+18) had collapsed from ground level and all four stubs were found damaged near the chimney level. Due to sudden impact, Coping was also found cracked from top in all four stubs. The collapsed tower had fallen on the right side in transverse direction facing Samba S/S. Due to sudden jerk caused by collapsed tower no. 26, the top phase cross arm at adjacent tower (Loc No 25) was also damaged.

Chief Engineer (PSE&TD), CEA, suggested that wind speed data from IMD observatories may be utilized for analysing the cause of tower failures. He further enquired about the reasons for failures occurring within 10 years of commissioning, to which the representative from Powergrid informed that, as per the revised wind zone map, the failed tower was located within 50 km of Wind Zone 5, whereas it had been designed for Wind Zone 4. The Chief Engineer (PSE&TD) clarified that, for towers located in overlapping wind zones, the higher wind zone shall be considered if the tower is situated within 50 km of the border area, and requested to ensure the same.

He also enquired about the increased span between towers, in response to which the representative of PGCIL explained that a higher tower span results in reduced angle of deviation, enabling more effective utilization of towers. Chief Engineer (PSE&TD), CEA, suggested that CEA clearance must be obtained prior to implementation of higher spans as it effects the RoW requirements and further suggested to submit the tower design report and material test report. Director (PSE&TD), CEA requested to check the restored tower strength as per IS 802: 2015 as the tower was earlier designed as per IS 802: 1995 and to furnish the justification for utilizing the higher span.

After detailed deliberations in the meeting, it was concluded that the primary reason for the failure was the design of the tower for wind zone-4, whereas the tower has been experiencing the effects of Wind Zone–5 due to it falling in the overlapping area between Wind Zone-4 & Wind Zone-5.

(ii) **765 KV Fatehpur-Agra 2 Transmission Line (within 12 years):** In 765 KV Fatehpur-Agra 2 Transmission Line, 1 no. of suspension type tower (A+0) at Tower Location Number 722 got failed. The line was commissioned in the year 2013 and line length is 335 km. The reported probable cause of failure is Extremely high-speed cyclonic windstorm.

As informed by representative of PGCIL**,** an internal committee of PGCIL visited the site to assess the damage. The committee observed that the tower had buckled above waist level and both peaks were damaged. No tower members, nuts, or bolts were found missing. Material testing of the components was carried out, and the reports were found to be satisfactory. The failed tower has been restored by erecting a spare tower on the existing foundation. For meteorological assessment, PGCIL requested wind speed data from IMD corresponding to the time of failure. However, IMD expressed its inability to provide the information owing to the absence of wind sensors in Shikohabad District, where the tower was located.

Chief Engineer (PSE&TD), CEA enquired about the reasons for failures occurring within just 12 years of commissioning, to which the representative from Powergrid informed that the tower configuration is 'Delta Type' which might have contributed to the failure despite the tower having undergone strengthening.

Director (PSE&TD), CEA highlighted that several failures of Delta-type towers have been reported in recent years. Detailed studies carried out by CPRI and Manitoba on this tower type had revealed certain inherent design-related concerns. Based on these studies, it was advised to strengthen such towers. Strengthening is done by adding additional members rather than replacing the member entirely.

Chief Engineer (PSE&TD), CEA remarked that submitted information as per CEA format is incomplete and asked PGCIL to furnish full details as per CEA format. Additionally, Director (PSE&TD), CEA mentioned that restored tower should be designed as per latest IS, i.e., IS 802: 2015.

After detailed deliberation, it was concluded that the primary cause of the failure was the inherent vulnerability of the Delta-type tower configuration, which remains structurally less reliable even after strengthening interventions.

3. The Representative of **RVPNL** presented failures of 2 nos. of transmission lines covering total 10 nos. of Towers (9 nos. of Suspension Type Tower and 1 no. of tension Type Tower). The transmission line wise deliberations are as under:

(iii) **400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line (with in 6 years)-** In 400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line, 8 nos. of suspension type tower (A+0) and 1 no of tension type got collapsed. The line was commissioned in the year 2019 and line length is 117 km. The reported probable cause of failure is heavy windstorm.

Representatives of RVPNL informed that two towers in the same line failed in the year 2021 and again 4 towers in the same line failed in the year 2023 and now again 9 towers failed in the year 2025. The material has been sent for testing. Further, an internal committee has also been formed to investigate the failure, the report of which is yet to be submitted. He further informed that the Towers have not been restored yet because of the issues arising due to land and crop compensation and expected to be restored by the next week.

Chief Engineer (PSE&TD), CEA enquired about the reliability level and reasons for failures occurring within just very few years of commissioning to which representatives from RVPNL stated that there might be some design issues in the towers.

The Chief Engineer (PSE&TD), CEA observed that the information submitted in the prescribed CEA format was incomplete. He directed that the same to be furnished in the complete CEA format along with all relevant reports and the presentation. He further emphasized that the matter be brought to the notice of senior officials of RVPNL and instructed that representatives well-versed with the subject should attend future meetings fully prepared. Director (PSE&TD), CEA requested to submit the Tower Patrolling reports also.

Complete information duly filled in the prescribed CEA format along with the details of wind zone in which the line is located is yet to be submitted by M/s. RVPNL.

(iv) **400 kV D/C Barmer- Bhinmal Line (within 6 years):** In 400 kV D/C Barmer- Bhinmal Line 1 nos. of suspension type tower (DA+9) at Tower Location no. 101 got collapsed. The line was commissioned in the year 2019 and line length is 144 km. The reported probable cause of failure is Heavy Rain, Wind Storm and Lightning.

The representatives of RVPNL informed that the line was restored on 05.06.2025, during which period the line remained out of service. It was further reported that earlier a (DA+9) type tower was in place; however, during restoration, a (DC+9) type tower was erected to reduce the span, considering that the tower location is surrounded by lower hills on both sides, which creates conditions conducive to the development of whirlwinds and cyclonic effects.

Chief Engineer (PSE&TD), CEA observed that the information submitted in the prescribed CEA format was incomplete. He directed that the same be furnished in the complete CEA format along with all relevant reports and the presentation. He further emphasized that the matter be brought

to the notice of senior officials of RVPNL and instructed that representatives well-versed with the subject should attend future meetings fully prepared. Director (PSE&TD), CEA suggested to submit the intimation of failures within 48 hours so that site visit of the committee can be scheduled.

Complete information duly filled in the prescribed CEA format along with the details of wind zone in which the line is located is yet to be submitted by M/s. RVPNL.

4. The Representative of **THDCIL** presented failures of 1 no. of transmission lines covering total 3 nos. of Suspension Type Towers. The transmission line wise deliberations are as under:

(v) 220 kV Amarapur-Tharad Line (within 13 years): In 220 kV Amarapur-Tharad Line, 3 nos. of suspension type towers (DA+3) at Tower Location Nos. 21,22 and 23 got collapsed. The line was commissioned in the year 2012 and the line length is 90 km. The reported probable cause of failure is heavy gusty wind.

The representative of THDCIL informed that THDCIL has a 50 MW wind power project at Patan and that the 220 kV Amarapur–Tharad line is a shared infrastructure among 18 renewable generators, including THDCIL. He stated that any decision regarding this transmission line requires the consensus of all 18 generators at Patan. Regarding the tower failures, he reported that the foundations of towers at locations 21, 22, and 23 were completely damaged. In particular, the tower at location 21 was situated close to the existing river course. These towers were temporarily restored on ERS on 27.06.2025, and the new alignment was shifted approximately 56–60 meters away from the river course.

He further informed that GETCO is the O&M contractor for this line; however, GETCO declined to undertake restoration, clarifying that their scope is limited to routine maintenance activities only.

Director (PSE&TD), CEA sought details of the wind data source. The THDCIL representative explained that wind speed measurements were taken from sensors installed at the wind generator at a height of 90 meters, which records higher values compared to the tower height. He further enquired about the type of foundation adopted for the failed towers. It was informed that a simple non-pile type foundation had been used at the time of design and installation. However, over time, the river appears to have changed its course, and currently the tower at location 21 is very close to the river, with high water levels.

Director (PSE&TD), CEA observed that based on the aerial view the river was already located close to the tower foundations at the time of installation also. He therefore advised to submit the details regarding type of foundation with depth of foundation along with the soil test reports for both at the time of commissioning and at the time of restoration. He further instructed to intimate the failure incident within 48 Hrs. to CEA and directed that the restored towers be

designed and strengthened in accordance with the latest provisions of IS 802:2015. He further directed to submit the complete information filled in CEA format along with all the relevant tests and reports.

The details regarding type of foundation with depth of foundation along with the soil test reports for both at the time of commissioning and at the time of restoration are yet to be submitted by M/s. THDCIL.

After detailed deliberations, it was concluded that the primary cause of failure may be the use of an inappropriate foundation type, which proved unreliable under conditions of waterlogging. **However, final conclusion may be drawn after receipt of the foundation design data and soil test report.**

5. The Representative of **GETCO** presented failures of 3 nos. of transmission lines covering total 4 nos. of Suspension Type Towers. The transmission line wise deliberations are as under:

(vi) 400 kV Kosamba Charal line and 400 kV Kosamba Panchham line- D/C Line (within 11 years): In 400 kV Kosamba Charal line and 400 kV Kosamba Panchham line- D/C Line, 2 nos. of suspension type towers (DR+0) at Tower Location Nos. 518(S) and 519 (S) got collapsed. The line was commissioned in the year 2014 and the line length for Kosamba Charal line is 248 km and for Kosamba Panchham line is 233 km. The reported probable cause of failure is extremely heavy wind and rain with lightning.

The representative of GETCO informed that the failed tower was located in a coastal area, however, its foundation had been designed for normal soil conditions. He suspected that the failure was likely due to foundation inadequacy and therefore suggested changing the foundation type for a 5 km stretch of the coastal section of the line. He further reported that the tower was restored on 15.05.2025.

Director (PSE&TD), CEA observed that the information submitted was incomplete in the prescribed CEA format. He directed that the same be furnished in the complete format along with all relevant test results and supporting reports. He requested submission of the soil test reports, both from the time of commissioning of the tower and from the time of failure along with photographs of the dismantled Tower and further advised referring to the "Recommendations of the Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) Infrastructure in Coastal Areas" (Report issued in May 2021) for appropriate adoption.

The soil test reports, both from the time of commissioning of the tower and from the time of failure along with photographs of the dismantled Tower is yet to be submitted by M/s. GETCO. Further, complete information in duly filled CEA format with details of wind zone is also awaited.

After detailed deliberations, it was concluded that the primary cause of failure was the use of an inappropriate foundation type, which proved unreliable under coastal conditions.

(vii) **220 kV Bhachunda Varsana/ Ukheda Varsana line (Line ownership of M/s Suzlon)**: In 220 kV Bhachunda Varsana/ Ukheda Varsana line, 1 no. of suspension type towers (DA+3) at Tower Location No. 336 got collapsed. The line was commissioned in the year 2004 and the line length for 173 km. The reported probable cause of failure is heavy rain, heavy wind and cyclone effect. Line restored on 23.05.2025.

The representative of GETCO informed that, as per the IMD report dated 06.05.2025, the wind speed in the nearby area was approximately 70–80 km/h, and the tower was designed for Wind Zone–5. He further stated that the line is a dedicated line and the ownership is with Suzlon Energy.

Chief Engineer (PSE&TD), CEA enquired why the tower had been designed as per IS 802:1977, whereas it should have been designed in accordance with IS 802:1995, since the installation was carried out in 2004. It was also highlighted that if the tower had been designed as per IS 802:1977, it would have been inadequate for the prevailing wind speeds reported by IMD, thereby leading to failure.

Accordingly, it was advised that GETCO verify the IS code actually followed during the design and commissioning of the tower from M/s Suzlon Energy and submit their findings to the Committee. It was further requested to provide IMD report dated 06.05.2025 indicating the recorded wind speed, along with the Tower Design Report prepared at the time of commissioning, and details of the necessary strengthening measures in line with the applicable IS code (IS 802:2015) as of now. Additionally, complete information in the duly filled CEA format, including all supporting reports and test results, was also sought for submission.

The requisite information sought in the meeting for further analysis of the cause of failure are yet to be submitted by M/s. GETCO.

After detailed deliberations, it was concluded that the primary cause of failure was inappropriate tower design, which did not conform to the relevant IS standards prevailing at that time, thereby rendering the structure unreliable and causing tower failure. Furthermore, since the line is a dedicated line, M/s Suzlon Energy shall be the responsible representative in matters pertaining to tower failures on this line.

(viii) **220kV Nakhatrana-Panadhro Line 1 & 2**: In 220kV Nakhatrana-Panadhro Line 1 & 2, 1 no. of suspension type towers (DA+0) at Tower Location No. 163 got collapsed. The line was commissioned in the year 1997 and the line length is 75 km. The reported probable cause of failure is heavy rain, heavy wind and cyclone effect.

The representative of GETCO informed that an internal committee visited the site. The failed tower was located in a coastal area, however, its foundation had been designed for normal soil conditions. He suspected that the failure was likely due to foundation inadequacy and therefore suggested changing the foundation type.

Chief Engineer (PSE&TD), CEA suggested that wind speed data from the nearest IMD observatories may be utilized for analysing the causes of tower failures.

Director (PSE&TD), CEA requested submission of the soil test reports, both from the time of commissioning of the tower and from the time of failure along with Tower Design Report at the time of commissioning of the tower and necessary strengthening measures as per the applicable IS code (IS 802:2015) as of now. Additionally, complete information in the duly filled CEA format, including all supporting reports and test results, was also sought for submission. He further advised referring to the "Recommendations of the Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) Infrastructure in Coastal Areas" (Report issued in May 2021) for appropriate adoption.

The requisite information sought in the meeting for further analysis of the cause of failure are yet to be submitted by M/s. GETCO.

After detailed deliberations, it was concluded that the primary cause of failure was the use of an inappropriate foundation type, which proved unreliable under coastal conditions.

6. The Representative of **MPPTCL** presented failures of 4 nos. of transmission lines covering total 24 nos. of Towers (21 nos. of Suspension Type Tower and 3 no. of tension Type Tower). The transmission line wise deliberations are as under:

(ix) **220KV SIDHI-ATPS & 220KV SIDHI-REWA Transmission Line (within 17 years)**: In 220KV SIDHI-ATPS & 220KV SIDHI-REWA Transmission Line, 1 no. of suspension type towers (JC) at Tower Location No. 8 and 1 no. of Tension type Towers (B60+10) at Tower Location No. 9 got collapsed. The line was commissioned in the year 2008 and the line length is 58 km. The reported probable cause of failure is Heavy storm and rain.

The representative of MPPTCL informed that the tower was commissioned in 2008 as per IS 802:1995, which was applicable at that time. It was further reported that the failed towers were restored using spare towers, and the restoration work was completed on 22.05.2025. He also mentioned that a special design tower with a 700 m span had been used for the river crossing.

The Chief Engineer (PSE&TD), enquired the reason of Tower failure within 17 Years only and directed MPPTCL for submission of Tower Design Report for further analysis. He further directed MPPTCL to submit the complete information in the prescribed CEA format along with the

complete design documents and test reports. Additionally, he advised that the standard tower nomenclature, as adopted nationally, should be followed.

Out of all the sought details/ documents, Tower Design Report and complete information in duly filled CEA format is yet to be submitted by M/s. MPPTCL.

(x) **400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II**: In 400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II, 5 no. of suspension type towers (FD0+3, FD0, FD0, FD0, , FD0) at Tower Location No. 112,113,114,115,116 and 1 no. of Tension type Towers (FD30) at Tower Location No. 111 got collapsed. The line was commissioned in the year 1991 and the line length is 97 km. The reported probable cause of failure is Cyclonic storm in localized area.

The representative of MPPTCL informed that wind speed data from IMD Bhopal as well as from the Revenue Department of the concerned Tehsil was not available at the time of the tower collapse. He further stated that the tower, commissioned in 1991, had completed its service life without any prior failure. It was reported that the failed towers were restored using spare towers of the old design (as per IS 802:1977), and the restoration was completed on 15.05.2025. He further informed that strengthening of the Tower as per IS 802:2015 is proposed without changing the foundation.

Chief Engineer (PSE&TD), CEA suggested strengthening the towers in compliance to latest IS 802:2015. He also directed that foundation test reports be furnished after carrying out the necessary tests, noting that the towers are located in paddy fields where waterlogging conditions may prevail. Submission of all the details as mentioned in CEA Format may also be submitted along with all the design details and test.

Director (PSE&TD), CEA directed submission of the new tower design in accordance with IS 802:2015, along with proposed recommendations for strengthening of the towers.

The details sought in the meeting for further analysis of the reason for failure of Tower are yet to be submitted by M/s. MPPTCL.

After detailed deliberations, it was concluded that the primary cause of failure was completion of the tower's service life, which likely led to weakening of the structure and eventual failure due to heavy wind.

(xi) **400 kV DCDS Bhopal Bina line Ckt.-I & II**: In 400 kV DCDS Bhopal Bina line Ckt.-I & II, 6 nos. of suspension type towers (FD0, FD0, FD0, FD0+3, FD0+6) at Tower Location No. 122, 123, 125, 126 ,127 got collapsed, 5 nos. of suspension type towers (FD0, FD0, FD0, FD0, FD0) at Tower Location No. 96, 98, 121, 128 ,129 got partially damaged and 1 no. of Tension type Towers (FD30) at Tower

Location No. 124 got partially damaged. The line was commissioned in the year 1994 and the line length is 135 km. The reported probable cause of failure is Cyclonic storm in localized area.

The representative of MPPTCL informed that Tower was commissioned in 1994 using IS 802:1977 applicable at that time and had completed almost its service life. It was reported that 1 circuit has been restored on ERS on 08.08.2025.

Chief Engineer (PSE&TD), CEA directed for submission of all the details as mentioned in CEA Format along with all the design details and test reports.

After detailed deliberations, it was concluded that the primary cause of failure was completion of the tower's service life, which likely led to weakening of the structure and eventual failure due to heavy wind.

(xii) **400kV DCDS Chhegoan- Julwania Transmission Line (within 11 years)**: In 400kV DCDS Chhegoan-Julwania Transmission Line, 2 nos. of suspension type towers (FD0, FD0+6) at Tower Location No. 240, 241, got collapsed and 2 nos. of suspension type towers (FD0+3, FD0+3) at Tower Location No. 235 and 239 got partially damaged. The line was commissioned in the year 2014 and the line length is 114 km. The reported probable cause of failure is Cyclonic storm in localized area.

The representative of MPPTCL informed that wind speed data from IMD Bhopal was not available and, therefore, data from the nearest tehsil was considered. The recorded wind speed at the time of tower failure was 50 km/hr. It was further reported that the failed towers were restored using spare towers of the old design (as per IS 802:1977), and the restoration was completed on 07.07.2025. He also mentioned that strengthening of the towers has been suggested in accordance with IS 802:2015.

Chief Engineer (PSE&TD), CEA enquired about the usage of IS 802:1977 for tower design when the line was commissioned in the year 2014. In response, the representative of MPPTCL clarified that strengthening has been proposed for all towers of the same line. The Chief Engineer (PSE&TD), CEA further directed submission of all details in the prescribed CEA format along with complete design documents and test reports.

Director (PSE&TD), CEA directed submission of the new tower design in compliance with IS 802:2015, along with proposed recommendations for strengthening of the towers which is yet to be submitted by M/s. MPPTCL.

After detailed deliberations, it was concluded that the primary cause of failure was inappropriate tower design using IS 802:1977, which did not conform to the relevant IS standards applicable at the time of Tower Design, thereby rendering the structure unreliable and causing tower failure.

7. The Representative of **UPPTCL** presented failures of 5 nos. of transmission lines covering total 16 nos. of Towers (12 nos. of Suspension Type Tower and 4 no. of tension Type Tower). The transmission line wise deliberations are as under:

(xiii) **400 KV ORAI - PARICHHA D/C – I & II (within in 9 years):** In 400 KV ORAI - PARICHHA D/C – I & II, 3 no. of suspension type towers (DA+0) at Tower Location No. 56,57 and 58 got collapsed. The line was commissioned in the year 2016 and the line length is 111 km. The reported probable cause of failure is heavy cyclonic storm.

Representative of UPPTCL informed that the tower was designed as per IS 802:1995, however, it was installed in the year 2016. He further clarified that while the foundation remained intact, damage occurred only to the stub. The tower was restored on 11.07.2025 by repairing the stub and erecting a spare tower. During this period, the line remained out of service.

It was noted that in the report submitted to CEA by UPPTCL, the likely date of restoration was mentioned as 30.05.2025. Chief Engineer (PSE&TD), CEA observed that the information provided in the report was not consistent with the presentation, and appeared incorrect. He recommended review of the submitted data, particularly with respect to the restoration date and reliability level, and once again directed UPPTCL to submit all relevant information and reports to CEA. Director (PSE&TD), CEA recommended to the review the design as per IS 802:2015.

The complete information in duly filled CEA format along with all the design documents and test reports are yet to be submitted by M/s. UPPTCL.

(xiv) **220 kV Nehtaur-Mataur (765 kV PGCIL) Line (within 14 years)**: In 220 kV Nehtaur-Mataur (765 kV PGCIL) Line, 2 nos. of Tension type towers (B5 and SC) at Tower Location No. 6 and 7 got collapsed. The line was commissioned in the year 2011 and the line length is 73 km. The reported probable cause of failure is heavy storm due to which tower got bend at stub.

Representative from UPPTCL did not present this particular failure.

(xv) **220 kV Jagriti Vihar-Hapur (765 KV) D/C line (within 6 years)**: In 220 kV Jagriti Vihar-Hapur (765 KV) D/C line, 2 nos. of Suspension type towers (DA+5 and DA+0) at Tower Location No. 86,87 and 2 nos. of Tension type towers (DB+5 and DB+0) at Tower Location No. 85 and 88 got collapsed. The line was commissioned in the year 2019 and the line length is 73 km. The reported probable cause of failure is Wind storm/ cyclone.

Representative of UPPTCL informed that the tower was designed as per IS 802:1995, however, it was installed in the year 2019. It was informed that foundations of the Towers were not damaged and the line was restored on 30.05.2025.

Director (PSE&TD), directed to obtain the wind speed data from the nearest IMD observatory and recommended to the review the design as per IS 802:2015. He further directed UPPTCL to submit all relevant information in CEA format along with all the material test reports and wind speed data to CEA.

The complete information in duly filled CEA format along with all the design documents and test reports are yet to be submitted by M/s. UPPTCL.

(xvi) **400 kV Panki- Unnao S/C Transmission Line (within 27 years):** In 400 kV Panki- Unnao S/C Transmission Line Manpur (Adani) line, 5 nos. of suspension type tower got collapsed. The line was commissioned in the year 1998 and the line length 49 km. The reported probable cause of failure is Very High Cyclonic Storm.

Representative of UPPTCL informed that the tower was designed for Wind Zone–4. It was reported that approximately 1.5 km of the span was affected, with damage limited to the foundation. UPPTCL was unable to confirm the specific IS code used for the tower design, and wind speed data for the incident was also not available.

Director (PSE&TD), directed to obtain the wind speed data from the nearest IMD observatory and recommended to the review the design as per IS 802:2015. He further directed UPPTCL to submit all relevant information in CEA format along with all the material test reports and wind speed data to CEA.

The complete information in duly filled CEA format along with all the design documents and test reports are yet to be submitted by M/s. UPPTCL.

(xvii) **220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line (within 3 years)**: 220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line, 2 nos. of suspension type tower (DA+5) at Tower location no 50 and 51 got collapsed. The line was commissioned in the year 2022 and the line length is 44.49 Km. for Hardoi-Mallawan circuit & 101.80 Km. for Mallawa-Shahjahanpur circuit. The reported probable cause of failure is heavy sporadic whirl wind followed by localized cyclonic storm.

Representative of UPPTCL informed that one tower was completely damaged and another one has damage in the cross arm and peak. It was also informed that KPTL design has extension 5 and 10. The wind speed data for the incident was not available with UPPTCL.

Director (PSE&TD), directed to obtain the wind speed data from the nearest IMD observatory and recommended to the review the design as per IS 802:2015 and strengthen the Tower

accordingly. He further directed UPPTCL to submit all relevant information in CEA format along with all the material test reports and wind speed data to CEA.

The complete information in duly filled CEA format along with all the design documents and test reports are yet to be submitted by M/s. UPPTCL.

8. The Representative of **RENEW** presented failures of 1 no. of transmission lines covering total 7 nos. of Towers (6 nos. of Suspension Type Tower and 1 no. of tension Type Tower). The transmission line wise deliberations are as under:

(xviii) **400 KV DC Gadag - Narendra (New) Transmission Line (within 1 year)**: In 400 KV DC Gadag - Narendra (New) Transmission Line, 5 nos. of suspension type tower (DA+3, DA+3, DA+0, DA+3, DA+6, DA+0) at Tower location no 16/4, 16/6, 16/7, 16/8, 16/9, 16/10 got completely collapsed , 1 no of suspension type Tower (DA+0) at tower location no. 16/10 had its peak damaged and 1 no. of Tension type tower (DC+6) at Tower location no. 17/0 had only peak damaged. The line was commissioned in the year 2024 and the line length 94 km. The reported probable cause of failure is Heavy Wind & cyclonic wind whirl followed by rain.

Representative of Renew informed that the towers were designed as per IS 802:2015 for Wind Zone–1 and Reliability Level–1. The tower designs have been reviewed, and no irregularities were observed. It was further reported that the failed towers are located along the passage of the Almatti hills, where tunneling effects of wind are also possible. Material samples were sent for testing to CPRI and NABL-accredited laboratories. The test results obtained from the NABL-accredited laboratory were found satisfactory, while the results from CPRI are still awaited. With regard to wind speed data, requests have already been sent to IMD Bangalore, Almatti Dam authorities, and NTPC; however, responses are awaited. He further informed that the line was restored on 29.06.2025 using spare towers.

Director (PSE&TD), CEA, observed that a parallel transmission line in the same corridor was not affected, and but that line had been designed for Reliability Level–2 due to the quad conductor configuration, therefore it's a need to review requirement of change of present reliability level-1 to reliability level-2 for the twin conductor configuration in the 400 kV D/C line in the relevant regulation/Standard separately.

He further informed that during site visit on the physical inspection of the failed towers no ambiguities in the erection and maintenance were observed. No missing member and nut-bolts were there. The failed towers were located near to passage of the hills. Heavy wind conditions prevailed in the vicinity of transmission line during failure of the towers that may be cause of failure.

After detailed deliberations, it was concluded that a high intensity wind was observed in the area which had led to collapse of the towers in the transverse direction which subsequently led to failure of nearby suspension towers due to the cascading effect.

9. The Representative of **KPTCL** presented failures of 1 no. of transmission lines covering 1 no. of Towers (6 nos. of Suspension Type Tower and 1 no. of tension Type Tower). The transmission line wise deliberations are as under:

(xix) **220 kV SRS Huballi- Narendra Line:** In 220 kV SRS Huballi- Narendra Line, 1 no. Suspension tower (DA+6) at Tower location no. 6 got collapsed. The Tower was commissioned in the year 1980 and the line length 94 km. The reported probable cause of failure is the dumping yard created adjacent to the Tower at Tower location no. 6 and in between Location 6 and 7.

Representative of KPTCL informed that the tower was designed as per IS 802:1977. He described the site conditions, stating that the tower had completely collapsed, with leg members severely bent, though no missing members or damaged joints were observed. He further informed that the Hubballi-Dharwad Municipal Corporation (HDMC) had created a dumping yard near the line between location numbers 6 and 7. The dumping height in this area is approximately 10–15 meters. Despite repeated requests from O&M personnel to shift the dumping yard away from the transmission corridor, no corrective action was taken by HDMC.

KPTCL observed that continuous dumping near the failed tower, up to a height of 7–10 meters, created excessive dead load on the tower's leg members. Several fire incidents and severe pollution have also been reported in the vicinity of the dumping yard.

The internal team of KPTCL concluded that the dumping yard, by creating additional dead load on the tower's leg members, was the primary cause of the tower failure. The internal committee of KPTCL further proposed that the affected tower be replaced and relocated at a safe distance from the dumping yard, with an increased span of approximately 400 meters in place of the existing 310 meters, and with higher body extensions. It was also suggested that anti-fog disc insulators be adopted. In addition, legal action against HDMC has already been initiated by KPTCL.

Chief Engineer (PSE&TD), CEA enquired if KPTCL team has not visited the site as the issue appeared to be persisting for quite a long time, and also if any FIR have been lodged, to which Representative of KPTCL informed that legal action has been initiated against HDMC.

Director (PSE&TD), CEA enquired about the line clearance from the dumping yard, to which the representative of KPTCL replied that the clearance had been reduced due to the dumping activities, resulting in repeated line trippings. Director (PSE&TD), CEA directed KPTCL to furnish details to CEA regarding the actions taken to resolve the issue, O&M practices being followed, and the recommended measures proposed by KPTCL in this regard.

The details sought (actions taken to resolve the issue, O&M practices being followed, and the recommended measures proposed by KPTCL in this regard) in the meeting are yet to be submitted by M/s. KPTCL.

After detailed deliberations, it was concluded that the primary cause of failure was the dumping yard located beneath the line. This rendered the structure unstable and ultimately led to tower failure. It was further recommended that KPTCL management engage with HDMC to ensure relocation of the dumping yard away from the transmission corridor.

10. The Representative of **NTPC** presented failures of 1 no. of transmission lines covering 1 no. of Tension type Tower. The transmission line wise deliberations are as under:

(xx) 400 kV Dadri- Harsh Vihar Ckt- 1&2 (within 13 years): In 400 kV Dadri- Harsh Vihar Ckt- 1&2, 1 no. Suspension tower (DD+25) at Tower location no. 24 got failed and bent. This line with line length of 53 km was designed in the year 2009 and was commissioned in the year 2012. The reported probable cause of failure is high-velocity dust & windy storm following rain near the location. These winds were exacerbated due to heavy dust storms in the area.

The representative of NTPC informed that the tower was designed as per IS 802:1995. The failed tower was the tallest tower along the route of the line. The foundations were found to be satisfactory, the stubs were damaged. Minor damages were also observed in the towers at location no. 23 (DA+6) and location no. 25 (DD+25). On the day of the tower failure, all 10 power evacuation lines from NTPC Dadri tripped due to the dust storm followed by rain, resulting in a complete station blackout. It was further informed that three transmission lines pass beneath this line, which might have necessitated an increased tower height. The line was restored on 22.06.2025 using a spare tower of similar design.

Chief Engineer (PSE&TD), CEA enquired about the wind speed at the time of failure and suggested that the same be obtained from the nearest IMD observatory or any other reliable source and shared with CEA. He further observed that, since this was a special tower with high extensions and multiple crossing lines beneath it, the reliability level should have been enhanced to ensure greater structural stability in the crossing corridor.

Director (PSE&TD), CEA recommended to the review the design as per IS 802:2015.

After detailed deliberations, it was concluded that the primary cause of failure was the impact of high-velocity dust and wind storms. Furthermore, NTPC was recommended to analyse requirement to increase the reliability level at power line crossings to ensure greater structural stability.

The committee also opined that tower extensions may be designed for Reliability Level–2, while the rest of the tower could continue with Reliability Level–1 in the 400 kV D/C twin moose conductor configuration. It was also suggested that CPRI and PGCIL may validate requirement of this approach.

11. The Representative of **NRSSXXXVI Transmission Limited** presented failures of 1 no. of transmission lines covering 2 no. of Tension type Tower. The transmission line wise deliberations are as under:

(xxi) 400 kV D/C Babai-Bhiwani Transmission Line (with in 2 years): In 400 kV D/C Babai-Bhiwani Transmission Line, 2 nos. of Tension type Towers (DD+30) at Tower location no. 300 and 301 got collapsed. The line was commissioned in the year 2023. The line length is 111 km. The reported probable cause of failure is Heavy localized Cyclonic storm.

The representative of NRSSXXXVI informed that the line was designed as per IS 802:2015 for Reliability Level–1. However, the line was commissioned in the year 2023. No missing members were observed in the failed tower, and the material test reports were found satisfactory. Members of the Standing Committee also visited the site. Requests for wind speed data were sent to IMD Delhi and IMD Chandigarh; however, no response has been received. It was further informed that the line has been restored using an ERS, and erection of the replacement tower is expected to be completed by 30.09.2025.

The representative from PGCIL highlighted that when tower extensions are raised, the tower base increases and the overall tower weight increase, which may contribute to failures due to self-weight.

Chief Engineer (PSE&TD), CEA suggested for carrying out a simulation of the tower design considering an increased Reliability Level–2 and subjecting it to equivalent loading to verify whether the tower could withstand the load. If positive results are obtained at Reliability Level–2, the same may be implemented in the field. He further emphasized that in RFPs, the reliability level should be specified for power line crossings.

After detailed deliberations, it was concluded that the primary cause of failure was the impact of high-velocity dust and wind storms. Furthermore, NRSSXXXVI was recommended to analyse requirement to increase the reliability level at power line crossings to ensure greater structural stability.

The committee also opined that tower extensions may be designed for Reliability Level–2, while the rest of the tower could continue with Reliability Level–1 in the 400 kV D/C twin moose conductor configuration. It was also suggested that CPRI and PGCIL may validate requirement of this approach.

12. The Representative of **ADANI** presented failures of 1 no. of transmission lines covering 5 no. of Tower (2 nos. of suspension type and 3 nos. of tension type). The transmission line wise deliberations are as under:

(xxii) **400 kV Mahendragarh–Bhiwani Transmission Line (within 14 years):** In 400 kV Mahendragarh–Bhiwani Transmission Line**,** 2 nos. of Suspension type Towers at location no 136 and 138 and 3 nos. of tension type of towers 135, 137 and 139 got failed. The line was commissioned in the year 2011. The line length is 111 km. The reported probable cause of failure is due to collapsed transmission towers of the 400kV Babai–Bhiwani line [owned by NRSSXXXVI Transmission Limited (Tata Power)] at Power Line crossing point during localized heavy windstorm and cyclone.

Representative of ADANI informed that their Tower failure is the collateral damage due to failure of Towers at Babai- Bhiwani Line. Towers no. 136–137 of this line are situated beneath the collapsed Babai–Bhiwani line, leading to the impact. Further, Tower No.135 and 139 suffered complete structural deformation with major damage to its top cross arm and leg of the Tower however, foundations were intact and towers no. 136 to 138 had impact on conductors, OPGW & earth wire. The restoration work was successfully completed with the erection of the spare tower, and the transmission line was re-energized on 04.07.2025.

Chief Engineer (PSE&TD), CEA enquired about the wind data and suggested to collect the wind data from the nearest IMD observatory or any other reliable source.

13. The Representative of **STERLITE** presented tripping of three 400 kV transmission lines mentioned below, feeding power to Mumbai three 400 kV transmission lines feeding power to Mumbai due to large no. of insulator failure. The deliberations are as under:

- 400 kV Phadge – Navi Mumbai
- 400 kV Phadge – Kharghar
- 400 kV Navi Mumbai – Vikhroli

The representative from M/s Sterlite informed that total 132 numbers of insulators including failed and suspected, have been replaced across all three lines, and as a corrective measure following three steps have been taken.

- The samples of failed/ burst insulators have been sent to ERDA for testing. However, the test reports are still awaited.
- Thermo-vision scanning of the insulator is being conducted across the entire line to identify the faulty insulator.
- OEM of the insulator has taken the samples and they are also doing root cause analysis

He apprised that FRP rod of the failed insulators is of 'AGNI' make, while the sheath is of 'TAG' make, pertaining to the manufacturing batches of December 2022 and July 2023. He also informed that many utilities have experienced issues with Insulators where the FRP rod is of AGNI make.

In this regard, the Standing Committee suggested to furnish a detailed report incorporating reports/ findings from ERDA and the OEM's, and to review their QAP in line with CEA's MQAP.

5. Statistics and Analysis of the EHV Transmission Line Tower failure:

5.1 Failure incidence intimation and report submission statistics:

SN	Category	Number of Failures	Number of Utilities	Remarks
1	Utilities intimated within 48 hrs on their own	3	2	PGCIL and UPPTCL (for 220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur Line on same DC Towers) had submitted the failure cases on time
2	Utilities intimated after 48 hrs on their own	9	4	RVPNL, GETCO, UPPTCL (400 kV Orai - Parichha D/C line – I & II, 220 kV Jagriti Vihar-Hapur D/C line, 220 kV Nehtaur-Mataur Line) and NRSS XXXVI intimated within one month on their own
3	Utilities submitted Detailed Report in One Month on their own	16	8	PGCIL, RVPNL, GETCO, NRSSXXXVI, RENEW and UPPTCL (for 220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur Line on same DC Towers) had submitted the Report on time
4	Utilities submitted Detailed Report after One Month but before CEA letter dated 11.03.2025 on their own	5	2	MPPTCL and UPPTCL (for 400 kV Orai - Parichha D/C line – I & II)
5	Utilities submitted Detailed Report only after CEA letter dated 11.03.2025.	7	5	THDCIL, KPTCL, NTPC, Adani and UPPTCL (for 220 kV Nehtaur-MataurLine, 220 kV Jagriti Vihar-Hapur D/C line, 400 KV Panki-Unnao S/C Line) had submitted the report after CEA letter dated 28.07.2025.
6	Utilities not submitted Detailed Report even after CEA letter	Nil	Nil	-

5.2 General Statistics of Reported EHV Transmission Line Tower Failures:

a) Failure of 75 Nos. of EHV Transmission Line Towers in 22 Nos. Transmission Lines of voltage class of 220 kV, 400 kV and 765 kV AC have been reported to CEA during the period of January, 2025 to June, 2025. The total 22 Nos. of EHV Transmission Lines failure are mentioned in the Table 1 given below:

Table 1: Details of failure of EHV Transmission Lines

S.N.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
1.	220 kV D/C Samba-Chowadhi-I/ Smba-Hiranagar-I Line	PGCIL	16.04.2025	2016	4	0	1	1	220 kV Single Zebra
2.	765 KV Fatehpur-Agra 2 Line	PGCIL	21.05.2025	2013	1	1	0	1	765 kV Quad Bersimis ACSR
3.	400 kV D/C Barmer-Bhaisara (Jaisalmer-2) Line	RVPNL	01.05.2025	2019	-	8	1	9	400 kV Moose ACSR
4.	400 kV D/C Barmer-Bhinmal Line	RVPNL	05.05.2025	2019	-	1	0	1	400 kV Twin MOOSE ACSR
5.	220 kV Amarapur-Tharad Line	THDCIL	05.05.2025	2012	-	3	0	3	220 kV Single MOOSE ACSR
6.	400KV Kosamba Charal line and 400KV Kosamba Panchham line- D/C Line	GETCO	05.05.2025	2014	-	2	0	2	400 kV MOOSE ACSR
7.	220 kV Bhachunda Varsana/ Ukheda Varsana line	GETCO (Owner M/s Suzlon)	06.05.2025	2004	5	1	0	1	220 kV AL59
8.	220kV Nakhatrana-Panadhro Line 1 & 2	GETCO	08.05.2025	1997	4	1	0	1	220 kV Single Zebra ACSR
9.	220kV Sidhi-ATPS & 220 kV Sidhi-Rewa Line	MPPTCL	05.05.2025	October, 2008	-	1	1	2	220 kV Single Zebra ACSR

10.	400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II	MPPTCL	21.05.2025	Ckt.-1-31.03.1991 , Ckt. II-18.06.1991	3	5	1	6	400 kV Twin MOOSE ACSR
11.	400 kV DCDS Bhopal-Bina line Ckt.-I & II	MPPTCL	11.06.2025	Ckt.-1-17.03.1994 , Ckt.-II 23.03.1994	3	11	1	12	400 kV Twin MOOSE ACSR
12.	400kV DCDS Chhegoan- Julwania Line	MPPTCL	12.06.2025	2014	3	4	0	4	400 kV Twin MOOSE ACSR
13.	400 kV Orai - Parichha D/C line – I & II	UPPTCL	11.05.2025	2016	5	3	0	3	400 kV Twin MOOSE ACSR
14.	220 kV Nehtaur-Mataur (765 kV PGCIL) Line	UPPTCL	21.05.2025	2011	-	0	2	2	220 kV Single Zebra ACSR
15.	220 kV Jagriti Vihar-Hapur (765 KV) D/C line	UPPTCL	21.05.2025	2019	4	2	2	4	220 kV Single Zebra ACSR
16.	400 KV Panki-Unnao S/C Transmission Line	UPPTCL	30.05.2025	1998	-	5	0	5	400 kV Twin MOOSE
17.	220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers	UPPTCL	15.06.2025	2022	4	2	0	2	220 kV Single Zebra ACSR
18.	400 KV DC Gadag - Narendra (New) Line	RENEW	13.05.2025	2024	1	6	1	7	400 kV Twin Bundle ACSS/AW HTLS
19.	220 kV SRS Huballi-Narendra Line	KPTCL	17.05.2025	1969	1	1	0	1	220 kV Single Deer ACSR
20.	400 kV Dadri- Harsh Vihar Ckt- 1&2	NTPC	21.05.2025	2011-12	4	0	1	1	400 kV Twin MOOSE ACSR
21.	400 kV DC Babai-Bhiwani Transmission Line	NRSS XXXVI	13.06.2025	2023	4	0	2	2	400 kV Twin MOOSE ACSR
22.	400kV Mahendragarh–Bhiwani Transmission Line	ADANI	13.06.2025	2011	4	2	3	5	400 kV Twin MOOSE ACSR
	Total					**59**	**16**	**75**	

b) The total number of incidences of failures of EHV Transmission Line Towers, and the Nos. of affected Tension type and Suspension type towers that have been reported to CEA for the period of January, 2025 to June, 2025 are indicated in the Fig. 1 given below.

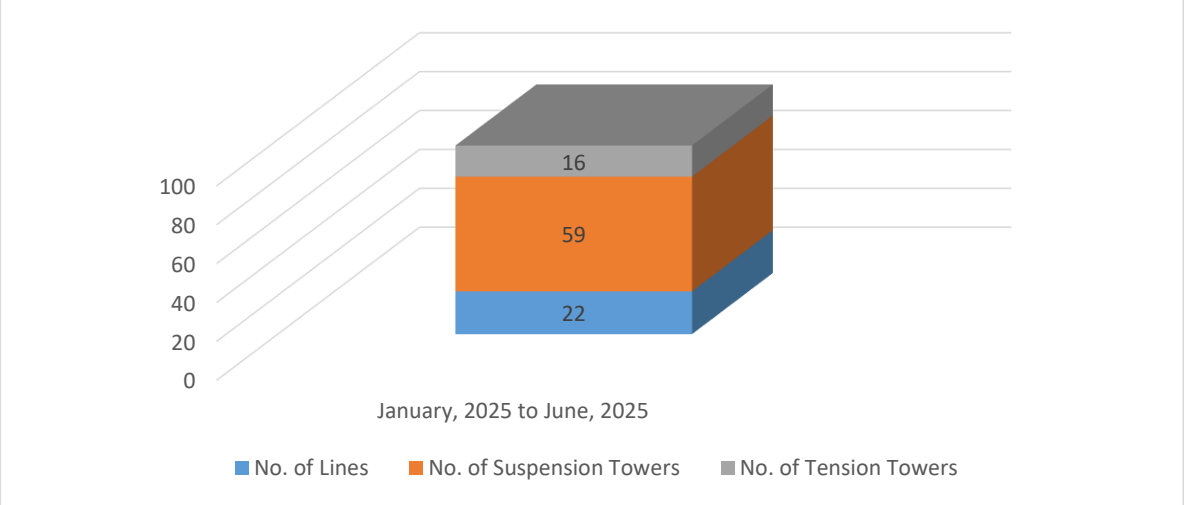

Fig. 1

c) The number of failed Suspension and Tension type towers at various voltage levels, reported for the period of January, 2025 to June, 2025 are indicated in Table-2 below:

Table 2: Voltage wise Tower failure

Voltage Level	Utility	No of affected line	No of Tower failed					
			Suspension tower	Tension Tower				Total no of Tower
			A	B	C	D	Total	
765 kV	PGCIL	1	1	0	0	0	0	1
	Total	**1**	**1**	**0**	**0**	**0**	**0**	**1**
400 kV	RVPN	2	9	1	0	0	1	10
	GETCO	1	2	0	0	0	0	2
	MPPTCL	3	20	0	0	2	2	22
	UPPTCL	2	8	0	0	0	0	8
	RENEW	1	6	0	1	0	1	7
	NTPC	1	0	0	0	1	1	1
	NRSS XXXVI	1	0	0	0	2	2	2
	ADANI	1	2	3	0	0	3	5
	Total	**12**	**47**	**4**	**1**	**5**	**10**	**57**
220 kV	PGCIL	1	0	0	0	1	1	1
	THDCIL	1	3	0	0	0	0	3
	GETCO	2	2	0	0	0	0	2
	MPPTCL	1	1	1	0	0	1	2
	UPPTCL	3	4	3	1	0	4	8

	KPTCL	1	1	0	0	0	0	1
	Total	**9**	**11**	**4**	**1**	**1**	**6**	**17**
Total		**22**	**59**	**8**	**2**	**6**	**16**	**75**

d) It can be seen from the below **Fig. 2** that at 765 kV Voltage level, 1 nos of Suspension type tower have failed in 1 no. of Transmission Line, at 400 kV Voltage level 47 nos. of Suspension type tower and 10 nos. of Tension type towers have failed in 12 nos. of Transmission Line, and at 220 kV Voltage level 11 nos. of Suspension type tower and 6 nos. Tension type towers of have failed in 9 nos. of Transmission Line.

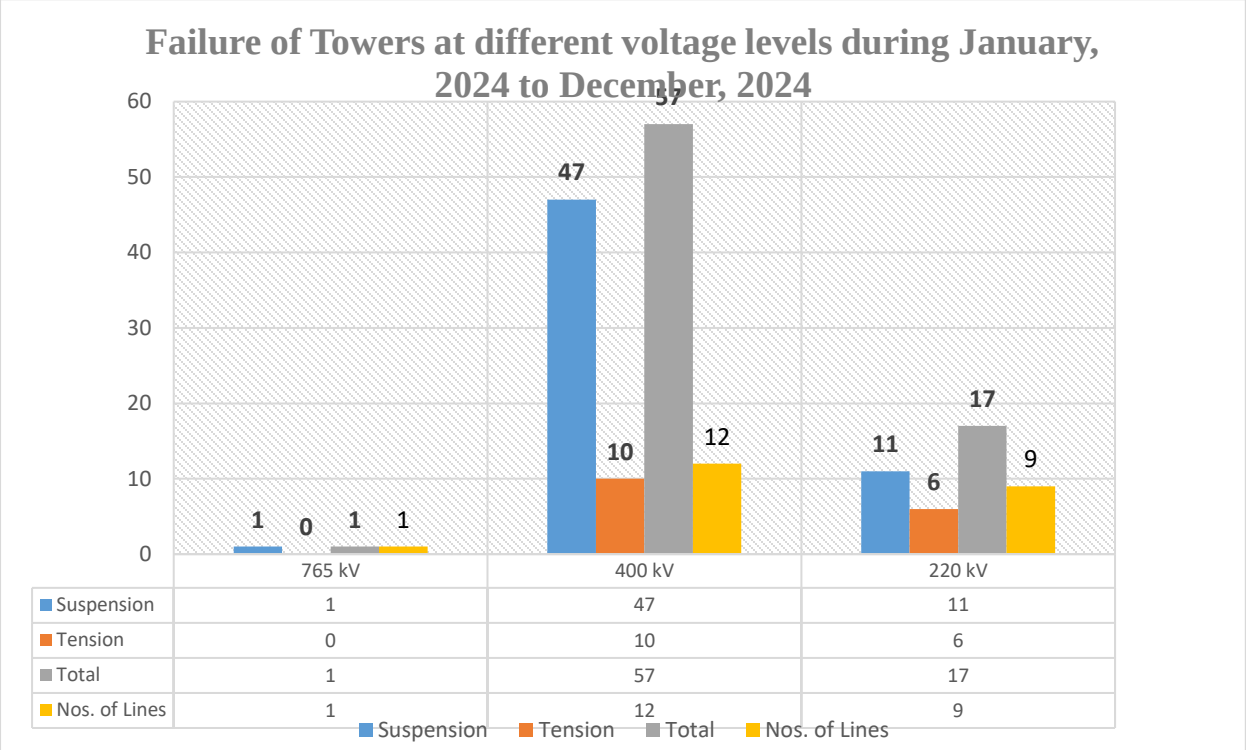

Fig. 2

e) It can be seen from the below **Fig. 3** that out of total 75 nos. of EHV Line Tower failure, 59 nos. are of Suspension type tower leading to its share of 78.7 % of total towers failed and 16 nos. are of Tension type towers leading to its share of 21.3 % of total towers failed. Out of total 16 nos. of Tension Type tower, 8 nos. are of Type B, 2 nos are of Type C and 6 nos are of Type D Tension type tower.

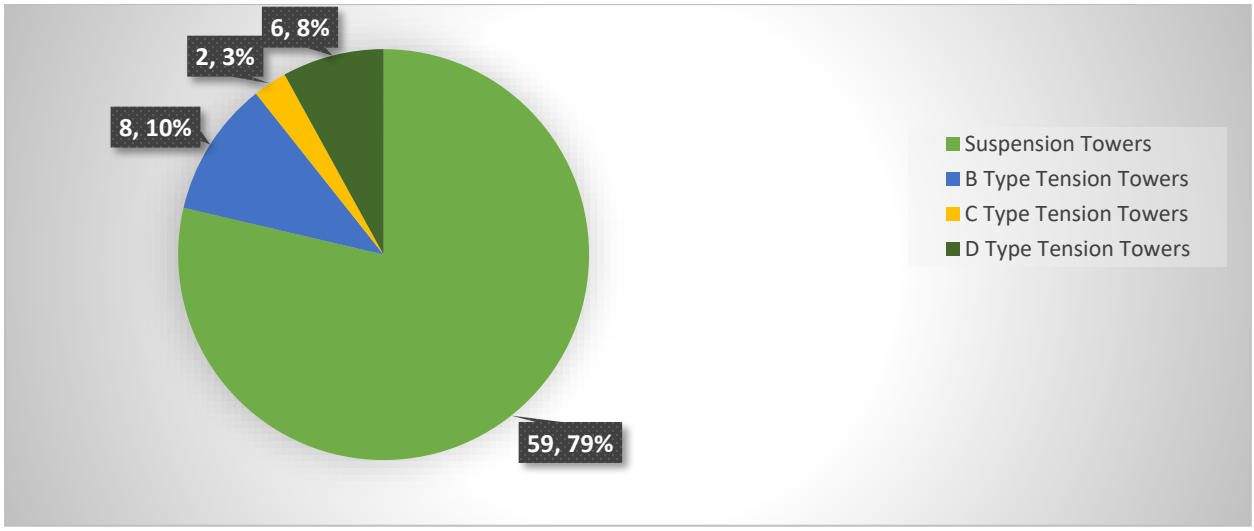

Fig. 3

f) It has been observed that the failure rate of Suspension type tower is much higher in comparison to Tension type tower. This may be because in normal terrain, generally, the nos. of Suspension type tower in any particular line is much higher than that of Tension type tower. Further, the Suspension type towers are not designed to take horizontal forces in the longitudinal direction and hence the failures of one suspension type tower causes secondary failure of adjacent Suspension towers due to the pulling force of conductors. In view of above, the loading criteria for the Suspension type towers have been made more stringent and the longitudinal and transverse force acting on Suspension type towers under security condition has been increased in revised IS 802: 2015.

g) The wind map of India was divided into three wind pressure zones that is light, medium & heavy, before the revision of IS 802 in 1995. In the third revision of IS 802: 1995, 6 wind zones were specified dividing various regions on the basis of 3 second wind gust speed. The no. of transmission lines and towers, failed during the period from January, 2025 to June, 2025 and designed according to various wind zones is given in **Fig. 4** below. It can be seen that the maximum No. of failure of towers have occurred for transmission lines which were designed for Wind Zone 3 and 4. It may be noted that maximum area of India is covered under the wind zones 2 and 4.

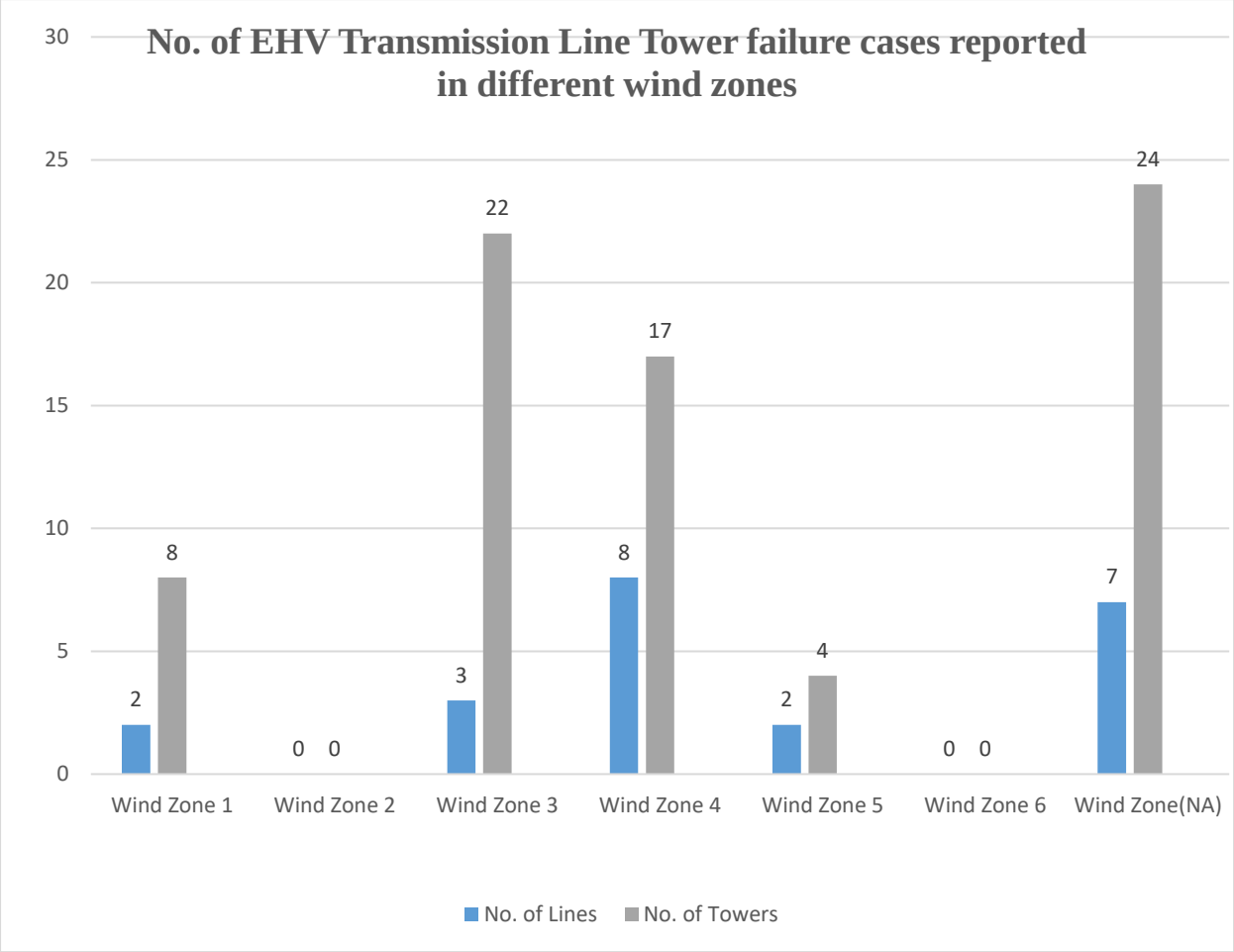

Fig. 4

5.3 Insights into Tower Failure Incidents during Past Years:

a) The details of previous EHV Transmission Line Tower failure incidents which were reported to CEA and have been discussed in the past Standing Committee meetings from the year 2014 onwards have been analysed by CEA and the graph depicting the failures of EHV Transmission Line towers occurred during past years (2014-June, 2025) that have been discussed in the previous Standing committee meetings are shown below in **Fig. 5**. The maximum No. of failures, i.e., 163 cases of tower failures occurred during year 2014. As has been observed in the previous Standing Committee meetings, the failure rate of suspension towers is much higher in comparison to tension towers. This may be because of the cascading effect of failure of suspension type towers i.e. secondary failure of adjacent suspension towers due to the pulling force of conductors which have been developed due to failure of another tower.

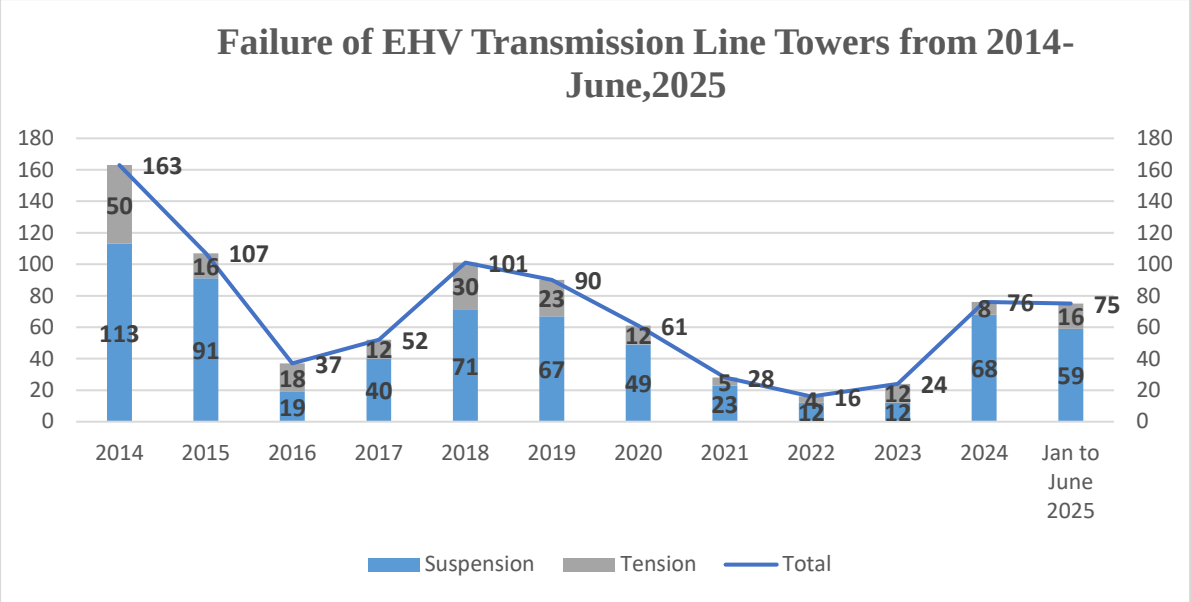

Fig. 5

b) The graph depicting the failures of towers at various voltage levels that have occurred in past years (2012-June 2025) and intimated to CEA which have been discussed in the Standing committee meetings are shown below in Fig. 6. It may be observed that towers of 400 kV voltage level have maximum incidents of failure. It may be noted that the mandate of the Standing Committee is to investigate failure of towers of 220 kV and above voltage class transmission line and the graph shows the details of only those transmission line failures which have been intimated to CEA.

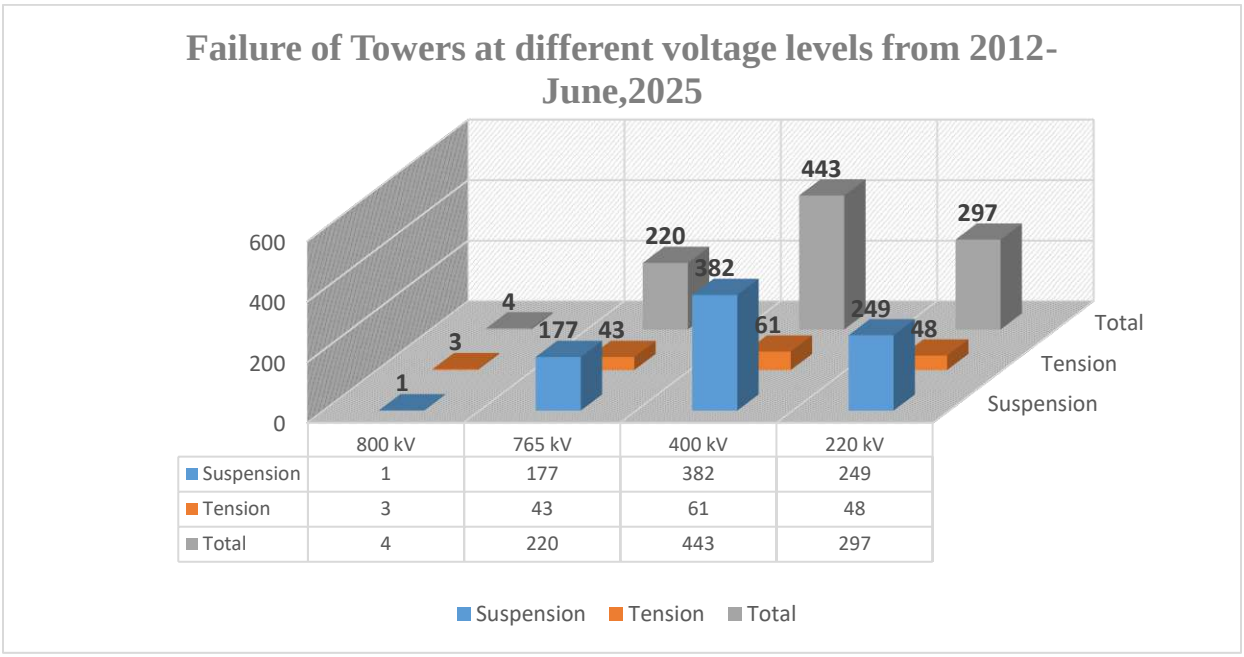

Fig. 6

6. Observations of the Committee

a) The type of failures of EHV Transmission Line Towers of various voltage levels can be broadly classified as under:
   - Deformation in legs of towers and cage portion of bottom cross arm level.
   - Buckling at stub level leading to complete collapse of towers with/without damage to tower foundation.
   - Buckling above 1st panel (normal tower) level with/ without damage to tower foundation.
   - Buckling from bottom cross arm level or top cross arm level or peak broken without any damage to lower portion of the tower and foundation.
   - Damage to foundation as well as to tower structure due to increased water level and additional force due to water flow/velocity in the river/soil erosion and inadequate protection to foundation of towers.
   - Shearing of stubs of leg members of towers.

b) The main cause of tower failures is attributed to high intensity wind as reported by the transmission utilities, however the utilities failed to produce wind data in many cases of EHV Transmission Line Tower failures which could substantiate their reasoning. The transmission utilities are unable to produce the actual wind speed data on the day of failures due to non-availability of wind speed data at the failure location. The standing committee observed that wherever reporting of tower failure is due to wind, the utility needs to get the wind data for the area from the IMD observatory/ nearby Airport/ nearest wind farms, or the State Irrigation Department which would serve as representative wind speed prevailing in that area at the time of failure. It was agreed that the high wind velocity during storm and local condition of whirl wind might have exceeded the design wind speed for which the tower is designed; however, this needs to be verified. Assistance of IMD & other agencies involved in metrological field may be taken by the affected utilities in this regard and utilities may request for sharing of the wind data obtained from Observatory/Satellite/ Radar.

c) The structural integrity of transmission towers depends on many factors including adequacy of technical standard/ stipulated codal requirement considered for designing the transmission tower, quality of material grade used in tower body, Construction methodology, workmanship and erection practices, Operations & Maintenance practices of the transmission utilities etc.

d) Over the years, Indian Standards for design of transmission line tower has undergone changes. As revision of codal provisions is a continuous process, the changes are to be implemented prospectively. **Strengthening of towers of existing transmission lines due to change in the codal provisions could be decided on case to case basis, if repeated failures are observed in a particular line**. **The Committee observed that the tower erected after restoration should be based on latest standards. And Spare towers which the Utilities procure also should conform to latest standards**

7. Recommendations and Remedial Measures suggested by the Committee:

The recommendations and remedial measures suggested by the Committee after detailed deliberations are given under:

I. Apart from intimating incidents of tower failures and furnishing detailed Report in stipulated format as per Regulation 48 (8) of CEA (Measures relating to Safety and Electric Supply) Regulations, 2023, concerned utilities shall furnish a closure report for the event within 3 months including all the details and records. All utilities are requested to adhere to these timelines strictly.

II. Digitization of Spares and Inventory Management of transmission system assets using suitable software like SAP shall be taken up on priority basis.

III. Recommendations of the Task Force on Cyclone Resilient Robust Electricity Transmission and Distribution (T&D) Infrastructure in Coastal area [Report brought out in May, 2021) shall be considered for appropriate adoption by the Utilities concerned.

IV. All utilities to develop in-house teams equipped with relevant tower design software to simulate, analyze, and address design issues in failed towers.

V. It has been observed that wind intensity has changed in certain parts of the country due to climate change. In response, the wind map was revised by SERC in 2016 and incorporated into the National Building Code (NBC) by BIS. However, the revised wind map has yet not been included in IS 875. SERC, in coordination with IMD, has been requested to update the wind map. Until IS 875 is formally revised, utilities are advised to refer to the wind map provided in the National Building Code for the design of towers.

VI. After every failure, the concerned utility needs to submit the actual wind velocity prevailed in the affected area so that the Investigating Team of Standing Committee could get reference wind speed prevailed over that area. In this matter, the respective utility may seek the help of IMD/ nearest Airport/ nearest wind farms, or the State Irrigation Department to estimate the wind speed in affected area based on data obtained from observatory/ Satellite/Radar.

VII. The towers which were designed based on old standards should be checked and strengthened based on latest standards.

VIII. For Towers having special design with high extensions and having powerline crossing (single or multiple) beneath it, the Committee recommended to increase the reliability level to ensure greater structural stability. It was also suggested that CPRI may be consulted to validate this approach.

IX. The Committee further emphasized that in RFPs, the reliability level should be specified for power line crossings.

X. For towers located in overlapping wind zones, the Committee recommended that higher wind zone shall be considered if the tower is situated within 50 km of the border area, and the Tower may be designed accordingly.

XI. Due to climatic change, incidents of high winds are increasing. Transmission Utilities need to take proactive measures such as **increased line patrolling**, immediate replacement of missing members/bolts. Various deficiencies such as missing members, missing bolts, bent members, incorrect attachment of cross arm, chimney covered with soil, rusted stub/members etc. has been observed during the failure site visit of various transmission towers of different utilities. These deficiencies may be attributed to poor workmanship, erection deficiency, O&M issues etc. Utilities shall take necessary precautions and carry out proper maintenance of their lines so as to avoid failure of towers due to such deficiencies.

XII. Pile type foundation shall be used for towers located in river or creek bed or on bank of river having scourable strata or in areas where river flow or change in river course is anticipated, based on detailed soil investigation and previous years' maximum flood discharge of the river, maximum velocity of water, highest flood level, scour depth and anticipated change in courser of river based on river morphology data of at least past 20 years to ensure availability and reliability of the transmission line.

XIII. The transmission towers erected near river banks should be frequently patrolled and assessment based on history should be made to anticipate the change in course of river and necessary protection should be provided to towers to avoid its damage during such incident.

XIV. In case of damage of foundation of towers, the foundation design is required to be examined.

XV. The material test report of failed towers should be examined to ascertain the quality of the material.

XVI. Committee suggested to clear the encroachment in the ROW of the line. Committee advised that utilities should improve their erection, patrolling and operation and maintenance practices.

XVII. Regular patrolling of the lines is required for smooth and trouble free operation of line. During patrolling any unauthorized construction/use/ storage under and around the towers should also be checked and if such activity is observed, local administrative authority should be immediately informed for assistance and necessary action

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Annexure-I: List of Participants

CEA

1. Sh. N.R.L.K. Prasad, Chief Engineer (PSE&TD)
2. Sh. Bhanwar Singh Meena, Director (PSE&TD)
3. Sh. Pankaj Kumar Sangwan, Dy. Director (PSE&TD)
4. Smt. Jyoti Singh, Dy. Director (PSE&TD)
5. Smt. Rashmi, Assistant Director (PSE&TD)

CPRI

1. Sh. K. Vijaya Kumar, Engg. Officer-IV

POWERGRID

1. Sh. N.K.Sinha, Sr. GM
2. Sh. Indra Singh Rouriya, DGM-Engg (TL)
3. Sh. Jivesh Khanna, Chief Manager

RVPNL

1. Sh. Prashant Lodha, SE
2. Sh. Uday Singh Meena, SE

THDCIL

1. Sh. M.K. Jain, GM (I/C)
2. Sh. Tushar Shinde, Engineer

GETCO

1. Sh. D.M. Dangi, SE (Corporate)

MPPTCL

1. Sh. D.K. Agarwal, Chief Engineer
2. Sh. Ravendra Patel (Exe. Engineer)

UPPTCL

1. Sh. Mohd. Saud, Executive Engineer
2. Sh. Mohd. Shahid, Executive Engineer

RENEW

1. Sh. Pankaj Kumar, GM (Transmission)
2. Sh. Rahul Gupta, Manger (Transmission)

KPTCL

1. Sh. Sudhakar Garapati, AEE

NTPC

1. Sh. Arun Kumar Sharma, DGM
2. Sh. Tabish Adeel, AGM

NRSS XXXVI Transmission Limited

1. Sh. Sandeep Mahabale, CEO NRSS-XXXVI
2. Sh. Rajnish Mehrotra, Head (Corporate Affairs)
3. Sh. Shashank Takawale, Head (PMU & operations) NRSS-XXXVI
4. Sh. Pareoh Mestri, Group Head (Structural Design)
5. Sh. Sachin Rawool Group Head (Trans. Lines)

ADANI

1. Sh. Rahul Yadav, Manager (Transmission)
2. Sh. Saurabhh Sharma, Deputy Manager

RESONIA LTD

1. Sh. Harish Kumar, AVP (Design & Engg.)
2. Sh. Nitesh Ranjan, Head (O&M)
3. Sh. Mahesh Bhapat, Manager (O&M)

HVPNL Haryana

1. Sh. Randeep Chauhan, Executive Engineer
2. Sh. Surendra Singh, SE (T/S)

TATA Projects

1. Sh. Shyam Navin Chandra, GM (T&D Engg.)
2. Sh. Manideep Reddy, Engg. Manager

BSPTCL

1. Sh. Rajeev Kumar Ambasthe, E.S.E.

APRAVA ENERGY

1. Sh. Siddhartha Ghosh, Head- Operation (Transmission)

NHPC Ltd.

1. Sh. Kuruba Hari Babu, DGM (E)
2. Sh. Keshav Kishore Jha, SM (E)

BBMB

1. Sh. Ashok Gahlawat, Exe.Engineer
2. Sh. Aman Dahiya, Sr. Xem, O&M Delhi
3. Sh. Manoj Kr. Srivastava, SE (O&M)

4. Ms. Swati Sharma, SDO (TL)
5. Ms. Sakshi Jain, JE (TL)

OPTCL

1. Sh. S.M. S. Sahoo, GM (Elect.)
2. Sh. K. B. Behera, GM (Elect.)

Annexure-II: Detailed information of EHV Transmission Line Tower Failure cases as reported by Various Transmission Utilities

1. POWERGRID

The following Transmission Lines Towers of POWERGRID had failed during January, 2025 to June, 2025:

Sl. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
1.	220 kV D/C Samba-Chowadhi-I/ Smba-Hiranagar-I Line	PGCIL	16.04.2025	2016	4	0	1	1	220 kV Single Zebra
2	765 KV Fatehpur-Agra 2 Line	PGCIL	21.05.2025	2013	1	1	0	1	765 kV Quad Bersimis ACSR

DETAILS IN RESPECT OF EACH TRANSMISSION LINE

1. 220 kV D/C Samba-Chowadhi I / Samba-Hiranagar I

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level:	220 kV D/C Samba-Chowadhi-I / Samba-Hiranagar I
2.	Date and time of occurrence/discovery of failure:	20:04 Hrs. of 16.04.2025 and discovery of failure immediately after failure
3.	Length of line (km):	220 kV S/C Samba-Chowadhi : 52.351 kms 220 kV D/C LILO portion Samba-Chowadhi / Samba-Hiranagar: 14.043 kms
4.	Type of configuration: (S/C, D/C, S/C strung on D/C towers, narrow base etc.)	Line is single circuit while LILO poriton is having double circuit towers
5.	Number of Towers and Type of Towers failed: [suspension / tension/dead end /special tower /river crossing tower/ Powerline crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 no. of Tension Type Towers Failed Tower at loc no. 26 (DD+18)
6.	Tower location No. with reference to nearest substation(indicate Name):	Tower No. 26 (Sequence from Hiranagar Sub-station)
7.	Name and size of conductor:	Zebra, Nominal Diameter: 28.62 mm
8.	No. of sub-conductors per bundle and bundle spacing:	Single conductor
9.	Number and size of Ground wire/OPGW (if provided):	OPGW is 24 strand/12mm nominal dia.
10.	Type of insulators in use (Porcelain / Glass / Polymer):	Polymer
11.	Configuration of insulators (I / V / Y / tension)	Vertical configuration D/C Tension tower with each insulator string using Single Tension string
12.	No. of insulators per string and No. of strings per phase:	“Single Tension” string having one nos of 120 kN polymer insulator
13.	Year of construction / commissioning:	Charging on Commissioning: June 2016 (for D/C portion which was LILO at Samba of [220 kV Jammu (Chowadhi)-Hiranagar]
14.	Executing Agency:	M/s Mohan Energy Corporation (for LILO D/C portion constructed in June 2016)
15.	Weather condition on the date of failure:	Extremely windy with unprecedented high speed local cyclonic winds
16.	Wind speed and duration at the time of failure	Request letter sent to concerned authority for wind data.

17.	Terrain Category:	Located in generally plain terrain in a Khad area in Ghagwal Town in Jammu about 6 kms from Samba Substation
18.	Reliability Level	1
19.	Wind Zone (1/2/3/4/5/6) and velocity of wind for which tower was designed:	Wind Zone-IV, 47 m/sec (Non-Snow Zone))
20.	Details of earthing of tower (pipe type/ Counter poise)	Counter Poise
21.	Line designed as per IS: 802 (1977/1995/2015/any other code):	1995
22.	Type of steel	GI (Grade A)
23.	The agency who designed the line:	M/s RPG
24.	Any Special consideration in design:	
25.	Power flow in the line prior to failure:	220 kV S/C Samba-Chowadhi : 2.118 MW 220 kV D/C Samba-Hiranagar I: 8.668 MW
26.	Any missing member found before / after failure of towers:	No
27.	Condition of foundation after failure:	All the four stubs were found damaged near the chimney level
28.	Details of previous failure of the line / tower	No history of previous failure in the line
29.	Details of last maintenance activity along with date	Last patrolling report attached as Annexure-A Last Maintenance Activity attached as Annexure-B
30.	Brief Description of failure: [along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind-storm etc.]	The tower at location no. 26 (D+18) had collapsed from ground level and all four stubs were found damaged near the chimney level. Due to sudden impact, Coping was also found cracked from top in all four stubs. The collapsed tower had fallen in the right side in transverse direction facing Samba S/S. Due to sudden jerk caused by collapsed tower no. 26, the top phase cross arm at adjacent tower (Loc No 25) was also damaged. Photographs are attached as annexure.
31.	Probable cause of failure:	High speed localized cyclonic winds
32.	Whether line will be restored on ERS or Spare tower will be used:	Spare tower to be used
33.	Likely date of restoration:	Line restored on 27.04.2025
34.	Present Status:	Tower is completely stable
35.	Details of any Tests carried out after failure:	Visual Inspection was carried out by officials from POWERGRID, NRPC and JKPTCL however

<table>
<tr><td></td><td></td><td>no missing/ loose members or nut-bolts were observed.

Tower Material (MS / HT member samples have been collected and shall be tested in NABL accredited lab</td></tr>
<tr><td>36.</td><td>Single line diagram / clearance diagram of the failed tower(s) with all dimensions (Horizontal and vertical dimensions including the base width of tower)</td><td></td></tr>
<tr><td>37.</td><td>Tower spotting data</td><td>Attached as Annexure-C</td></tr>
<tr><td>38.</td><td>Tower Schedule for the failed section</td><td>
<table>
<tr><th>Tower No.</th><th>Tower Type</th><th>Span Length (m)</th><th>Angle of deviation</th></tr>
<tr><td>22</td><td>DB</td><td></td><td>08°10'22"LT</td></tr>
<tr><td></td><td></td><td>247</td><td></td></tr>
<tr><td>23</td><td>DB</td><td></td><td>09°15'16"RT</td></tr>
<tr><td></td><td></td><td>349</td><td></td></tr>
<tr><td>24</td><td>DA</td><td></td><td>00°00'00"</td></tr>
<tr><td></td><td></td><td>350</td><td></td></tr>
<tr><td>25</td><td>DA</td><td></td><td>00°00'00"</td></tr>
<tr><td></td><td></td><td>348.</td><td></td></tr>
<tr><td>26</td><td>DD</td><td></td><td>30°00'01"RT</td></tr>
<tr><td></td><td></td><td>462</td><td></td></tr>
<tr><td>27</td><td>DB</td><td></td><td>00°00'00"</td></tr>
<tr><td></td><td></td><td>303</td><td></td></tr>
<tr><td>28</td><td>DD</td><td></td><td>44°38'35"RT</td></tr>
<tr><td></td><td></td><td>337</td><td></td></tr>
<tr><td>29</td><td>DD</td><td></td><td>40°31'53"LT</td></tr>
</table>
</td></tr>
<tr><td>39.</td><td>Sag tension calculation considered for the design of towers</td><td></td></tr>
<tr><td>40.</td><td>Any other relevant information:</td><td></td></tr>
</table>

2. 765 KV Fatehpur-Agra 2 Transmission Line

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level	765kV S/C Fatehpur-Agra Ckt # 2
2.	Date and time of occurrence/discovery of failure	21-05-2025, 22:28 Hrs
3.	Length of line (km)	334. 83
4.	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	S/C Delta Configuration
5.	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 No. "A+0" Type Suspension Tower
6.	Tower location No. with reference to nearest substation (indicate Name)	Location no.-722 near Agra Substation
7.	Name and size of conductor	ACSR Bersimis & Dia- 35.05mm
8.	No. of sub-conductors per bundle and bundle spacing	04 sub-conductors per bundle, bundle spacing: 457 mm.
9.	Number and size of Ground wire/OPGW (if provided)	Both Earth Wire
10.	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer
11.	Configuration of insulators (I / V / Y / tension)	"I" Type both Side, Middle "V" Type
12.	No. of insulators per string and No. of strings per phase	02/String, 02string/Phase
13.	Year of construction / commissioning	01 Nov 2013
14	Executing Agency	M/s KEC International Limited
15.	Weather condition on the date of failure	Heavy Thunderstorm and Wind
16	Terrain Category	Plain
17.	Reliability Level	2
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind: Zone	IV- 47 m/sec
19.	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20.	Line designed as per IS:802 (1977/1995/2015 any other code	IS:802 (1995), Strengthened as per Manitoba Hydro International, Canada recommendations.
21.	The agency who designed the line	POWERGRID
22.	Any Special consideration in design	1. Tower also analysed for narrow front wind loading condition 2. Tower Strengthened as per Manitoba Hydro

		International, Canada recommendations.
23.	Details of last maintenance activity along with date	24-Feb-2025
24.	Power flow in the line prior to failure	259MW
25.	Any missing member found before / after failure of towers	No
26.	Condition of foundation after failure	OK
27.	Brief Description of failure	On 21.05.2025, due to high-speed cyclonic windstorm, the K-frame of
	[Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	the tower above waist level got twisted resulting in tower damage. Photographs & Newspaper cutting attached.
28.	Probable cause of failure	Heavy Cyclonic Wind
29.	Details of previous failure of the line / tower	NIL
30.	Whether line will be restored on ERS or Spare tower will be used	Line restored on Spare tower.
31.	Likely date of restoration	Line restored on 2nd June'25
32.	Present Status	Line restored on 2nd June'25
33	Details of any Tests carried out after failure (attach test reports)	Samples of Tower material collected and sent to NABL certified lab for testing
34.	Wind speed data of date & time of failure from nearby authorized observatory	No wind observatory installed nearby tower location (copy of IMD letter attached)
35.	Location of failed tower	
	a. Location Coordinates b. Nearest Airport c. District and State	a. 26.97725, 78.63683 b. Agra c. Agra & U. P
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Structural drawing attached.
37.	Tower weight	Approx. 23 MT
38.	Tower spotting data	Attached
39.	Tower schedule of affected section	Attached
40.	Sag tension calculation considered for design of tower	T = 9.7t. Sg = 14.80Mtr.
41.	Design document of failed towers	As per IS 802-1995
42.	Any other relevant information	-

2. RVPNL

The following Transmission Lines Towers of RVPNL had failed during January, 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
3	400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line	RVPNL	01.05.2025	2019	-	8	1	9	400 kV Moose ACSR
4	400 kV D/C Barmer- Bhinmal Line	RVPNL	05.05.2025	2019	-	1	0	1	400 kV Twin MOOSE ACSR

DETAILS IN RESPECT OF EACH TRANSMISSION LINE

3. 400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line

Sr. No.	Item Description	Details
01	Name of Transmission line with voltage level	400 kV D/C Barmer- Bhaisara (Jaisalmer-2) Line
02	Date and time of occurrence/discovery of failure	01.05.2025 at 21:05 Hrs
03	Length of line (km):	116.998 KM
04	Type of configuration:[(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
05	Number of Towers and Type of Towers failed:[Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)	Total failure towers:- 09, DA+0=05, DA+3=03, DB+0=01
06	Tower location No. with reference to nearest substation(indicate Name):	400KV GSS RVPN Jaisalmer-2 (Bhensara)
07	Name and size of conductor:	ACSR Moose Conductor
08	No. of sub-conductors per bundle and bundle spacing	NA
09	Number and size of Ground wire/OPGW (if provided):	7/3.66 Earth wire & 24-F OPGW
10	Type of insulators in use(Porcelain / Glass / Polymer):	Polymer
11	Configuration of insulators (I / V / Y / tension):	I & Tension
12	No. of insulators per string and No. of strings per phase:	02 Strings per phase
13	Year of construction / commissioning:	2019
14	Executing Agency:	M/s TATA Projects
15	Weather condition on the date of failure:	Rainy and heavy Storm
16	Terrain Category:	Plain & undolated
17	Reliability Level:	NA
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Wind zone 5
19	Details of earthing of tower (pipe type/ Counter poise):	Counterpoise
20	Line designed as per IS:802 (1977/1995/2015 any other code):	2015
21	The agency who designed the line:	M/s TATA Projects
22	Any Special consideration in design:	NA
23	Details of last maintenance activity along with date:	31.03.2025

24	Power flow in the line prior to failure	219 MW
25	Any missing member found before / after failure of towers:	Yes
26	Condition of foundation after failure:	OK
27	Brief Description of failure:	Enclosed
28	Probable cause of failure:	Heavy Wind storm
29	Details of previous failure of the line / tower :	136 to 140
30	Whether line will be restored on ERS or Spare tower will be used:	No
31	Likely date of restoration:	10.07.2023
32	Present Status:	Restoration work under progress
33	Details of any Tests carried out after failure(attach test reports):	No
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower	
A	Location Coordinates:	Enclosed in Tower schedule
B	Nearest Airport:	Jaisalmer
C	District and State:	Jaisalmer (Rajasthan)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
38	Tower weight:	DA- 10.335MT & DB-17.60MT
39	Tower spotting data:	Enclosed
40	Sag tension calculation considered for design of tower	Enclosed
41	Design document of failed towers:	NA
42	Any other relevant information:	NA

4. 400 kV D/C Barmer- Bhinmal Line

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level:	400 kV D/C Barmer- Bhinmal Line
2.	Date and time of occurrence/discovery of failure:	05.05.2025 at 04:14 hrs
3.	Length of line (km):	143.775 Km Barmer to Bhinmal end
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 no. suspension (DA+9)
6.	Tower location No. with reference to nearest substation(indicate Name):	Loc No. 101 (DA+9)
7.	Name and size of conductor:	Twin Moose Conductor, 597.2 Sq. MM
8.	No. of sub-conductors per bundle and bundle spacing:	AL-54/3.53 and Steel- 7/3.53
9.	Number and size of Ground wire/OPGW (if provided):	Ground (7/3.66 mm) and OPGW (24 Fiber)
10.	Type of insulators in use(Porcelain / Glass / Polymer):	Polymer
11.	Configuration of insulators (I / V / Y / tension):	I-string, Twin Moose
12.	No. of insulators per string and No. of strings per phase:	Composite Long Rod Insulator- 01 No.
13.	Year of construction / commissioning:	21.05.2019, Barmer/ Bhinmal
14.	Executing Agency:	RVPN
15.	Weather condition on the date of failure:	Heavy Rain, Wind Storm and Lightning
16.	Terrain Category:	Sandy Plains and sandy Dunes
17.	Reliability Level:	
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Requested to weather department of Govt. of Rajasthan but not provided
19.	Details of earthing of tower (pipe type/ Counter poise):	pipe type
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	-
21.	The agency who designed the line:	RVPN
22.	Any Special consideration in design:	-
23.	Details of last maintenance activity along with date:	Line patrolling done on date 01.02.2025 to 28.02.2025
24.	Power flow in the line prior to failure:	104 MW Barmer/ 102 MW Bhinmal
25.	Any missing member found before / after failure of towers:	No
26.	Condition of foundation after failure:	Damage

27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Heavy Rain, Wind Storm and Lightning
28.	Probable cause of failure:	Heavy Rain, Wind Storm and Lightning
29.	Details of previous failure of the line / tower :	Nil
30.	Whether line will be restored on ERS or Spare tower will be used:	Not restored on ERS and work is in progress for new erection of tower
31.	Likely date of restoration:	
32.	Present Status:	work is in progress
33.	Details of any Tests carried out after failure(attach test reports):	-
34.	Wind speed data of date & time of failure from nearby authorized observatory:	Requested to weather department of Govt. of Rajasthan but not provided
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	TL No. 101 a.25.597162 & 71.497112 b. Jodhpur c. Barmer and Rajasthan
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	
37.	Tower weight:	15.50 MT
38.	Tower spotting data:	-
39.	Tower schedule of affected section:	1.2 Km
40.	Sag tension calculation considered for design of tower:	-
41.	Design document of failed towers:	-
42.	Any other relevant information:	-

3. THDCIL

The following Transmission Line Towers of THDCIL had failed during January 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
5	220 kV Amarapur-Tharad Line	THDCIL	05.05.2025	2012	-	3	0	3	220 kV Single MOOSE ACSR

5. 220 kV Amarapur-Tharad Line

Sr. No	Item Description	Details
1.	Name of Transmission line with voltage level:	220 kV Amarapur-Tharad Line
2.	Date and time of occurrence/discovery of failure:	05.05.2025
3.	Length of line (km):	1.4 Km
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	3 nos. Tower / DA+3 Type
6.	Tower location No. with reference to nearest substation(indicate Name):	Tower No.21, 22, 23
7.	Name and size of conductor:	AL59 MOOSE
8.	No. of sub-conductors per bundle and bundle spacing:	ONE
9.	Number and size of Ground wire/OPGW (if provided):	24 CORE OPGW NA
10.	Type of insulators in use(Porcelain / Glass / Polymer):	Porcelain
11.	Configuration of insulators (I / V / Y / tension):	I
12.	No. of insulators per string and No. of strings per phase:	One Insulator Per String and One String Per Phase
13.	Year of construction / commissioning:	2012
14.	Executing Agency:	KINTECH
15.	Weather condition on the date of failure:	Very Heavy Cyclonic Wind (40 Mtr/Sec) And Rain
16.	Terrain Category:	-
17.	Reliability Level:	-
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	-
19.	Details of earthing of tower (pipe type/ Counter poise):	Counter Type
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	IS:802/1995
21.	The agency who designed the line:	KINTECH
22.	Any Special consideration in design:	-

23.	Details of last maintenance activity along with date:	Scope of GETCO
24.	Power flow in the line prior to failure:	-
25.	Any missing member found before / after failure of towers:	Some Member Missing Found During Inspection
26.	Condition of foundation after failure:	Damaged
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Tower No.21,22,23 Totally Collapsed and All Tower Stub Damaged
28.	Probable cause of failure:	Heavy Gusty Wind
29.	Details of previous failure of the line / tower :	Previous In 2020 5 Nos. Tower Collapse
30.	Whether line will be restored on ERS or Spare tower will be used:	ERS Used for One Month
31.	Likely date of restoration:	27.06.2025
32.	Present Status:	Both Line Charged After CEIG Approval
33.	Details of any Tests carried out after failure(attach test reports):	NA
34.	Wind speed data of date & time of failure from nearby authorized observatory:	NA
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	**Location Coordinates** **Village**-Adgam, Ta-Radhanpur. **Nearest Airport:** Ahmadabad, Gujarat. **District and State**: Dist.-Patan, Gujarat -385240
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	NA
37.	Tower weight:	Approx. 3.5 Ton
38.	Tower spotting data:	-
39.	Tower schedule of affected section:	Please refer **Appendix -I**
40.	Sag tension calculation considered for design of tower:	-
41.	Design document of failed towers:	-
42.	Any other relevant information:	-

4. GETCO

The following Transmission Lines Towers of GETCO had failed during January 2025 to June 2025.

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
6	400KV Kosamba Charal line and 400KV Kosamba Panchham line-D/C Line	GETCO	05.05.2025	2014	-	2	0	2	400 kV MOOSE ACSR
7	220 kV Bhachunda Varsana/ Ukheda Varsana line	GETCO	06.05.2025	2004	5	1	0	1	220 kV AL59
8	220kV Nakhatrana-Panadhro Line 1 & 2	GETCO	08.05.2025	1997	4	1	0	1	220 kV Single Zebra ACSR

6. 400KV Kosamba Charal line and 400KV Kosamba Panchham line- D/C Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level:	400KV Kosamba Charal line and 400KV Kosamba Panchham line- D/C Line
2	Date and time of occurrence/discovery of failure	On dated 05.05.2025 @ 18:29, 400KV Kosamba Charal line and 400KV Kosamba Panchham line- D/C Line tripped from Both end, as probable fault jurisdiction is in Dahej Jurisdiction, Line patrolling carried out . During patrolling, it was found out that Loc No.518(S)-Top and bottom cross arm found bend, Loc No.519(S)-Tower collapsed from its foundation and Between Loc No. 520(S) to 521(S) -OPGW found broken.
3	Length of line (km):	247.60Kms and 233 Kms respectively
4	Type of configuration:[(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C tower
5	Number of Towers and Type of Towers failed:[Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	02 Nos Suspension
6	Tower location No. with reference to nearest substation(indicate Name):	518(S) and 519(S) nearest Bhersam Village nearer to 220kV Dahej
7	Name and size of conductor:	ACSR Moose Conductor & 520mm^2
8	No. of sub-conductors per bundle and bundle spacing:	
9	Number and size of Ground wire/OPGW (if provided):	24F OPGW
10	Type of insulators in use(Porcelain / Glass / Polymer):	SRI
11	Configuration of insulators (I / V / Y / tension):	
12	No. of insulators per string and No. of strings per phase:	1 &1
13	Year of construction / commissioning:	05.07.2014
14	Executing Agency:	Bajaj Electricals LTD
15	Weather condition on the date of failure:	Extremely Heavy wind and rain with lightning
16	Terrain Category:	

17	Reliability Level:	
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	
19	Details of earthing of tower (pipe type/ Counter poise):	Rod type
20	Line designed as per IS:802 (1977/1995/2015 any other code):	
21	The agency who designed the line:	
22	Any Special consideration in design:	
23	Details of last maintenance activity along with date:	30.03.2025-Jumper tightning of from loc no.498 to 554 of bharuch juridiction
24	Power flow in the line prior to failure:	400KV Kosamba Charal line-268 MW and 400KV Kosamba Panchham line-375 MW
25	Any missing member found before / after failure of towers:	No
26	Condition of foundation after failure:	02 Legs foundation found cracked and 02 nos are totally uprooted from ground of Loc No.519(S)
27	Brief Description of failure:[Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	
28	Probable cause of failure:	extremely Heavy wind and rain with lightning
29	Details of previous failure of the line / tower :	-
30	Whether line will be restored on ERS or Spare tower will be used:	In PF
31	Likely date of restoration:	15.05.2025
32	Present Status:	Loc No. 519(S) tower erection work in prograss, Loc No. 518(S) cross arm repalced and damage cunductor work under progress
33	Details of any Tests carried out after failure (attach test reports):	No
34	Wind speed data of date & time of failure from nearby authorized observatory:	-
35	Location of failed towera. Location Coordinates:b. Nearest Airport:c. District and State:	A.Lat.21.7676790 Long.72.8526770 B. Surat C.Bharuch, Gujarat
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	-
37	Tower weight:	10MT

38	Tower spotting data:	Attached here with
39	Tower schedule of affected section	Attached here with
40	Sag tension calculation considered for design of tower	-
41	Design document of failed towers:	-
42	Any other relevant information	-

7. 220 kV Bhachunda Varsana/ Ukheda Varsana line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level:	220kv Bhachunda Varsana/ Ukheda Varsana Line
2	Date and time of occurrence/discovery of failure	06.05.2025 at 13.30hrs
3	Length of line (km):	173 km
4	Type of configuration:[(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C Tower
5	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	1 Nos. Suspension Normal Tower
6	Tower location No. with reference to nearest substation(indicate Name):	Location no-336 Connected with 400kV Varsana s/s
7	Name and size of conductor:	AL 59
8	No. of sub-conductors per bundle and bundle spacing:	Single conductor
9	Number and size of Ground wire/OPGW (if provided):	Single Ground wire
10	Type of insulators in use(Porcelain / Glass / Polymer):	Polymer
11	Configuration of insulators (I / V / Y / tension):	I
12	No. of insulators per string and No. of strings per phase:	Single insulator per phase, Single string per phase.
13	Year of construction / commissioning:	18.02.2004
14	Executing Agency:	Suzlon
15	Weather condition on the date of failure:	Heavy rain with wind
16	Terrain Category:	Desert area
17	Reliability Level:	NA
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	5
19	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20	Line designed as per IS:802 (1977/1995/2015 any other code):	Line designed as per IS:802 (1977)

21	The agency who designed the line:	M/S SUZLON(IN EPC project)
22	Any Special consideration in design:	No any special design not considered
23	Details of last maintenance activity along with date:	17-05-2024 Ground petrolling
24	Power flow in the line prior to failure:	60 Amp
25	Any missing member found before / after failure of towers:	NO
26	Condition of foundation after failure:	Towers twisted and collapsed. Foundation found ok.
27	Brief Description of failure:[Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Due to wind gust on dated 06.05.2025, line tripped, after petrolling it was found that tower no 336 collapsed.
28	Probable cause of failure:	Heavy rain, heavy wind and cyclone effect.
29	Details of previous failure of the line / tower :	NA
30	Whether line will be restored on ERS or Spare tower will be used:	NA
31	Likely date of restoration:	20.05.2025
32	Present Status:	WORK UNDER PROGRESS
33	Details of any Tests carried out after failure (attach test reports):	No any test carried out
34	Wind speed data of date & time of failure from nearby authorized observatory:	Approx 70-80 KM/Hrs due to mini cyclone as per IMD Report 06.05.2025
35	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	Loc 336, 23.4587,69.678 Near 66kv Loria substation, Bhuj Airport, Kutch Gujarat
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Single line diagram & network is Attached herewith
37	Tower weight:	4 MT Appr.
38	Tower spotting data:	336(S): 23.4587,69.678
39	Tower schedule of affected section	Attached with here.
40	Sag tension calculation considered for design of tower	For ASCR AL59 conductor,32degree full wind, 3950 kg 0 degree 2/3 full wind ,4360kg
41	Design document of failed towers:	DA+3 tower

42	Any other relevant information	On dated 06.05.2025, due to heavy rain with very high wind gust at Loria,Sumrasar Village tower has been collapsed.

8. 220kV Nakhatrana-Panadhro Line 1 & 2

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level:	220kV Nakhatrana-Panadhro Line 1 & 2
2	Date and time of occurrence/discovery of failure	08-05-2025 18:35:00 Hrs
3	Length of line (km):	75 km
4	Type of configuration:[(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C Tower
5	Number of Towers and Type of Towers failed:[Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	1 No. Suspension Normal Tower
6	Tower location No. with reference to nearest substation(indicate Name):	163 (S)
7	Name and size of conductor:	ACSR Zebra
8	No. of sub-conductors per bundle and bundle spacing:	Single conductor
9	Number and size of Ground wire/OPGW (if provided):	Single OPGW
10	Type of insulators in use(Porcelain / Glass / Polymer):	Polymer
11	Configuration of insulators (I / V / Y / tension):	I
12	No. of insulators per string and No. of strings per phase:	Single insulator per phase, Single string per phase.
13	Year of construction / commissioning:	24.01.1997
14	Executing Agency:	M/s Kalpatru
15	Weather condition on the date of failure:	Heavy rain with wind
16	Terrain Category:	Costal and creek area
17	Reliability Level:	Design as old IS:802,Not applicable in old tower design (IS)
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	4
19	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20	Line designed as per IS:802 (1977/1995/2015 any other code):	Line designed as per IS:802 (1977)
21	The agency who designed the line:	M/s Kalpatru
22	Any Special consideration in design:	No any special design not considered
23	Details of last maintenance activity along with date:	28.04.2025 Ground petrolling carried out

24	Power flow in the line prior to failure:	63 Amp
25	Any missing member found before / after failure of towers:	NO
26	Condition of foundation after failure:	Towers collapsed from Bottom
27	Brief Description of failure:[Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Due to wind gust on dated 08.05.2025, line tripped, after petrolling it was found that tower no. 163(S) collapsed.
28	Probable cause of failure:	Heavy rain, heavy wind and cyclone effect.
29	Details of previous failure of the line / tower :	NA
30	Whether line will be restored on ERS or Spare tower will be used:	NO
31	Likely date of restoration:	31-May-25
32	Present Status:	New Tower Material collected from store
33	Details of any Tests carried out after failure(attach test reports):	No any test carried out
34	Wind speed data of date & time of failure from nearby authorized observatory:	-
35	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	Paneli Village, Ta- Lakhpat, Dist- Kutchh.
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Single line daigram & network is Attached herewith
37	Tower weight:	3.6 MT Appr.
38	Tower spotting data:	163(S): 23.606098, 68.951446
39	Tower schedule of affected section	Attached with here.
40	Sag tension calculation considered for design of tower	For ASCR zebra conductor,32degree full wind,3950kg 0 degree 2/3 full wind ,4360kg
41	Design document of failed towers:	DA+0 tower
42	Any other relevant information	On dated 08.05.2025, due to heavy rain with very high wind gust at Paneli village tower has been collapsed.

5. MPPTCL

The following Transmission Lines Towers of MPPTCL had failed during January, 2025 to June, 2025.

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
9	220kV Sidhi-ATPS & 220 kV Sidhi-Rewa Line	MPPTCL	05.05.2025	October, 2008	-	1	1	2	220 kV Single Zebra ACSR
10	400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II	MPPTCL	21.05.2025	Ckt.-1-31.03.1991, Ckt. II-18.06.1991	3	5	1	6	400 kV Twin MOOSE ACSR
11	400 kV DCDS Bhopal- Bina line Ckt.-I & II	MPPTCL	11.06.2025	Ckt.-1-17.03.1994, Ckt.-II 23.03.1994	3	11	1	12	400 kV Twin MOOSE ACSR
12	400kV DCDS Chhegoan-Julwania Line	MPPTCL	12.06.2025	2014	3	4	0	4	400 kV Twin MOOSE ACSR

9. 220KV SIDHI-ATPS & 220KV SIDHI-REWA Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	220KV SIDHI-ATPS & 220KV SIDHI-REWA Transmission Line
2	Date and time: 1. Occurrence of failure 2. Discovery of failure	05.05.2025 Time 00:45 Hrs/05:10Hrs
3	Length of line (km)	58.372 km. (Under tlm Sidhi)
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 (JC) suspension & 01(860+10) tension
6	Tower location No. with reference to nearest substation	Loc.No.8 (IC) & 9 (B60+10),220 kV S/s Sidhi
7	Name and size of conductor	ACSR Zebra
8	No. of sub-conductors per bundle and bundle spacing	Single ACSR Zebra
9	Number and size of Ground wire/OPGW	12.50 MM, Earth wire
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porcelain Insulator
11	Configuration of insulators (I / V / Y / tension)	suspension & 1 tension
12	No. of insulators per string and No. of strings per phase	Loc. No 8 (JC) 12 No. insulators per strings per phase/ 6 No. 2. Lac. No. 9 (1860-10) 13No. insulators per strings per phase/12 No.
13	Year of construction / commissioning	Oct-2008
14	Executing Agency	MPPTCL
15	Weather condition on the date of failure	Heavy storm and rain
16	Terrain Category	Hilly

17	Reliability Level	Category - 02
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	..
19	Details of earthing of tower (pipe type/ Counter poise)	Counter poise
20	Line designed as per IS:802 (1977/1995/2015 any other code)	YES
21	The agency who designed the line	MPEB Jabalpur
22	Any Special consideration in design	NA
23	Details of last maintenance activity along with date	01.04.2025
24	Power flow in the line prior to failure	20 MW
25	Any missing member found before / after failure of towers	NO
26	Condition of foundation after failure	Foundation was robust, only 2 No stub found bend due to tower collapse.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Heavy storm in that area therfore tower has been collapsed.
28	Probable cause of failure	Due to heavy wind and thunder across the line
29	Details of previous failure of the line / tower	NA
30	Whether line will be restored on ERS, or Spare tower will be used	Re-erection of tower same location.
31	Likely date of restoration	Restored on dt. 22.05.2025
32	Present Status	Charged on dt. 22.05.2025. AT 22:28 Hrs & 00.45
33	Details of any Tests carried out after failure (attach test reports)	Test reports of Sample of damge tower has been Enclosed given by testing lab, MP Laghu Udyog Nigam Ltd. Jabalpur
34	Wind speed data of date & time of failure from nearby authorized observatory	No data available at O/o Deputy director of meteorological department Satna/Nagpur.
35	Location of failed tower: a. Location Coordinates b. Nearest Airport District and State	8 (JC) & 9(860+10) (24.149792*N, 81.2257358°E) Rewa (M.P.) Shahdol Madhya Pradesh.
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions	Not available

	(horizontal & vertical dimensions including base width of tower)	
37	Tower weight	28000 kgs.
38	Tower spotting data	Not available
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	
41	Design document of failed towers	
42	Any other relevant information	

10. 400 kV DCDS Bhopal-Itarsi (PGCIL) line Ckt.-1 & II

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400 kV DCDS Bhopal Itarsi (PGCIL) line Ckt.-1 & II
2	Date and time: 3. Occurrence of failure 4. Discovery of failure	21.05.2025 at 15:39
3	Length of line (km)	96.932 km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	DCDS (DC)
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01. 04 no suspension tower collapse loc. no. 113(FD0), 114(FD0), 115(FD0), 112(FD0+3)/ 02. 01 no suspension tower partially damage loc. no. 116(FDO) 03. 01 no tension tower got partially damage loc. no. 111(FD30)
6	Tower location No. with reference to nearest substation	400 kV S/s Bhopal
7	Name and size of conductor	Twin moose ACSR conductor size 31.80 Dia
8	No. of sub-conductors per bundle and bundle spacing	02 no. conductor per bundle
9	Number and size of Ground wire/OPGW	OPGW 8 fiber & 24 fiber
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porceline
11	Configuration of insulators (I / V / Y / tension)	I type
12	No. of insulators per string and No. of strings per phase	23 no. and 01 no. string per phase in suspension tower and 24 no. and 02 no strings per phase in tension tower
13	Year of construction / commissioning	Ckt.-1-31.03.1991, Ckt. Il 18.06.1991
14	Executing Agency	MPPTCL
15	Weather condition on the date of failure	Heavy thunder storm & cyclone
16	Terrain Category	Plan area
17	Reliability Level	Not available
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind zone - 3
19	Details of earthing of tower (pipe type/ Counter poise)	Rod type Earthing (04 leg)
20	Line designed as per IS:802 (1977/1995/2015 any other code)	1977

21	The agency who designed the line	SAE India Ltd.
22	Any Special consideration in design	No
23	Details of last maintenance activity along with date	Ground patrolling done on date 13.05.2025
24	Power flow in the line prior to failure	Both circuits of line was in operation.
25	Any missing member found before / after failure of towers	No missing member
26	Condition of foundation after failure	Foundation ok
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Enclosed
28	Probable cause of failure	Cyclonic storm in localised area.
29	Details of previous failure of the line / tower	NA
30	Whether line will be restored on ERS, or Spare tower will be used	NO
31	Likely date of restoration	Ckt-I charged on 11.07.25& ckt-1l 13.07.2025
32	Present Status	Rectification is under progress
33	Details of any Tests carried out after failure (attach test reports)	Mechanical & Chemical test of tower part (report enclosed)
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower: c. Location Coordinates d. Nearest Airport District and State	04 no tower collapse 112(FD0+3),113(FD0),114(FD0), 115(FDQ) and 02 no tower got partially damage 111(FD30),116(FD0) Cordinates- List enclosed Nearest Airport - bhopal Dist. – Raisen (mp)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
37	Tower weight	Superstructure (9.173 MT)
38	Tower spotting data	Nil
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	With in limit
41	Design document of failed towers	NA
42	Any other relevant information	No

11. 400 kV DCDS Bhopal Bina Line Ckt I & II

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400 kV DCDS Bhopla Bina Line Ckt I & II
2	Date and time: 5. Occurrence of failure 6. Discovery of failure	11.06.2025 at 19:13
3	Length of line (km)	134.924 km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	DCDS (DC)
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01. 06 no suspension tower collapse loc. no. 122(FDO), 123(FD0), 125(FD0), 126 (FD0+3),127(FD0+6) 02. 05 no suspension tower partially damage loc. no. 96(FD0),98(FD0), 121(FD0), 128(FDO),129(FD0) 03. 01 no tension tower got partially damage loc. no. 124 (FD30) 'T'
6	Tower location No. with reference to nearest substation	400 kV S/s Bhopal
7	Name and size of conductor	Name -Twin Moose ACSR conductor size-31.80 mm dia
8	No. of sub-conductors per bundle and bundle spacing	02 No conductor per bundle
9	Number and size of Ground wire/OPGW	OPGW 8 fiber & 24 fiber
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porceline
11	Configuration of insulators (I / V / Y / tension)	I type
12	No. of insulators per string and No. of strings per phase	23 no. and 01 no. string per phase in suspension tower and 24 no. and 02 no strings per phase in tension tower
13	Year of construction / commissioning	Ckt.-1-17.03.1994, Ckt.-II 23.03.1994
14	Executing Agency	MPPTCL
15	Weather condition on the date of failure	Heavy thunder storm & cyclone
16	Terrain Category	Plan area
17	Reliability Level	Not available
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind zone - 3

19	Details of earthing of tower (pipe type/ Counter poise)	Rod type Earthing (04 leg)
20	Line designed as per IS:802 (1977/1995/2015 any other code)	1977
21	The agency who designed the line	SAE India Ltd.
22	Any Special consideration in design	No
23	Details of last maintenance activity along with date	Ground patrolling done on date 06.05.2025
24	Power flow in the line prior to failure	Both circuits of line was in operation.
25	Any missing member found before / after failure of towers	No missing member
26	Condition of foundation after failure	Foundation ok
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Enclosed with detailed report
28	Probable cause of failure	Cyclonic storm in localised area.
29	Details of previous failure of the line / tower	NA
30	Whether line will be restored on ERS, or Spare tower will be used	No
31	Likely date of restoration	30.07.2025
32	Present Status	Rectification is under progress
33	Details of any Tests carried out after failure (attach test reports)	Mechanical & Chemical test of tower part will be carried out
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower: e. Location Coordinates f. Nearest Airport District and State	6 no tower found collapse tower loc. no. (1) 97 (FD0+6), (2)122(FDO) (3) 123 (FD0), (4)125 (FDO), (5) 126 (FD0+3), (6) 127 (FD0+6) and 06 no tower got partially damage (1) 98 (FDO) bend from middle x-arm, (2) 96(FD0) bend canopy, (3)121 FD0 bend above bottom x-arm, (4) 124 (FD30) Transposition tower Bend above bottom farm, (5) 128 FD0 bend above bottom, (6)129 FDO bend above bottom. Cordinatos- List enclosed Nearest Airport Bhopal Dist. Vidisha (mp)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
37	Tower weight	Superstructure (9.173 MT)

38	Tower spotting data	Nil
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	With in limit
41	Design document of failed towers	Na
42	Any other relevant information	No

12. 400kV DCDS Chhegoan- Julwania Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400kV DCDS Chhegoan- Julwania Transmission Line Ckt.-1 & II
2	Date and time: 7. Occurrence of failure 8. Discovery of failure	12.06.2025 at 19:08 Hr
3	Length of line (km)	113.639 KM
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	DCDS (DC
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	1.) 02 Nos Suspension towers collapsed [240 (FD0), 241 (FD0+6)] 2) 02 Nos Suspension Partially Damaged [239 (FD0+3), 235 (FD0+3)l Total 04 no Suspension
6	Tower location No. with reference to nearest substation	Loc No. 340 is situated at 400kV Julwania Sub-Station
7	Name and size of conductor	Name -Twin Moose ACSR conductor size-31.80 mm dia
8	No. of sub-conductors per bundle and bundle spacing	02 No conductor per bundle
9	Number and size of Ground wire/OPGW	713.66 mm, Gl GW and OPGW
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porceline
11	Configuration of insulators (I / V / Y / tension)	I type
12	No. of insulators per string and No. of strings per phase	23 No. & 0L no. string per Phase in suspension tower.
13	Year of construction / commissioning	Year - 2014
14	Executing Agency	MPPTCL
15	Weather condition on the date of failure	Cyclonic storm in localized qlgg
16	Terrain Category	Agriculture area
17	Reliability Level	Not available
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind zone - 3
19	Details of earthing of tower (pipe type/ Counter poise)	Rod type Earthing
20	Line designed as per IS:802 (1977/1995/2015 any other code)	1977
21	The agency who designed the line	SAE India Ltd.

22	Any Special consideration in design	Strengthening of towers structure are proposed
23	Details of last maintenance activity along with date	Ground patrolling done on date 23.05.2025
24	Power flow in the line prior to failure	Both circuits of line was in operation.
25	Any missing member found before / after failure of towers	No missing member
26	Condition of foundation after failure	Foundation and stub ok
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Enclosed with detailed report
28	Probable cause of failure	Cyclonic storm in localised area.
29	Details of previous failure of the line / tower	Nil
30	Whether line will be restored on ERS, or Spare tower will be used	Spare tower used
31	Likely date of restoration	Restoration work compelled on dtd 7.O7.2025
32	Present Status	line charged ckt-l at 1"9:44hrs and Ckt-ll 19:46 hrs dtd 7.O7.2025
33	Details of any Tests carried out after failure (attach test reports)	Under Process
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower: g. Location Coordinates h. Nearest Airport District and State	02 Nos towers collapsed [240 (FD0), 241 (FD0+6)l 02 Nos Partially Damaged [239(FD0+3) & 23s(FD0+3)] Cordinatos- List enclosed Nearest Airport - indore Dist. – Khargone (mp)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
37	Tower weight	Suprestructure (9.173 MT)
38	Tower spotting data	Nil
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	With in limit
41	Design document of failed towers	NA
42	Any other relevant information	NA

6. UPPTCL

The following Transmission Lines Towers of UPPTCL had failed during January 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
13	400 kV Orai - Parichha D/C line – I & II	UPPTCL	11.05.2025	2016	5	3	0	3	400 kV Twin MOOSE ACSR
14	220 kV Nehtaur-Mataur (765 kV PGCIL) Line	UPPTCL	21.05.2025	2011	-	0	2	2	220 kV Single Zebra ACSR
15	220 kV Jagriti Vihar-Hapur (765 KV) D/C line	UPPTCL	21.05.2025	2019	4	2	2	4	220 kV Single Zebra ACSR
16	400 KV Panki-Unnao S/C Transmission Line	UPPTCL	30.05.2025	1998	-	5	0	5	400 kV Twin MOOSE
17	220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers	UPPTCL	15.06.2025	2022	4	2	0	2	220 kV Single Zebra ACSR

13. 400 kV ORAI - PARICHHA D/C – I & II

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level:	400 KV ORAI - PARICHHA D/C – I & II
2.	Date and time of occurrence/discovery of failure:	11.05.2025 13:51 Hrs.
3.	Length of line (km):	111 km
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C on D/C tower
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	03 Nos tower failed Failed tower type : DA+0
6.	Tower location No. with reference to nearest substation (indicate Name):	Tower No. 56, 57 & 58 Parichha Thermal Power Station
7.	Name and size of conductor:	ACSR Twin Moose conductor Overall Size of conductor 31.77 mm Specification of conductor : 54/7/3.53
8.	No. of sub-conductors per bundle and bundle spacing:	ACSR twin Moose conductor Bundle spacing – 450 mm
9.	Number and size of Ground wire/OPGW (if provided):	01 No Earthwire (7/3.66 mm) & 01 No OPGW (24 fiber)
10.	Type of insulators in use(Porcelain / Glass / Polymer):	Porcelain
11.	Configuration of insulators (I / V / Y / tension):	V type
12.	No. of insulators per string and No. of strings per phase:	02 string per phase. & 23 Nos insulator per string
13.	Year of construction / commissioning:	2016 (Commissioning)
14.	Executing Agency:	M/s Gammon India Ltd., Nagpur
15.	Weather condition on the date of failure:	Heavy storm / cyclone / squall.
16.	Terrain Category:	Plain
17.	Reliability Level:	2
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Wind zone 5, 90 Km/H surface wind at time of fault
19.	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	---
21.	The agency who designed the line:	SAE
22.	Any Special consideration in design:	No

23.	Details of last maintenance activity along with date:	Tree cutting and Month of April 2025
24.	Power flow in the line prior to failure:	170 Amp on each Ckt.
25.	Any missing member found before / after failure of towers:	No
26.	Condition of foundation after failure:	Foundation is ok
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Tower collapse, Due to heavy cyclonic storm / squall. [Photographs attach)
28.	Probable cause of failure:	Due to heavy storm / cyclone / squall.
29.	Details of previous failure of the line / tower :	17/05/2017 (13:58 Hrs)
30.	Whether line will be restored on ERS or Spare tower will be used:	Old & used spare tower will be used for restoration of line.
31.	Likely date of restoration:	30/05/2025
32.	Present Status:	Restoration work underway.
33.	Details of any Tests carried out after failure(attach test reports):	Send for testing result awaited.
34.	Wind speed data of date & time of failure from nearby authorized observatory:	90 Km/Hr. wind speed
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	Tower no 56 (DA+0) 25.668570 N, 78.846630 E Tower no 57 (DA+0) 25.671270 N, 78.848770 E Tower no 58 (DA+0) 25.674050 N, 78.851010 E Kanpur Kanpur (U.P.)
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Drawing enclosed
37.	Tower weight:	Tower type DA +0, weight 9.63 MT
38.	Tower spotting data:	NA
39.	Tower schedule of affected section:	Enclosed.
40.	Sag tension calculation considered for design of tower:	NA
41.	Design document of failed towers:	SAE make D/C tower (BOM & tower erection drawing enclosed).
42.	Any other relevant information:	Tower fail during heavy storm/ cyclone / squall.

14. 220 kV 220 kV Nehtaur-Mataur (765 kV PGCIL) Line

Sr. No	Item Description	Details
1.	Name of Transmission line with voltage level:	220 kV Nehtaur-Mataur (765 kV PGCIL) Line
2.	Date and time of occurrence/discovery of failure:	19:56 Hrs. on date 21.05.2025
3.	Length of line (km):	72.477 km
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	S/C
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	02 Nos. Towers Tension tower (B+5, SC type)
6.	Tower location No. with reference to nearest substation(indicate Name):	Tower No. 06 and Tower No. 07, near of 765 kV Mataur PGCIL substation
7.	Name and size of conductor:	Zebra conductor and overall diameter 28.62 mm
8.	No. of sub-conductors per bundle and bundle spacing:	One conductor per phase
9.	Number and size of Ground wire/OPGW (if provided):	One Earth wire size 7/3.67 mm
10.	Type of insulators in use(Porcelain / Glass / Polymer):	Porcelain insulators
11.	Configuration of insulators (I / V / Y / tension):	Tension
12.	No. of insulators per string and No. of strings per phase:	16 Nos. insulators and 01 no. string per phase
13.	Year of construction / commissioning:	30.09.2011
14.	Executing Agency:	M/s Scantac
15.	Weather condition on the date of failure:	Heavy storm and Heavy rain
16.	Terrain Category:	
17.	Reliability Level:	
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	80 km per hour.
19.	Details of earthing of tower (pipe type/ Counter poise):	Pipe type
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	
21.	The agency who designed the line:	Kalptaru (Sangam Allahabad manufacture)
22.	Any Special consideration in design:	

23.	Details of last maintenance activity along with date:	On dated 17.05.2025 TLPS patrolling done
24.	Power flow in the line prior to failure:	11 MW load flow through Mataur to Nehtaur
25.	Any missing member found before / after failure of towers:	NIL
26.	Condition of foundation after failure:	Normal
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Due to heavy storm tower banded at stub (Photographs Attached)
28.	Probable cause of failure:	Heavy storm and Heavy rain
29.	Details of previous failure of the line / tower :	NIL
30.	Whether line will be restored on ERS or Spare tower will be used:	220KV Charla to Mataur line tower used (Tower no 5 to tower no 3 LILO portion) for restored 220KV Nehtaur – Mataur line.
31.	Likely date of restoration:	28.06.2025
32.	Present Status:	In Service
33.	Details of any Tests carried out after failure(attach test reports):	NIL
34.	Wind speed data of date & time of failure from nearby authorized observatory:	
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	a.(i) Tower No. 6 (29.319314,78.338147) a.(ii) Tower No. 7 (29.320000,78.335456) b. Delhi Airport c. Meerut and Uttar Pradesh
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	
37.	Tower weight:	7800 kg (for old B+5 S/C type tower)
38.	Tower spotting data:	
39.	Tower schedule of affected section:	Attached
40.	Sag tension calculation considered for design of tower:	
41.	Design document of failed towers:	
42.	Any other relevant information:	

15. 220 kV Jagriti Vihar-Hapur (765 KV) D/C line

Sr. No	Item Description	Details
1.	Name of Transmission line with voltage level :	220 kV Jagriti Vihar-Hapur (765 KV) D/C line
2.	Date and time of occurrence/discovery of failure:	21.05.2025, 20:00 Hrs.
3.	Length of line (Km) :	26.307 Km.
4.	Type of configuration : [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.	D/C
5.	Number of Towers and type of towers failed : [Suspension/tension/dead end/special tower/river crossing tower/Power line crossing/Railway Crossing etc., with/without extension (indicate the type & length of extension)].	04 Nos. Towers failed Tower No. 85 – DC+5 – Tension 86 – DA+5 – Suspension 87 – DA+0 – Suspension 88 – DB+0 – Tension
6.	Tower location No. with reference to nearest substation (indicate Name):	Tower No. – 88, nearest to 220 KV Sub-Station Partapur (Jagriti Vihar) Meerut
7.	Name and size of conductor:	Zebra, 420 Sq.mm.
8.	No. of Sub-conductors per bundle and bundle spacing:	Single Conductor
9.	Number and size of Ground wire/OPGW (if provided):	OPGW, 24F
10.	Type of insulators in use (Porcelain/Glass/Polymer):	Porcelain
11.	Configuration of insulators (I/V/Y/tension):	I, Tension (Single String)
12.	No. of insulators per string and No. of strings per phase:	Suspension – 14 & Single string per phase Tension – 16
13.	Year of construction/commissioning:	14.09.2019
14.	Executing Agency:	-
15.	Weather condition on the date of failure:	Rainstorm (CYCLONE)
16.	Terrain Category:	Category 1
17.	Reliability Level:	-
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Wind zone 4
19.	Details of earthing of tower (pipe type/Counter poise) :	Pipe type

20.	Line designed as per IS:802 (1977/1995/2015 any other code) :	-
21.	The agency who designed the line:	KPTL
22.	Any Special consideration in design:	-
23.	Details of last maintenance activity along with date:	Hapur Ckt-Ist, dt. 21.04.2025 to 22.04.2025 Hapur Ckt-IInd, dt. 23.04.2025 to 24.04.2025
24.	Power flow in the line prior to failure:	Hapur Ist – 4.07 MW Hapur IInd – 3.58 MW
25.	Any missing member found before/after failure of towers:	No
26.	Condition of foundation after failure:	Good condition
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone/wind storm etc.]	Attached
28.	Probable cause of failure:	Wind storm/CYCLONE
29.	Details of previous failure of the line/tower:	N/A
30.	Whether line will be restored on ERS or Spare tower will be used:	Spare Tower used
31.	Likely date of restoration:	31.05.2025
32.	Present Status:	Good
33.	Details of any Tests carried out after failure (attach test reports):	-
34.	Wind speed data of date & time of failure from nearby authorized observatory:	-
35.	Location failed tower a) Location Coordinates: b) Nearest Airport: c) District and Stat :	a) Latitude - 28.891275^0, Longitude - 77.750223^0 b) Indira Gandhi International Airport Delhi c) Meerut, Uttar Pradesh
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	-

37.	Tower weight.	Tower No. 85 (DC+5) – 9.811 MT + 2.881 MT = 12.692 MT Tower No. 86 (DA+0) – 4.391 MT = 4.391 MT Tower No. 87 (DA+5) – 4.391+1.144 MT = 5.535 MT Tower No. (88 DB+0) – 7.694 MT = 7.694 MT
38.	Tower spotting data:	Attached
39.	Tower schedule of affected section:	Attached
40.	Sag tension calculation considered for design of tower:	Attached
41.	Design document of failed towers:	-
42.	Any other relevant information:	-

16. 400 kV Panki- Unnao S/C Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400 kV Panki- Unnao S/C Transmission Line
2	Date and time: 9. Occurrence of failure 10. Discovery of failure	30.05.2025, Time 16.27 hrs
3	Length of line (km)	48.8km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	S/C
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	5 Nos. Suspension Polymer
6	Tower location No. with reference to nearest substation	400 KV S/S Panki
7	Name and size of conductor	Moose
8	No. of sub-conductors per bundle and bundle spacing	2 Nos. Suspension Polymer
9	Number and size of Ground wire/OPGW	OPGW
10	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer
11	Configuration of insulators (I / V / Y / tension)	Suspension (V)
12	No. of insulators per string and No. of strings per phase	02 Nos. Suspension Polymer String
13	Year of construction / commissioning	1998
14	Executing Agency	M/s. Lashani Enterprises
15	Weather condition on the date of failure	Cyclonic Storm
16	Terrain Category	
17	Reliability Level	
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	
19	Details of earthing of tower (pipe type/ Counter poise)	Pipe Type
20	Line designed as per IS:802 (1977/1995/2015 any other code)	

21	The agency who designed the line	KEC
22	Any Special consideration in design	-
23	Details of last maintenance activity along with date	15.05.2025
24	Power flow in the line prior to failure	20 MW
25	Any missing member found before / after failure of towers	No
26	Condition of foundation after failure	OK, Partially Damage
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	Stubs 03 nos. tower broken out of 5 nos. Towers
28	Probable cause of failure	Very High Cyclonic Storm
29	Details of previous failure of the line / tower	NA
30	Whether line will be restored on ERS, or Spare tower will be used	No
31	Likely date of restoration	27.06.2025
32	Present Status	NORMAL
33	Details of any Tests carried out after failure (attach test reports)	
34	Wind speed data of date & time of failure from nearby authorized observatory	
35	Location of failed tower: i. Location Coordinates j. Nearest Airport District and State	Longitude 80°13' 03.0320 Latitude 26°31' 45.236° Chakeri Airport Kanpur (UP)
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	
37	Tower weight	5.6 MT
38	Tower spotting data	
39	Tower schedule of affected section	
40	Sag tension calculation considered for design of tower	
41	Design document of failed towers	
42	Any other relevant information	

17. 220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers

Sr. No	Item Description	Details
1	Name of Transmission line with voltage level:	220 KV Hardoi-Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers
2	Date and time of occurrence/discovery of failure	Time 03:52 dt. 15.06.2025/ Time 08:00 dt. 15.06.2025
3	Length of line (km):	44.49 Km. & 101.80 Km.
4	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	Double Circuit.
5	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end /special tower /river crossing tower / Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	2 Nos. (DA+5) Suspension tower
6	Tower location No. with reference to nearest substation (indicate Name):	Tower No. 50 & 51 (220 KV Substation Hardoi)
7	Name and size of conductor	ACSR Zebra Conductor 54/7/3.18
8	No. of sub-conductors per bundle and bundle spacing:	Single conductor.
9	Number and size of Ground wire/OPGW (if provided)	48 Fibre OPGW
10	Type of insulators in use (Porcelain / Glass / Polymer	Porcelain Disc Insulator.
11	Configuration of insulators (I / V / Y / tension):	I- Configuration.
12	No. of insulators per string and No. of strings per phase	14 Disc Insulators (1 String per phase for Suspension Tower)
13	Year of construction / commissioning	LOA - 4326/ETDC/4/TD-448/MAN/Pkg.-2 dt. 17.12.2019, Date of commissioning 03.08.22
14	Executing Agency:	M/s Man structurals Pvt Ltd., Jaipur
15	Weather condition on the date of failure	Heavy localised cyclonic wind & rain with thunder storm.
16	Terrain Category	Plain
17	Reliability Level:	1
18	Wind Zone (1/2/3/4/5/6) and velocity of wind:	Wind Zone -4
19	Details of earthing of tower (pipe type/ Counter poise):	Pipe Type
20	Line designed as per IS:802 (1977/1995/2015 any other code):	IS:802/1995

21	The agency who designed the line:	UPPTCL
22	Any Special consideration in design:	KPTL Design
23	Details of last maintenance activity along with date	Preventive Maintenance, Date : 26.05.2025 to 30.05.2025. No defect observed.
24	Power flow in the line prior to failure:	48.28 MW on 220KV Hardoi-Mallawan line and 13 MW ON 22O KV Mallawan- PG (Shahjahanpur) Line
25	Any missing member found before / after failure of towers	NIL
26	Condition of foundation after failure:	Foundation is intact, upper portion of stub damaged.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	Tower got damaged due to heavy and strong cyclonic winds. Photographs attached.
28	Probable cause of failure:	Due to heavy sporadic whirl wind followed by localized cyclonic storm might have exceeded the designed wind speed damaged the tower no. 50, 51.
29	Details of previous failure of the line / tower:	T. No 85-88 (220 KV Sub-station Hardoi) failed due to localized storm in year 2024-25
30	Whether line will be restored on ERS or Spare tower will be used:	Spare towers shall be used for restoration of towers & circuit Mallawan-PG (Shahjahanpur) is being used at 220 KV S/S, Hardoi by changing jumpering arrangement & protection settings (SLD enclosed)
31	Likely date of restoration:	30.06.2025
32	Present Status:	Restoration work in progress
33	Details of any Tests carried out after failure (attach test reports):	Damaged member shall be sent to NABL certified laboratory for material testing. Report shall be shared to CEA-PSETD after test result receive.
34	Wind speed data of date & time of failure from nearby authorized observatory:	Request letter sent to IMD lucknow to provide us the real time wind speed data. However, we have enclosed documentary evidence viz. photographs, reports of thunder strom/ cyclonic events & associated damages to trees/ infrastructure & cattle life, etc. which shows the high wind speed in the affected area.

35	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	Longitude 27.2584640 Latitude 80.1563280, No Airport, Hardoi, U.P
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	-
37	Tower weight:	04.175 MT (DA+5)
38	Tower spotting data:	Enclosed.
39	Tower schedule of affected section	Tower No. Tower type span length 47 DB+5 359 48 DA+0 279 49 DA+0 318 50 DA+5 299 51 DA+5 335 52 DA+0 331 53 DA+0 322 54 DB+0 315
40	Sag tension calculation considered for design of tower	-
41	Design document of failed towers:	-
42	Any other relevant information:	NA

7. RENEW

The following Transmission Lines Towers of RENEW had failed during January, 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
18	400 KV DC Gadag - Narendra (New) Line	RENEW	13.05.2025	2024	1	6	1	7	400 kV Twin Bundle ACSS/AW HTLS

18. 400 KV DC Gadag - Narendra (New) Transmission Line

<table>
<tr><th>Sr. No</th><th>Item Description</th><th>Details</th></tr>
<tr><td>1</td><td>Name of Transmission line with voltage level:</td><td>400 KV DC HTLS Twin HTLS Gadag - Narendra (New) Transmission Line</td></tr>
<tr><td>2</td><td>Date and time of occurance/discovery of failure</td><td>13.05.2025</td></tr>
<tr><td>3</td><td>Length of line (km):</td><td>93.507 KM</td></tr>
<tr><td>4</td><td>Type of configuration: [(S/C, D/C, S/C strung on D/C towers, narrow base etc.)</td><td>D/C strung on D/C Tower</td></tr>
<tr><td>5</td><td>Number of Towers and Type of Towers failed: [suspension/ tension/dead end/special tower/river crossing tower/ Powerline crossing/Railway Crossingetc., with / without extension (indicatethe type & length of extension)]</td><td>
<table>
<tr><th>Sl. No.</th><th>Location No.</th><th>Tower Number</th><th>Tower Type</th><th>Remarks</th></tr>
<tr><td>1</td><td>16/4</td><td>52</td><td>DA+3 (1.5M RC)</td><td>Collapsed</td></tr>
<tr><td>2</td><td>16/6</td><td>54</td><td>DA+3 (1M RC)</td><td>Collapsed</td></tr>
<tr><td>3</td><td>16/7</td><td>55</td><td>DA+0 (1M RC)</td><td>Collapsed</td></tr>
<tr><td>4</td><td>16/8</td><td>56</td><td>DA+3 (1M RC)</td><td>Collapsed</td></tr>
<tr><td>5</td><td>16/9</td><td>57</td><td>DA+6</td><td>Collapsed</td></tr>
<tr><td>6</td><td>16/10</td><td>58</td><td>DA+0 (1M RC)</td><td>Peak damage</td></tr>
<tr><td>7</td><td>17/0</td><td>59</td><td>DC+6</td><td>Peak damage</td></tr>
</table>
</td></tr>
<tr><td>6</td><td>Tower location No. with reference to nearest substation(indicate Name):</td><td>16/4, 16/6, 16/7, 16/8, 16/9, 16/10 and 17/0</td></tr>
<tr><td>7</td><td>Name and size of conductor:</td><td>HTLS Conductor ACSS/AW 478 SQMM</td></tr>
<tr><td>8</td><td>No. of sub-conductors per bundle and bundle spacing:</td><td>Twin Bundle HTLS</td></tr>
<tr><td>9</td><td>Number and size of Ground wire/OPGW (if provided):</td><td>1 Earthwire & 1 OPGW (24 Fiber)</td></tr>
<tr><td>10</td><td>Type of insulators in use(Porcelain / Glass / Polymer):</td><td>Polymer</td></tr>
<tr><td>11</td><td>Configuration of insulators (I / V / Y / tension)</td><td>“I” & Tension</td></tr>
<tr><td>12</td><td>No. of insulators per string and No. of strings per phase:</td><td>2 (Two)</td></tr>
<tr><td>13</td><td>Year of construction / commissioning:</td><td>30 August 2024</td></tr>
<tr><td>14</td><td>Executing Agency:</td><td>RS Infraprojects Private Limited</td></tr>
<tr><td>15</td><td>Weather condition on the date of failure:</td><td>Heavy Wind & cyclonic wind whirl (Yellow alert of IMD)</td></tr>
<tr><td>16</td><td>Terrain Category:</td><td>Plain</td></tr>
<tr><td>17</td><td>Reliability Level</td><td>1</td></tr>
<tr><td>18</td><td>Wind Zone (1/2/3/4/5/6) and velocity of wind:</td><td>WZ-1 velocity 33m/sec</td></tr>
</table>

<table>
<tr><td>19</td><td>Details of earthing of tower (pipe type/Counter poise):</td><td>Pipe Type Earthing</td></tr>
<tr><td>20</td><td>Line designed as per IS:802 (1977/1995/any other code):</td><td>IS 802 (Part 1 / Sec 1) : 2015/TS</td></tr>
<tr><td>21</td><td>The agency who designed the line:</td><td>RS Infraprojects Private Limited</td></tr>
<tr><td>22</td><td>Any Special consideration in design:</td><td>Drag Coefficient as per IS 802 (1995) & WZ as per National Building Code</td></tr>
<tr><td>23</td><td>Details of last maintenance activity along with date</td><td>27th, 28th, 29th & 30th Jan 2025</td></tr>
<tr><td>24</td><td>Power flow in the line prior to failure:</td><td>62 MW in 400 kV Line -01 & 64 MW in 400 kV Line -02. Total 126 MW</td></tr>
<tr><td>25</td><td>Any missing member found before / after failure of towers:</td><td>No</td></tr>
<tr><td>26</td><td>Condition of foundation after failure:</td><td>Foundation are ok, however few stubs are bend & at some places chimney are cracked due to load of fallen structure.</td></tr>
<tr><td>27</td><td>Brief Description of failure: alongwith photographs(if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]</td><td>Formation of wind tunnel or whirl nearby tower collapsed area where the wind speed is very high and resulted collapse of towers.</td></tr>
<tr><td>28</td><td>Probable cause of failure:</td><td>Overload factor approx 1.78 times of Actual wind at collapsed tower location above designed wind on the basis of certain calculation prepared by us.</td></tr>
<tr><td>29</td><td>Details of previous failure of the line / tower :</td><td>Nil</td></tr>
<tr><td>30</td><td>Whether line will be restored on ERS or Spare tower will be used:</td><td>Spare Tower will be used</td></tr>
<tr><td>31</td><td>Likely date of restoration:</td><td>18th Jun 2025</td></tr>
<tr><td>32</td><td>Present Status:</td><td>Fallen structure dismantling U/P. Work is at hold for CEA/CPRI/PGCIL inspection.</td></tr>
<tr><td>33</td><td>Details of any Tests carried out after failure:</td><td>NO</td></tr>
<tr><td>34</td><td>Wind speed data of date & time of failure from nearby authorised observatory:</td><td></td></tr>
<tr><td>35</td><td>Location of failed tower</td><td></td></tr>
<tr><td></td><td>a) Location Coordinates</td><td>
<table>
<tr><th rowspan="2">Loc No</th><th rowspan="2">Tower Type</th><th colspan="2">GPS CO-ORDINATES</th></tr>
<tr><th>EASTING</th><th>NORTHING</th></tr>
<tr><td>16/4</td><td>DA+3</td><td>597260.18</td><td>1813069.21</td></tr>
<tr><td>16/6</td><td>DA+3</td><td>597929.33</td><td>1812522.41</td></tr>
<tr><td>16/7</td><td>DA+0</td><td>598266.15</td><td>1812247.18</td></tr>
<tr><td>16/8</td><td>DA+3</td><td>598597.40</td><td>1811976.49</td></tr>
<tr><td>16/9</td><td>DA+6</td><td>598929.25</td><td>1811705.31</td></tr>
<tr><td>16/10</td><td>DA+0</td><td>599266.07</td><td>1811430.08</td></tr>
<tr><td>17/0</td><td>DC+6</td><td>599577.00</td><td>1811176.00</td></tr>
</table>
</td></tr>
<tr><td></td><td>b)Nearesh Airport:</td><td>Hubali</td></tr>
</table>

<table>
<tr><td></td><td>C) District and State:</td><td>Vijaypura, Karnataka</td></tr>
<tr><td>36</td><td>Single Line diagram/clearance diagram of failed tower(s) with all diamensions (Horizontal & vertical dimensions including base width of tower</td><td></td></tr>
<tr><td>37</td><td>Tower weight:</td><td><table><tr><th>Type</th><th>Total</th></tr><tr><td>DA+0</td><td>8,428.30</td></tr><tr><td>DA+3</td><td>9,698.76</td></tr><tr><td>DA+6</td><td>10,478.41</td></tr><tr><td>DC+6</td><td>17,896.09</td></tr></table></td></tr>
<tr><td>38</td><td>Tower spotting data:</td><td></td></tr>
<tr><td>39</td><td>Tower scheduled of affected section</td><td></td></tr>
<tr><td>40</td><td>Sag tension calculation considered for design of tower</td><td></td></tr>
<tr><td>41</td><td>Design document of failed towers:</td><td></td></tr>
<tr><td>42</td><td>Any other relevant information</td><td></td></tr>
</table>

8. KPTCL

The following Transmission Line Tower of KPTCL had failed during January, 2025 to June, 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
19	220 kV SRS Huballi-Narendra Line	KPTCL	17.05.2025	1969	1	1	0	1	220 kV Single Deer ACSR

19. 220 kV SRS Huballi- Narendra Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	220kV SRS Huballi Narendra D/C Line
2	Date and time: 11. Occurrence of failure 12. Discovery of failure	17.05.2025 at 14.32Hrs
3	Length of line (km)	139
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	One tower of type DATOM
6	Tower location No. with reference to nearest substation	Loc No 6 From 220kV SKS Huballi Substation
7	Name and size of conductor	ACSR Deer Conductor Complete Dia 29.89mm 30/4.27mm +7/4.27mm
8	No. of sub-conductors per bundle and bundle spacing	Single Deer Conductor
9	Number and size of Ground wire/OPGW	48F OPGW, 12.4mm Dia
10	Type of insulators in use (Porcelain / Glass / Polymer)	Porcelain
11	Configuration of insulators (I / V / Y / tension)	T Configuration
12	No. of insulators per string and No. of strings per phase	14 Nus
13	Year of construction / commissioning	1969
14	Executing Agency	Not Available
15	Weather condition on the date of failure	Heavy Rain. However. No wind activity was Recorded
16	Terrain Category	2
17	Reliability Level	1
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Light Wind Zone (Wind zone 1, 33m/s)
19	Details of earthing of tower (pipe type/ Counter poise)	Pipe
20	Line designed as per IS:802 (1977/1995/2015 any other code)	IS 802 1977

21	The agency who designed the line	L&T
22	Any Special consideration in design	Nil
23	Details of last maintenance activity along with date	NA
24	Power flow in the line prior to failure	At 14:00 Hrs Ckt-1 8MW & Ckt-2.7MW
25	Any missing member found before / after failure of towers	Nil
26	Condition of foundation after failure	Good and Intact
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	The tower is located in fairly flat land. The land adjacent to the line belongs to Huballi-Dharwad Municipal Corporation. The tower has failed completely in main leg member one panel above the ground level and completely collapsed in transverse direction Photographs and tower schedule enclosed.
28	Probable cause of failure	i. The Huballi -Dharwad Municipal Corporation (HDMC) nas created dumping yard adjacent to the tower at Loc No:6 and in between Loc 6-7. The height of the dumping yard is about 10 to 15M ii. It is found that, there has been extensive dumping of garbage, waste and even dead animals on one side of the tower footing at Loc 6. The accumulated load from the dumped materials appears to have exerted uneven loading and likely exerted additional stress on the leg members on one side, Compromising on tower's structural balance area between loc no 6 and 7 as well as reports of persistent iii. There also has been continuous fire incidents in the dumping yard emission of various gases. The combination of thermal stress from fires may have weakened the tower metal components iv. Furthermore, significant deposition of garbage on the power conductor has led to increase of both diameter and weight of the conductor which might have added additional load on the conductor. v. During inspection it was found that there has been frequent tripping of the line due to

		decreased vertical clearance between Loc No 6 and 7 due to the accumulated garbage up to height of 10-15M
29	Details of previous failure of the line / tower	Nil
30	Whether line will be restored on ERS, or Spare tower will be used	No
31	Likely date of restoration	2 Months
32	Present Status	Under Progress
33	Details of any Tests carried out after failure (attach test reports)	Nil
34	Wind speed data of date & time of failure from nearby authorized observatory	NA
35	Location of failed tower: k. Location Coordinates l. Nearest Airport District and State	15.32596057 75.116375463 Airport :Huballi District & State :Dharawad District Karnataka State
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	NA
37	Tower weight	4.5MT
38	Tower spotting data	NA
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	NA
41	Design document of failed towers	NA
42	Any other relevant information	Nil

9. NTPC

The following Transmission Line Towers of NTPC had failed during January 2025 to June, 2025.

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
20	400 kV Dadri-Harsh Vihar Ckt-1&2	NTPC	21.05.2025	2011-12	4	0	1	1	400 kV Twin MOOSE ACSR

20. 400 kV Dadri- Harsh Vihar Ckt- 1&2

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400KV Dadri-Harsh Vihar Ckt-1&2
2	Date and time: 13. Occurrence of failure 14. Discovery of failure	May 21, 2025; 20:19 Hrs.
3	Length of line (km)	53.284km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	D/C
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	01 No. of Tower failed. Tower Type DD with +25M Extension
6	Tower location No. with reference to nearest substation	No. 24, Near Dehra Jhal, Approx. 9km from NTPC Dadri
7	Name and size of conductor	Moose ACSR 32mm Size
8	No. of sub-conductors per bundle and bundle spacing	Twin
9	Number and size of Ground wire/OPGW	12mm Size, 02 Nos.
10	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer, 160kN
11	Configuration of insulators (I / V / Y / tension)	I Configuration
12	No. of insulators per string and No. of strings per phase	Single I String
13	Year of construction / commissioning	2011-12
14	Executing Agency	M/s Powergrid
15	Weather condition on the date of failure	On the evening of May 21, 2025, adverse weather conditions prevailed, marked by severely stormy weather condition.
16	Terrain Category	Normal Plain Area
17	Reliability Level	
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind Zone-4, Velocity 44-47 m/s
19	Details of earthing of tower (pipe type/ Counter poise)	Pipe Type

20	Line designed as per IS:802 (1977/1995/2015 any other code)	Yes
21	The agency who designed the line	M/s Powergrid
22	Any Special consideration in design	Line Patrolling done during the period from
23	Details of last maintenance activity along with date	07.05.2025-17.05.2025.
24	Power flow in the line prior to failure	250MW each line
25	Any missing member found before / after failure of towers	None
26	Condition of foundation after failure	All four concrete foundations of tower-24 were found intact. Structure was found bent above the foundation.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	On the evening of May 21, 2025, adverse weather conditions prevailed, marked by heavy storms and rainfall. At approximately 20:19 hrs., amidst this stormy condition, both the 400KV circuits (Ckt-1&2) transmission lines from Dadri to Harsh Vihar tripped on phase-to-phase faults. Also, a station blackout happened during the storm. Subsequent inspection during line patrolling identified that Tower no-24 of the Dadri-Harsh Vihar circuit had collapsed. Due to the heavy storm effect, uprooting of trees within NTPC Dadri & in vicinity was observed.
28	Probable cause of failure	The root cause of the Tower collapse was the high-velocity dust & windy storm with the following rain near the location. These winds were exacerbated due to heavy dust storms in the area.
29	Details of previous failure of the line / tower	None
30	Whether line will be restored on ERS, or Spare tower will be used	Line to be restored through Permanent Tower Structure on existing foundation
31	Likely date of restoration	17.06.2025
32	Present Status	Charged
33	Details of any Tests carried out after failure (attach test reports)	Following tests to be performed before charging of the lines: - a. Tower Footing Resistance b. IR Test c. Continuity Test d. Offline fault locator test
34	Wind speed data of date & time of failure from nearby authorized observatory	

35	Location of failed tower: m. Location Coordinates n. Nearest Airport District and State	a. 28°39'31"/77°35'43" b. New Delhi c. Ghaziabad, U.P.
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Attached (Annexure-1)
37	Tower weight	53626KG
38	Tower spotting data	Attached (Annexure-2)
39	Tower schedule of affected section	Attached (Annexure-3)
40	Sag tension calculation considered for design of tower	Attached (Annexure-4)
41	Design document of failed towers	Standard DD Type Tower Super Structure & 25M Extension, BoM and Drawing attached.
42	Any other relevant information	

10. NRSS XXXVI TRANSMISSION LIMITED

The following Transmission Line Towers of NRSS XXXVI Transmission Limited had failed during January, 2025 to June, 2025.

Sl. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
21	400 kV DC Babai-Bhiwani Transmission Line	NRSS XXXVI	13.06.2025	2023	4	0	2	2	400 kV Twin MOOSE ACSR

21. 400 kV D/C Babai-Bhiwani Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400 kV D/C Babai-Bhiwani Transmission Line
2	Date and time: 15. Occurrence of failure 16. Discovery of failure	13.06.2025 at around 15:30 hrs./ 13.06.2025 at around 19:30 hrs
3	Length of line (km)	110.962
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	Double Circuit - Twin Moose
5	Number of Towers and Type of Towers failed[Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/RailwayCrossing etc., with / without extension (indicate the type & length of extension)]	Total 2 nos. and DD with extension (30 meter) [Powerline Crossing]
6	Tower location No. with reference to nearest substation	AP-86/0 (Tower no. 300) & AP-87/0 (Tower no. 301
7	Name and size of conductor	ACSR Moose Conductor 31.77 mm. (54 Al./7 Steel/3.53 mm
8	No. of sub-conductors per bundle and bundle spacing	2 nos. Bundle; spacing 400 mm
9	Number and size of Ground wire/OPGW	1 no. Ground wire. Size 7/3.66 mm. Ground wire/ 1 no. OPGW. Size 24 Fibre OPGW 12.5 mm
10	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer
11	Configuration of insulators (I / V / Y / tension)	Tension
12	No. of insulators per string and No. of strings per phase	2 insulators per string & 2 no. of strings per phase
13	Year of construction / commissioning	2023
14	Executing Agency	M/s Tata Projects Limited
15	Weather condition on the date of failure	: Heavy cyclonic storm with gusty winds
16	Terrain Category	2
17	Reliability Level	1
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind Zone 4
19	Details of earthing of tower (pipe type/ Counter poise)	Pipe Type
20	Line designed as per IS:802 (1977/1995/2015 any other code)	Yes (2015)

21	The agency who designed the line	M/s Srushti Associates, Mumbai
22	Any Special consideration in design	
23	Details of last maintenance activity along with date	Patrolling of line on 23 May 2025
24	Power flow in the line prior to failure	Circuit I – 18 MW Circuit II – 16 MW
25	Any missing member found before / after failure of towers	No
26	Condition of foundation after failure	Foundation is intact.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	The area in which the towers are located witnessed very high intensity winds. Tower failure has occurred due to rotational movement of the localised heavy wind (tornado). Newspaper cutting and photos attached
28	Probable cause of failure	Heavy localized Cyclonic storm (tornado)
29	Details of previous failure of the line / tower	Not Applicable
30	Whether line will be restored on ERS, or Spare tower will be used	As an immediate measure one circuit will be restored on ERS. Subsequently, other circuit will be taken as per the load requirement.
31	Likely date of restoration	28-Jun-25.
32	Present Status	Back stay provided to towers on either side of the failed towers to safeguard these towers.
33	Details of any Tests carried out after failure (attach test reports)	Will be carried out
34	Wind speed data of date & time of failure from nearby authorized observatory	
35	Location of failed tower: o. Location Coordinates p. Nearest Airport District and State	a. Easting 612008, Northing 3178215, Elevation 215.78 for AP-86/0 & Easting 612155, Northing 3178319, Elevation 215.86 for AP87/0 b. Hisar Airport. c. Hisar, Haryana
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Attached
37	Tower weight	58265.17
38	Tower spotting data	Attached
39	Tower schedule of affected section	Attached
40	Sag tension calculation considered for design of tower	Attached
41	Design document of failed towers	Attached
42	Any other relevant information	

11 ADANI

The following Transmission Lines Towers of ADANI had failed during January 2025 to June 2025

Si. No.	Name of the Transmission Line	Name of Utility	Date of Failure	Year of Commissioning	Wind Zone	No. of Towers Failed			Conductor
						Suspension	Tension	Total	
22	400kV Mahendragarh–Bhiwani Transmission Line	ADANI	13.06.2025	2011	4	2	3	5	400 kV Twin MOOSE ACSR

22. 400kV Mahendragarh–Bhiwani Transmission Line

Sr. No.	Item Description	Details
1	Name of Transmission line with voltage level	400kV Mahendragarh–Bhiwani Transmission Line
2	Date and time: 17. Occurrence of failure 18. Discovery of failure	13.06.2025, 15:30 hours Discovery immediately after failure
3	Length of line (km)	49.862Km
4	Type of configuration [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	Double Circuit - Twin Moose
5	Number of Towers and Type of Towers failed [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	Tower No. 135: Crossarm & Peak Bend and tower deformed (Tension Tower DY+0) Tower No. 136-139: Conductor, Earthwire & OPGW Damaged. (136 - Suspension DR+0) (137 - Tension DY+0)
6	Tower location No. with reference to nearest substation	135, 136 to 139, PGCIL Bhiwani Substation
7	Name and size of conductor	ACSR Moose Type (Dia-31.77mm)
8	No. of sub-conductors per bundle and bundle spacing	Two (02)
9	Number and size of Ground wire/OPGW	Earth wire - 01 Side OPGW - 01 Side
10	Type of insulators in use (Porcelain / Glass / Polymer)	Polymer - SRI Insulator
11	Configuration of insulators (I / V / Y / tension)	Suspension - I String Tension - Twin String
12	No. of insulators per string and No. of strings per phase	Suspension - 01 Insulator / String & Phase Tension - 02 Insulator / String & 04 Insulator / Phase
13	Year of construction / commissioning	26-04-2011
14	Executing Agency	M/s Gammon India Limited (Transrail)
15	Weather condition on the date of failure	The region experienced sporadic occurrences of intense whirlwinds, followed by a localized cyclonic storm accompanied by rainfall.
16	Terrain Category	Normal Terrain - (Category - 02)
17	Reliability Level	Category - 02
18	Wind Zone (1/2/3/4/5/6) and velocity of wind	Wind zone - 4

19	Details of earthing of tower (pipe type/ Counter poise)	Pipe Type Earthing
20	Line designed as per IS:802 (1977/1995/2015 any other code)	IS 802:1995
21	The agency who designed the line	M/s Gammon India Limited (Transrail)
22	Any Special consideration in design	No
23	Details of last maintenance activity along with date	The patrolling of the above locations/towers was carried out on 22.05.2025 in the previous cycle and no abnormality was observed.
24	Power flow in the line prior to failure	CKT-I : 316MW CKT-II : 318 MW
25	Any missing member found before / after failure of towers	NIL
26	Condition of foundation after failure	All foundations in the affected section were found intact.
27	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / windstorm etc.]	This is with reference to the incident that occurred at 15:30 hours on 13.06.2025, during which a severe localized storm affected the region near village Nimriwali, Tehsil Bhiwani (Haryana). As a result of this extreme weather event, transmission towers of the 400kV Babai–Bhiwani line [owned by NRSS XXXVI Transmission Limited (Tata Power)] collapsed, Tower No.135 suffered complete structural deformation with major damage to its top cross arm and affecting conductors, OPGW & earth wire towers no. 136 to 139 of the 400kV Mahendragarh–Bhiwani D/C transmission line [Owned by Adani Transmission India Limited (ATIL)]. Notably, towers no. 136–137 of our line were situated beneath the collapsed Babai–Bhiwani line, leading to the impact (Refer attached our Letter No. ATIL/ Force Majeure/14062025, dated 14.06.2025 to NRLDC)
28	Probable cause of failure	Due to collapsed transmission towers of the 400kV Babai–Bhiwani line [owned by NRSS XXXVI Transmission Limited (Tata Power)] at Power Line crossing point during localized heavy windstorm and cyclone.
29	Details of previous failure of the line / tower	NIL
30	Whether line will be restored on ERS, or Spare tower will be used	ERS could not be installed due to severe Right of Way constraints and the unavailability of a suitable corridor for installation. Restoration was carried out using a spare tower only.
31	Likely date of restoration	Line restored and charges on: CKT-I: 04.07.2025, 16:49 Hrs.

		CKT-II: 04.07.2025, 17:21 Hrs.
32	Present Status	The restoration work was successfully completed, and the transmission line was re-energized on 04.07.2025.
33	Details of any Tests carried out after failure (attach test reports)	As the incident was caused by the collapse of a transmission tower belonging to another utility, and no technical deficiency was observed in ATIL's assets, no post-failure testing was conducted.
34	Wind speed data of date & time of failure from nearby authorized observatory	As the incident was caused by the collapse of a transmission tower belonging to another utility, and no technical deficiency was observed in ATIL's assets, hence no major data was collected from authorized observatory.
35	Location of failed tower: q. Location Coordinates r. Nearest Airport District and State	TN-135 (Lat- 28°21'31.04"N, Long 76°13'29.65"E) TN-136 (Lat- 28°21'20.85"N, Long- 76°13'30.19"E) TN-137 (Lat- 28°21'13.90"N, Long- 76°13'18.73"E) Nearest Airport - Delhi Dist. - Bhiwani, State - Haryana
36	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	Enclosed
37	Tower weight	Tower No. 135 - 25.789MT
38	Tower spotting data	Enclosed
39	Tower schedule of affected section	Enclosed
40	Sag tension calculation considered for design of tower	Enclosed
41	Design document of failed towers	Design parameters are indicated in Tower Spotting Data (TSD).
42	Any other relevant information	The localized cyclone in the surrounding area was extremely intense, causing significant impact to the transmission infrastructure.

12 STERLITE

23. Outage of 400 kV Line in Mumbai Area

Sr. No.	Item Description	Details
1.	Name of Transmission line with voltage level:	1. 400KV-NAVI MUMBAI-PADGHE-PG 2. 400KV-PADGHE-PG-KHARGHAR-1 3. 400KV-NAVI MUMBAI-VIKHROLI
2.	Date and time of occurrence/discovery of failure:	1. 31.07.2025/ 3:45 hrs 2. 30.07.2025/ 12:15 hrs 3. 31.07.2025/ 3:24 hrs
3.	Weather condition at the date of failure	Extreme weather conditions, including heavy rainfall and high-velocity winds
4.	Brief Description of failure	400 kV Phadge PG - Kharghar, 400 kV Padge PG-Navi Mumbai and 400 kV Navi Mumbai - Vikhroli lines were reliably operating since its commissioning in September-2024, however, the said lines have tripped on 30-07-2025/31-07-2025, leading to failing of long rod polymer insulators. It is stated that the region has experienced extreme weather conditions, including heavy rainfall and high-velocity winds, and it has contributed to the failure of insulators and subsequent tripping. It is also to update that the said issue has also been escalated to the top management of Insulator OEM (M/s Tag) to conduct the root cause analysis.
5.	Probable cause of failure	The line tripped due to multiple insulator failure at various locations. The RCA of insulator failure is under process and will inform the root cause once finalized.
6.	Insulator Failure Details	Please refer Annexure-A
7.	Details of wind zone & Pollution Level in the areas of above Insulators	Wind Zone- 03, moderately polluted
8.	Original Test Report in support of Quality of the Insulator used	Attached
9.	Details of any Tests carried out after failure (attach test reports)	Testing under process, will share the report once concluded.
10.	Post Failure Test Report	Testing under process, will share the report once concluded.
11.	Quality Assurance Plan followed by the Utility for Insulators	Attached
12.	OEM Analysis of failure of Insulators	Under process
13.	Utility Analysis for failure of the Insulators	Under process
14.	O&M Plan followed by the Utility	Attached
15.	Details of the last maintenance activity along with date	Only non-shutdown maintenance activities are carried out on the line. Considering the high loading, shutdown request was deferred in the month of Mar'25 & May'25 by grid operators. Hence the shutdown maintenance was not carried out.

16.	Voltage & Power flow in the line prior to failure	As remote end bays belong to PGCIL & KVTL (Adani), the said data is not available with M/s MUML.

Annexure-III: Proforma for reporting of failure of EHV Transmission Line Towers

Sl. No.	Details	Remarks
1.	Name of Transmission line with voltage level:	
2.	Date and time of occurrence/discovery of failure:	
3.	Length of line (km):	
4.	Type of configuration: [(S/C, D/C, M/C, S/C strung on D/C towers, narrow base etc.)	
5.	Number of Towers and Type of Towers failed: [Suspension/ tension/dead end/special tower /river crossing tower/ Power line crossing/Railway Crossing etc., with / without extension (indicate the type & length of extension)]	
6.	Tower location No. with reference to nearest substation (indicate Name):	
7.	Name and size of conductor:	
8.	No. of sub-conductors per bundle and bundle spacing:	
9.	Number and size of Ground wire/OPGW (if provided):	
10.	Type of insulators in use(Porcelain / Glass / Polymer):	
11.	Configuration of insulators (I / V / Y / tension):	
12.	No. of insulators per string and No. of strings per phase:	
13.	Year of construction / commissioning:	
14.	Executing Agency:	
15.	Weather condition on the date of failure:	
16.	Terrain Category:	
17.	Reliability Level:	
18.	Wind Zone (1/2/3/4/5/6) and velocity of wind:	
19.	Details of earthing of tower (pipe type/ Counter poise):	
20.	Line designed as per IS:802 (1977/1995/2015 any other code):	

21.	The agency who designed the line:	
22.	Any Special consideration in design:	
23.	Details of last maintenance activity along with date:	
24.	Power flow in the line prior to failure:	
25.	Any missing member found before / after failure of towers:	
26.	Condition of foundation after failure:	
27.	Brief Description of failure: [Along with photographs (if available), other related information like tower schedule, newspaper clipping for cyclone / wind storm etc.]	
28.	Probable cause of failure:	
29.	Details of previous failure of the line / tower :	
30.	Whether line will be restored on ERS or Spare tower will be used:	
31.	Likely date of restoration:	
32.	Present Status:	
33.	Details of any Tests carried out after failure (attach test reports):	
34.	Wind speed data of date & time of failure from nearby authorized observatory:	
35.	Location of failed tower a. Location Coordinates: b. Nearest Airport: c. District and State:	
36.	Single line diagram/clearance diagram of failed tower(s) with all dimensions (horizontal & vertical dimensions including base width of tower)	
37.	Tower weight:	
38.	Tower spotting data:	
39.	Tower schedule of affected section:	

40.	Sag tension calculation considered for design of tower:	
41.	Design document of failed towers:	
42.	Any other relevant information:	

Annexure-IV: Composition of Standing Committee of Experts

Central Electricity Authority
Office of the Secretary

No.5-41/98/Secy/CEA / 809

Date 24/9/99
30

(Technical Committee No 16)

Office Memorandum

Subject: **Constitution of Standing Committee of Experts to investigate the Failure of Towers.**

Because of transmission line tower failures taking place in the country, resulting in disruption of power on large scale for long periods, it has been decided as per chapter-II, para 3 (viii) of the Electricity (Supply) Act. No 54 of 1948 to constitute a Standing Committee, consisting of experts in the field of EHV Transmission lines from CEA, Power Grid, CPRI, IIT Delhi, & SEB (of the State, where tower failure has taken place). In the event of any failure of towers for transmission lines of 220kV and higher voltages of power utilities, members of the committee should immediately visit the site to have first hand information and ascertain the causes of failure and give recommendations to prevent such recurrences in future.

2. The scope and terms of reference of the committee shall be as follows:

   (i) To investigate the causes of failure of towers.

   (ii) Recommendations to avert recurrences, of such failures in future.

3. Committee will submit its report within three months, from the date of failure.

4. Concerned power utility will provide all assistance, required by the committee in carrying out the meetings, make arrangements for immediate site visit after failure of towers by providing transport and travel facilities and preparation of the report.

5. All the Organisations/Power Utilities are requested to nominate their officers/alternate as their representative, and intimate to Chief Engineer STE, C

A

Every incident of Tower failure must be immediately reported to Chairman, CEA and Members of the Standing Committee.

8. This issues with the approval of Chairman, CEA.

3/9/99

(VIJOY KUMAR)
Secretary (CEA)

O/L

CMD Power Grid, New Delhi.

DG CPRI, Bangalore.

Head of Civil Engg. Deptt., IIT Delhi

Chairman of SEBs/Transmission Corporation/Grid Companies

PS to Chairman, CEA

PS to Member (PS), CEA

As per list Enclosed.

Copy to: Chief Engineer (GM), CEA
PS to Secy, CEA

Sealed
1/10/99

भारत सरकार
केन्द्रीय विद्युत प्राधिकरण
सचिव का कार्यालय
सेवा भवन, आर0 के0 पुरम,
नई दिल्ली - 110 066
****

No.CEA/5-41(18)/Secy-2012 / 166 Dated: 06.08.2012

OFFICE ORDER

Subject: Re-composition of the Standing Committee of Experts to investigate failure of towers-Amendment - Reg.

Standing Committee of Experts was constituted vide this Office Memorandum (Techincal Committee No. 16) of even no. dated 30.09.1999 to investigate the causes of failure of towers. After the enactment of Electricity Act, 2003, it is felt necessary to re-compose the above said Committee. The revised Compostion of the Standing Committee of Experts to investigate failure of towers is given below:

1.	Chief Engineer, SETD, CEA	-	Chairperson
2.	Additional Director, (CPRI)	-	Member
3.	Head, Deptt. of Civil Engg, Delhi Technological University	-	Member
4.	Representative from Power Utility where Power failure occurred	-	Member
5.	Member Secretary, Regional Power Committee where Power failure occurred	-	Member
6.	Director (Transmission), SETD, CEA	-	Member Secretary

The other terms of reference shall remain the same as indicated in the above referred Office Memorandum.

(M.S. Puri)
Secretary, CEA
Tel. No.26108476

To:

1. Chief Engineer, SETD, CEA
2. Director (Transmission), SETD, CEA
3. Additional Director, Mechanical Enginering Division, Central Power Research Institute (CPRI), C.V. Raman Road, Banglore
4. Head, Deptt. of Civil Engineering, Delhi Technological University, Shahbad Daulatpur, Bawana Road, Delhi

5. Representative from Power Utility (as per list enclosed)
6. Member Secretary, Regional Power Committee (NRPC, WRPC, SRPC, ERPC & NERPC)

Copy for information to:

1. SA to Chairperson, CEA
2. SA to Member (PS), CEA

Copy for kind information to:

1. Secretary, Ministry of Power, Sharam Shakti Bhawan, Rafi Marg, New Delhi
2. Chairman and Managing Director, Powergrid Corporation of India Ltd., Saudamini, Plot No.2, Sector-29, Gurgaon

(M.S. Puri)
Secretary, CEA
Tel. No.26108476

Annexure-IV

Transmission towers failure during Jan-June 2025 in Northern Region									
S.N.	**Transmission Line**	**Utility**	**Date of Failure**	**Date of Restoration**	**Year of Commissioning**	**Total No of Failed Towers**	**Cause/ Conclusion as Per minutes of Standing Committee of Experts Jan-June-2025 Report**	**Recommendation as Per minutes of Standing Committee of Experts Jan-June-2025 Report**	**Action Taken by Concern Utiity As on Date**
1	220 kV D/C SambaChowadhi-I/ SmbaHiranagar-I Line	PGCIL	16.04.2025	17.04.2025 (on ByPass Arrangement) 27.04.2025 (Permanent)	2016	1	it was concluded that the primary reason for the failure was the design of the tower for wind zone-4, whereas the tower has been experiencing the effects of Wind Zone–5 due to it falling in the overlapping area between Wind Zone-4 & Wind Zone-5	1. check the restored tower strength as per IS 802: 2015 as the tower was earlier designed as per IS 802: 1995. 2. furnish the justification for utilizing the higher span.	No action taken reported by utility to NRPC.
2	765 KV Fatehpur-Agra 2 Line	PGCIL	21.05.2025	02.06.2025	2013	1	Concluded that the primary cause of the failure was the inherent vulnerability of the Delta-type tower configuration, which remains structurally less reliable even after strengthening interventions.	1. PGCIL to furnish full details as per CEA format. 2.Restored tower should be designed as per latest IS, i.e., IS 802:2015.	No action taken reported by utility to NRPC.
3	400 kV D/C Barmer Bhaisara (Jaisalmer-2) Line	RVPNL	01.05.2025	5.10.2025	2019	9	The reported probable cause of failure is heavy windstorm. However, No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Details of wind zone in which the line is located. 3. Submit Tower Patrolling reports	No action taken reported by utility to NRPC.
4	400 kV D/C Barmer Bhinmal Line	RVPNL	05.05.2025	05.06.2025	2019	1	The reported probable cause of failure is Heavy Rain, Wind Storm and Lightning. No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Details of wind zone in which the line is located.	No action taken reported by utility to NRPC.
5	400 kV Orai - Parichha D/C line – I & II	UPPTCL	11.05.2025	30.05.2025	2016	3	The reported probable cause of failure is heavy cyclonic storm. No conclusion drawn by Committee	1.Complete information duly filled in the prescribed CEA format. 2. Review the designed as per IS 802: 2015.	No action taken reported by utility to NRPC.
6	220 kV Nehtaur - Mataur (765 kV PGCIL) Line	UPPTCL	21.05.2025	24.05.2025	2011	2	The reported probable cause of failure is heavy storm due to which tower got bend at stub. No conclusion drawn by Committee as UPPTCL representative was absent.	Nil	Not Applicable.
7	220 kV Jagriti Vihar -Hapur (765 KV) D/C line	UPPTCL	21.05.2025	30.05.2025	2019	4	The reported probable cause of failure is Wind storm/ cyclone. No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Review the designed as per IS 802: 2015. 3. Material Test Report. 4. Submit wind speed data of nearest IMD observatory	No action taken reported by utility to NRPC.
8	400 KV Panki-Unnao S/C Transmission Line	UPPTCL	30.05.2025	09.06.2025	1998	5	The reported probable cause of failure is Very High Cyclonic Storm. No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Review the designed as per IS 802: 2015. 3. Material Test Report. 4. Submit wind speed data of nearest IMD observatory	No action taken reported by utility to NRPC.

Transmission towers failure during Jan-June 2025 in Northern Region									
S.N.	**Transmission Line**	**Utility**	**Date of Failure**	**Date of Restoration**	**Year of Commissioning**	**Total No of Failed Towers**	**Cause/ Conclusion as Per minutes of Standing Committee of Experts Jan-June-2025 Report**	**Recommendation as Per minutes of Standing Committee of Experts Jan-June-2025 Report**	**Action Taken by Concern Utiity As on Date**
9	220 KV Hardoi Mallawan and 220KV Mallawa-Shahjahanpur (PGCIL) Line on same DC Towers	UPPTCL	15.06.2025	11.07.2025	2022	2	The reported probable cause of failure is heavy sporadic whirl wind followed by localized cyclonic storm. No conclusion drawn by Committee.	1.Complete information duly filled in the prescribed CEA format. 2. Review the designed as per IS 802: 2015. 3. Material Test Report. 4. Submit wind speed data of nearest IMD observatory	No action taken reported by utility to NRPC.
10	400 kV Dadri- Harsh Vihar Ckt- 1&2	NTPC	21.05.2025	22.06.2025	2011	1	1. It was concluded that the primary cause of failure was the impactof high-velocity dust and wind storms.	1. Analyse requirement to increase the reliability level at power line crossings to ensure greater structural stability. 2. Review the designed as per IS 802: 2015. 3. Submit wind speed data of nearest IMD observatory	No action taken reported by utility to NRPC.
11	400 kV DC Babai- Bhiwani Transmission Line	NRSS XXXVI	13.06.2025	01.07.2025(On ERS Ckt-2) 16.07.2025 (On ERS CKT-1)	2023	2	it was concluded that the primary cause of failure was the impact of high-velocity dust and wind storms.	1. Analyse requirement to increase the reliability level at power line crossings to ensure greater structural stability.	No action taken reported by utility to NRPC.
12	400kV Mahendragarh–Bhiwani Transmission Line	ADANI	13.06.2025	04.07.2025 (Permanent)	2011	5	The reported probable cause of failure is due to collapsed transmission towers of the 400kV Babai–Bhiwani line [owned by NRSSXXXVI Transmission Limited (Tata Power)] at Power Line crossing point during localized heavy windstorm and cyclone. No conclusion drawn by Committee.	wind data from the nearest IMD observatory or any other reliable source.	AESL has shared the action taken vide email dated 11.11.2025

Annexure-V

Transmission towers failure since July 2025 in Northern Region							
S.N.	**Transmission Line**	**Utility**	**Date of Failure**	**Restoration**	**Year of Commissioning**	**Total No of Failed Towers**	**Reported Cause**
1	400 kV Jalandhar-Sambha (Ckt-1)	NRSS XXIX/ INDIGRID	26.08.2025	30.09.2025 (ERS)	2016	5	flooding of Ravi River
2	400 kV Jalandhar-Sambha (Ckt-2)	NRSS XXIX/ INDIGRID	26.08.2025	16.10.2025 (ERS)	2016	5	flooding of Ravi River
3	400 kV Koldam(NT)-Parbati Pooling Banala(PG) (PKTCL) Ckt-1	NRSS XXIX/ INDIGRID	10.10.2025	Not restored	2014	1	continued land subsistence
4	400KV Chamera 1 Chamera 2	POWERGRID	26.08.2025	08.09.2025 (ERS)	1997	1	flash floods in Ravi River followed by washing away of Tower No 78
5	400KV S/C Chamera 2 Kishenpur	POWERGRID	06.09.2025	18.09.2025	1997	1	sinking of land

सं. 22-17/2/2020-ओ एम [252889]
भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power

Nirman Bhawan, New Delhi
Dated : 04th November, 2025

OFFICE MEMORANDUM

Subject: Minutes of the meeting held under the Chairmanship of Secretary (Power) on 22.10.2025 to discuss the deployment of Battery Energy Storage System (BESS) for Ancillary Services– reg.

Please find enclosed herewith a copy of minutes of the meeting held under the Chairmanship of Secretary (Power) on 22.10.2025 to discuss the deployment of Battery Energy Storage System (BESS) for Ancillary Services for information and necessary action.

Encl: As above

04.11.2025

(Thenkholal Baite)
Under Secretary to the Government of India
Telefax: 23062492; Email:opmonitor-power@nic.in

To

1. Chairperson, CEA
2. CMD, Grid India
3. CGM, Grid-India with the request to forward a copy of minutes of the meeting to all concerned RPCs.

Copy to:—

PPS to Secretary (Power)/ PS to Addl. Secretary (OM/R&R/ Transmission)/ PPS to Director (OM/FSC).

Minutes of meeting held under the chairmanship of the Secretary (P) on 22.10.2025 to discuss the deployment of Battery Energy Storage Systems (BESS) for Ancillary Services

****

A meeting was held under the Chairmanship of Secretary (P) on 22.10.2025 to discuss the deployment of Battery Energy Storage Systems (BESS) for Ancillary Services. The meeting was attended by senior officers of the MoP, CEA and Grid-India. The list of participants is **Annexed.**

2. Grid-India made a detailed presentation on the subject highlighting the following points:

(i) Ancillary services are essential to maintain grid stability and reliability by balancing real time demand and generation.

(ii) Ancillary Services are broadly classified into three main categories based on their functionality and mode of operation viz. Frequency Control Ancillary Services (FCAS), Voltage Control Ancillary Services (VCAS) and Black Start Ancillary Services (BSAS).

(iii) Frequency Control Ancillary Services are intended to maintain the system frequency within the permissible band by balancing generation and demand. FCAS are divided into three levels of control such as Primary Control through Governor action, Secondary Control through Automatic Generation Control (AGC) and Tertiary Control through Market-based dispatch. Voltage Control Ancillary Services are designed to maintain voltage levels within acceptable operational limits and Black Start Services used to restore the grid following a total or partial blackout.

(iv) A total of 83 power plants (215 generating units) encompassing 81,130 MW installed capacity have been integrated under AGC including coal, hydro, gas-based stations and pilot projects on Solar, BESS and Pumped Storage Plants (PSP). Pilot testing of 20 MW/40 MWh Battery Energy Storage System (BESS) at BRPL Kilokari-1 was conducted in May'2025. The BESS pilot demonstrated effective response to AGC signals in both charging and discharging modes. Similarly, Tehri Pumped Hydro Station was pilot-tested in September, 2025.

(v) The ongoing expansion of the ambit of AGC to bring intra-state plants and IPPs into the SRAS, alongside pilots with new technologies such as solar, BESS, and pumped hydro, approx. 6500 MW of intra-state generation has already been integrated under Secondary Reserve Ancillary Services (SRAS) and further inclusion is under progress.

(vi) Participation of intra-state plants will strengthen system reliability, provide operational experience and enhance SLDC readiness to implement intra-state AGC in the future. **Secretary (Power)** emphasized the need to expeditiously replicate AGC implementation across all generating stations and SLDCs to enable real-time frequency control and integration with AGC. **Secretary (Power)** advised Chairperson, CEA to take up the matter with the heads of IPPs, State generating companies and SLDCs and monitor commissioning of AGC and participation in SRAS.

(vii) During the evening peak period, plants are fully requisitioned to meet the high demand. Consequently, there are no upward reserves available in this duration. In the solar hours, plants are scheduled at or below their Minimum Technical Load (MTL) due to high renewable generation. As a result, there are no downward reserves available during these hours. In other periods, TRAS capacity is available in the range of 3,000 MW- 4,000 MW. Secretary (Power) emphasized that as per the Resource Adequacy, reserve monitoring is equally important and directed that Reserves being maintained and despatched at the intrastate and interstate level should be included as a regular agenda item in review meetings.

(viii) Apart from continuing present balancing activities, a BESS capacity of around 2500 MW/ 5000 MWh dedicated for Ancillary Services would keep frequency to almost 90% of the time within the permissible band on typical days. A 2-hour BESS configuration was found optimal for ancillary services. As per study, the second cycle availability will boost the ability to counter the evening peak dip in frequency when needed. Further, one-hour and two-hour BESS satisfy the required frequency improvement target while 0.5 hour BESS may be inadequate under energy deficit scenarios.

(ix) It was highlighted that Grid-India's studies have suggested that there is a value proposition in utilizing a portion of a BESS's capacity for Ancillary Services to support grid balancing, even while the remaining capacity is engaged in energy arbitrage or generation as per its PPA schedule.

(x) It was proposed to undertake a pilot of 500 MW / 1000 MWh BESS exclusively for ancillary services at the inter-state level to define technical requirements and regulatory modalities.

3. Secretary (Power) advised that advance procurement of reserves from BESS may be considered for completion by 2027 and directed Grid-India to initiate necessary actions in consultation with CERC. Secretary (Power) also noted that with the growing availability of cost-effective storage, the same should be leveraged for Ancillary Services.

4. After detailed discussions, following action points emerged in the meeting:

(i) SLDCs and Intra-state generating stations shall be pursued to maintain adequate reserves and implement Automatic Generation Control for balancing and improving the grid frequency profile.

(Action: Grid-India / RPC / CEA)

(ii) Considering the growing need for system balancing, CEA to work with Independent Power Producers, State generation companies and SLDCs towards establishment of infrastructure for Automatic Generation Control and participation in intra-state AGC/secondary reserve ancillary services. A monthly update may be provided by CEA to MoP.

(Action: CEA)

(iii) Reserves being maintained and despatched at the intrastate and interstate level shall be reviewed in the National and Regional Power Ministers' Conference.

(Action: Grid-India, CEA & MoP)

(iv) Grid-India shall initiate actions for regulatory approvals for advance procurement of reserves from Battery Energy Storage Systems for despatch under ancillary services.

(Action: Grid-India)

(v) Grid India to undertake Pilot of 500 MW / 1000 MWh BESS exclusively for ancillary services at interstate level for devising the future roadmap.

(Action: Grid-India)

5. The meeting ended with vote of thanks to all participants.

****

Annexure

List of the participants

Ministry of Power

1. Shri Pankaj Agarwal, Secretary (Power) ------ In chair
2. Shri Srikant Nagulapalli, Additional Secretary (R&R/ Transmission)
3. Shri Parveen Dudeja, Director (OM)
4. Shri Thenkholal Baite, Under Secretary (OM)

CEA

1. Shri Ghanshyam Prasad, Chairperson
2. Shri Vijay Kumar Singh, Member (Power System)
3. Smt. Ammi Ruhama Toppo, Chief Engineer (Power System Planning & Appraisal-I)

GRID- INDIA

1. Shri S.C Saxena, CMD
2. Shri. R.K Porwal, Director (SO)
3. Shri Vivek Pandey, CGM
4. Shri Phanishankar Chilkuri, Chief Manager

5/5

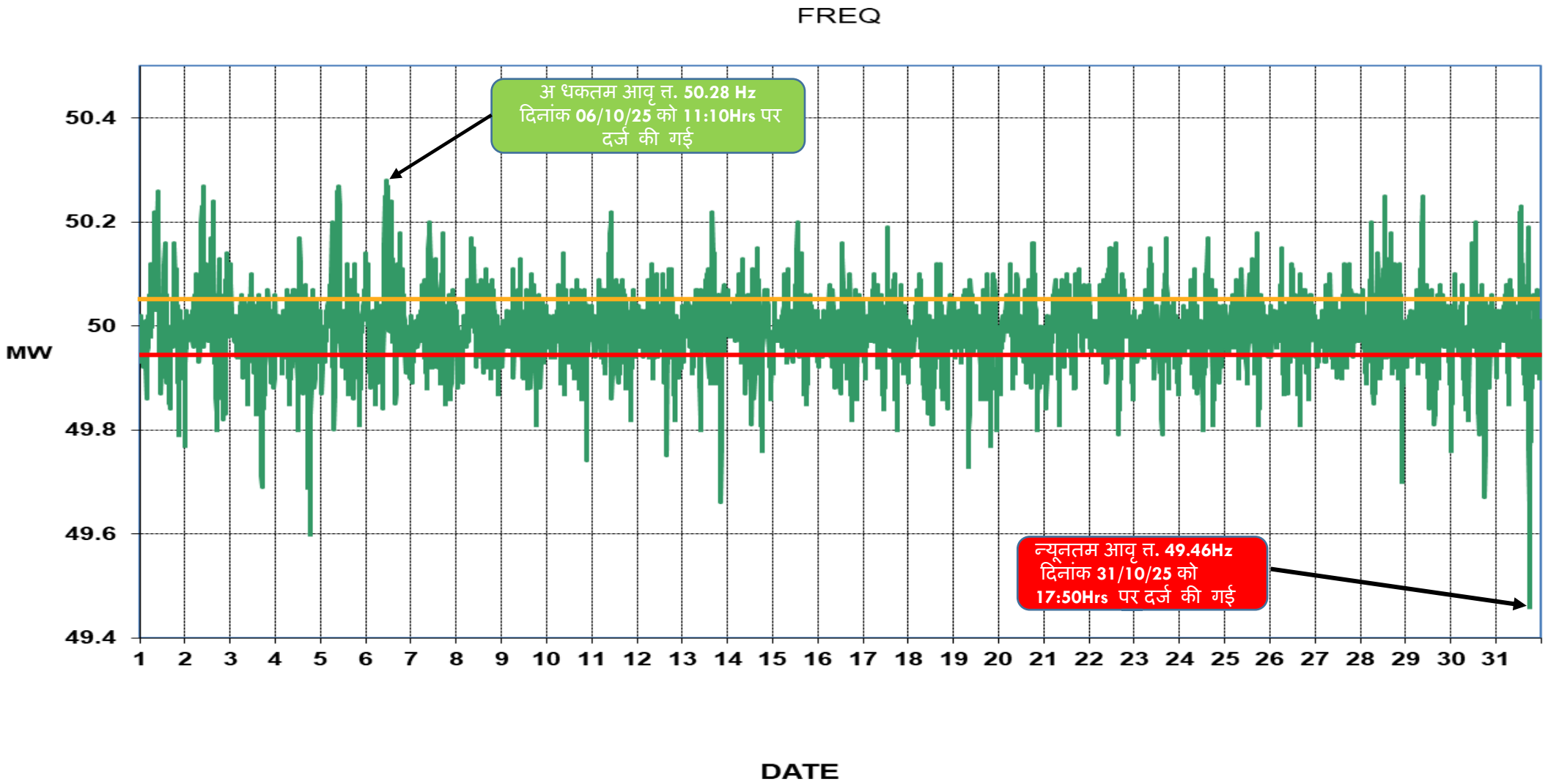
प्रचालन समन्वय उपस मति की बैठक

अक्टूबर - 2025

NRLDC (Northern Regional Load Dispatch Centre), New Delhi

अक्टूबर-2025 के दौरान आवृत्ति की स्थिति
(As per 5 Minute SCADA data)

क्षेत्रीय **OD/UD :** अ धकतम आवृ त्त पर: -2365 MW(UD) न्यूनतम आवृ त्त पर : +347 MW(OD)



OD(+)/UD(-) at Max Freq

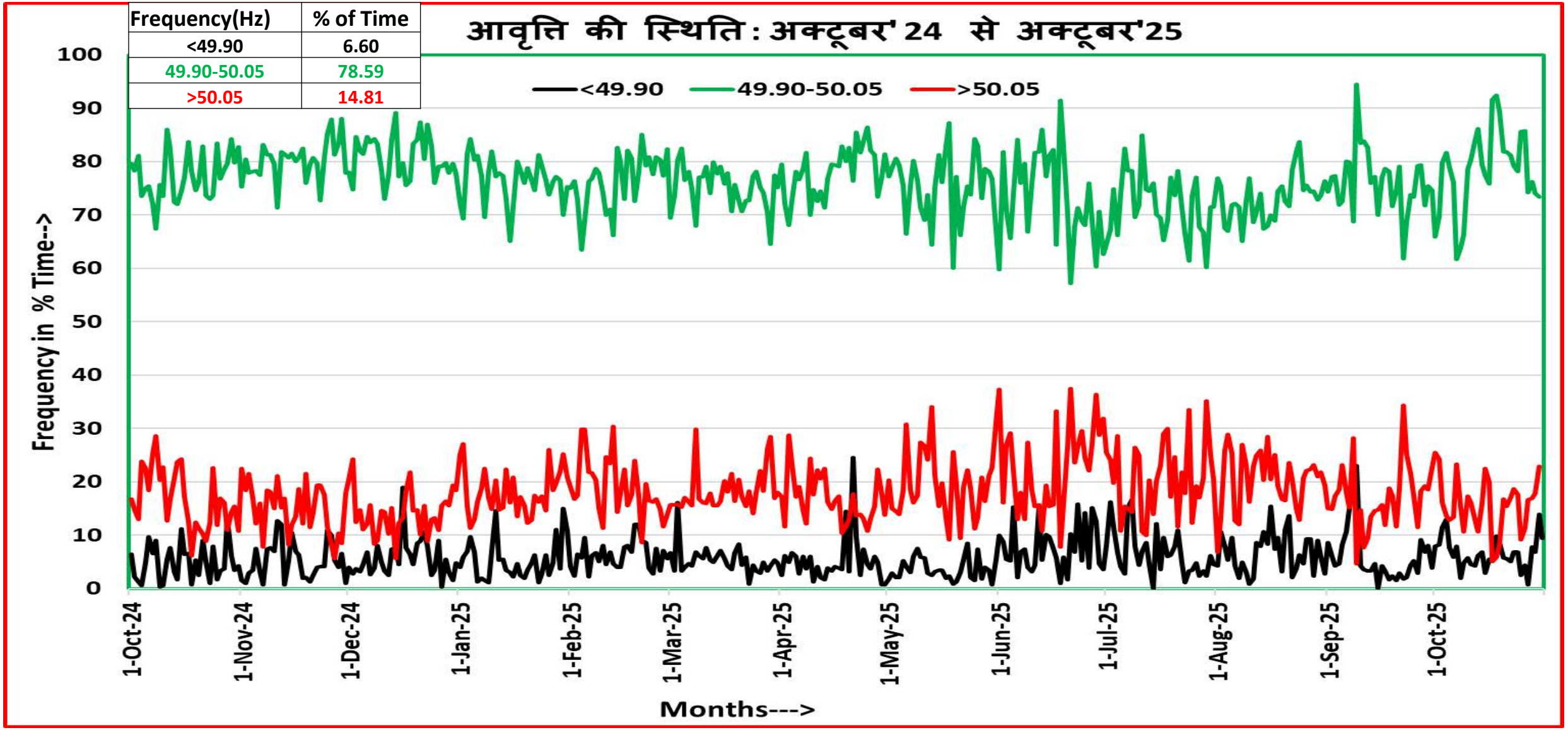
Del	+423
Utt	+ 278
HP	+129
Chd	+22
JK	+07
Raj	-1966
Har	-362
Pun	-894
UP	-02

OD(+)/UD(-) at Min Freq

Har	- 155
Raj	- 157
UP	- 164
Utt	- 42
Chd	-08
JK	00
Pun	+618
Del	+222
HP	+34

आवृत्ति की स्थिति: अक्टूबर-2024 से 2025

Frequency(Hz)	% of Time
<49.90	6.60
49.90-50.05	78.59
>50.05	14.81



पिछले एक साल मे आवृत्ति की स्थिति

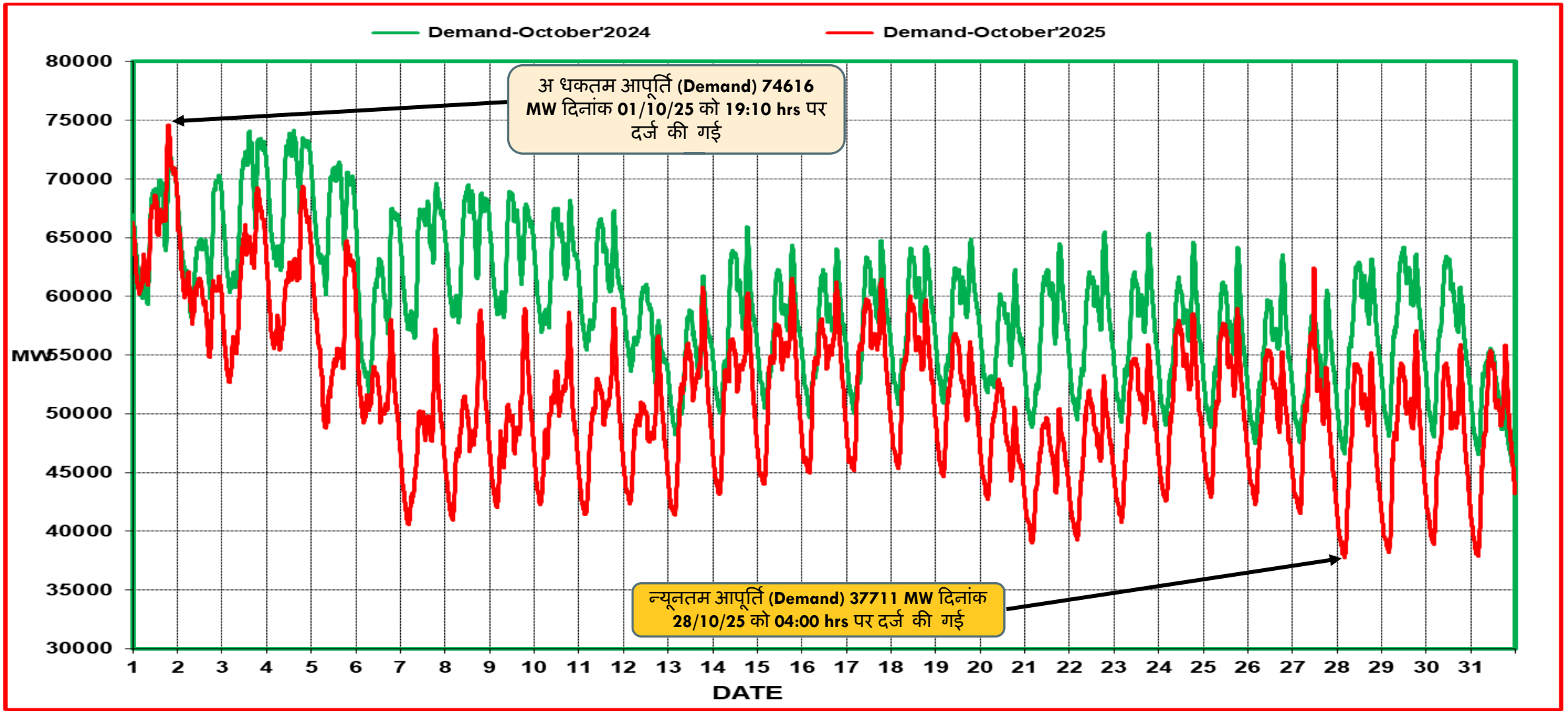
आवृ त्त बैंड	अक्टूबर 2024	नवम्बर 2024	दिसंबर 2024	जनवरी 2025	फरवरी 2025	मार्च 2025	अप्रैल 2025	मई 2025	जून 2025	जुलाई 2025	अगस्त 2025	सतम्बर 2025	अक्टूबर 2025
< 49.7 Hz(%)	0.14	0.10	0.29	0.18	0.12	0.05	0.27	0.07	0.15	0.32	0.20	0.42	0.16
<49.8 Hz(%)	0.60	0.66	0.97	0.92	0.73	0.61	0.96	0.29	0.86	1.39	0.80	0.93	0.75
<49.9 Hz(%)	4.86	5.15	5.58	5.23	6.24	5.32	5.16	3.60	7.56	6.65	6.63	6.02	6.60
49.90-50.05 Hz(%)	80.27	80.80	76.45	76.05	75.35	77.89	75.64	73.30	71.85	72.89	76.22	78.33	78.59
50.05-50.10 Hz(%)	12.18	10.90	14.59	15.09	14.23	13.12	14.80	15.35	14.11	16.38	13.19	12.76	11.36
>50.10 Hz(%)	2.49	3.15	3.38	3.63	4.18	3.67	4.39	7.76	6.48	4.08	3.96	2.89	3.46
>50.20 Hz(%)	0.20	0.21	0.37	0.33	0.55	0.63	1.09	2.87	1.73	0.64	0.83	0.28	0.62
औसत आवृ त्त	49.998	49.995	49.998	49.998	49.999	50.001	50.004	50.015	50.002	50.003	49.999	49.996	49.993

अक्टूबर -2025 के दौरान अधिकतम मांग (Demand Met), अधिकतम ऊर्जा खपत (Energy consumption) और अब तक का कीर्तिमान (राज्यों द्वारा जमा आंकड़ों के अनुसार)

राज्य	अ धकतम मांग (MW) (in Oct'25)	दिनांक / समय	रिकॉर्ड अ धकतम मांग (in MW) (upto Sep'25)	दिनांक / समय	अ धकतम ऊर्जा खपत (MU) (in Oct'25)	दिनांक	रिकॉर्ड अ धकतम ऊर्जा खपत (MU) (Upto Sep'25)	दिनांक
पंजाब	12989	01-10-2025 12:00	16754	28.06.25 at 15:00	282.3	03-10-2025	366.8	21.07.2024
हरियाणा	11372	01-10-2025 15:00	14662	31.07.24 at 14:30	240.2	01-10-2025	293.4	30.07.2024
राजस्थान	14165	26-10-2025 10:00	19165	12.02.25 at 11:00	302.4	01-10-2025	388.01	11.06.2025
दिल्ली	5956	01-10-2025 15:12	8656	19.06.24 at 15:06	123.4	01-10-2025	177.7	18.06.2024
उत्तर प्रदेश	26269	01-10-2025 19:17	31486	11.06.25 at 00:45	507.7	01-10-2025	658.7	17.06.2024
उत्तराखंड	2466	03-10-2025 19:00	2910	11.06.25 at 22:00	47.3	04-10-2025	62.1	14.06.2024
हिमाचल प्रदेश	2003	29-10-2025 07:00	2273	17.01.25 at 09:00	35.9	01-10-2025	42.55	11.06.2025
जम्मू और कश्मीर (UT) तथा लद्दाख़ (UT)	2759	30-10-2025 19:00	3200	07.01.25 at 10:00	54.9	29-10-2025	70.3	04.02.2025
चंडीगढ़	323	01-10-2025 15:00	482	18.06.24 at 15:28	6.5	01-10-2025	9.28	12.06.2025
उत्तरी क्षेत्र #	74215	01-10-2025 19:00	91234	19.06.24 at 14:37	1590.8	01-10-2025	2022.9	12.06.2025

उत्तरी क्षेत्र अ धकतम मांग (Demand Met) as per 1 min SCADA Data

क्षेत्रीय विद्युत आपूर्ति (Demand) अक्टूबर 2024 बनाम अक्टूबर 2025 (As per 5 Minute SCADA data)

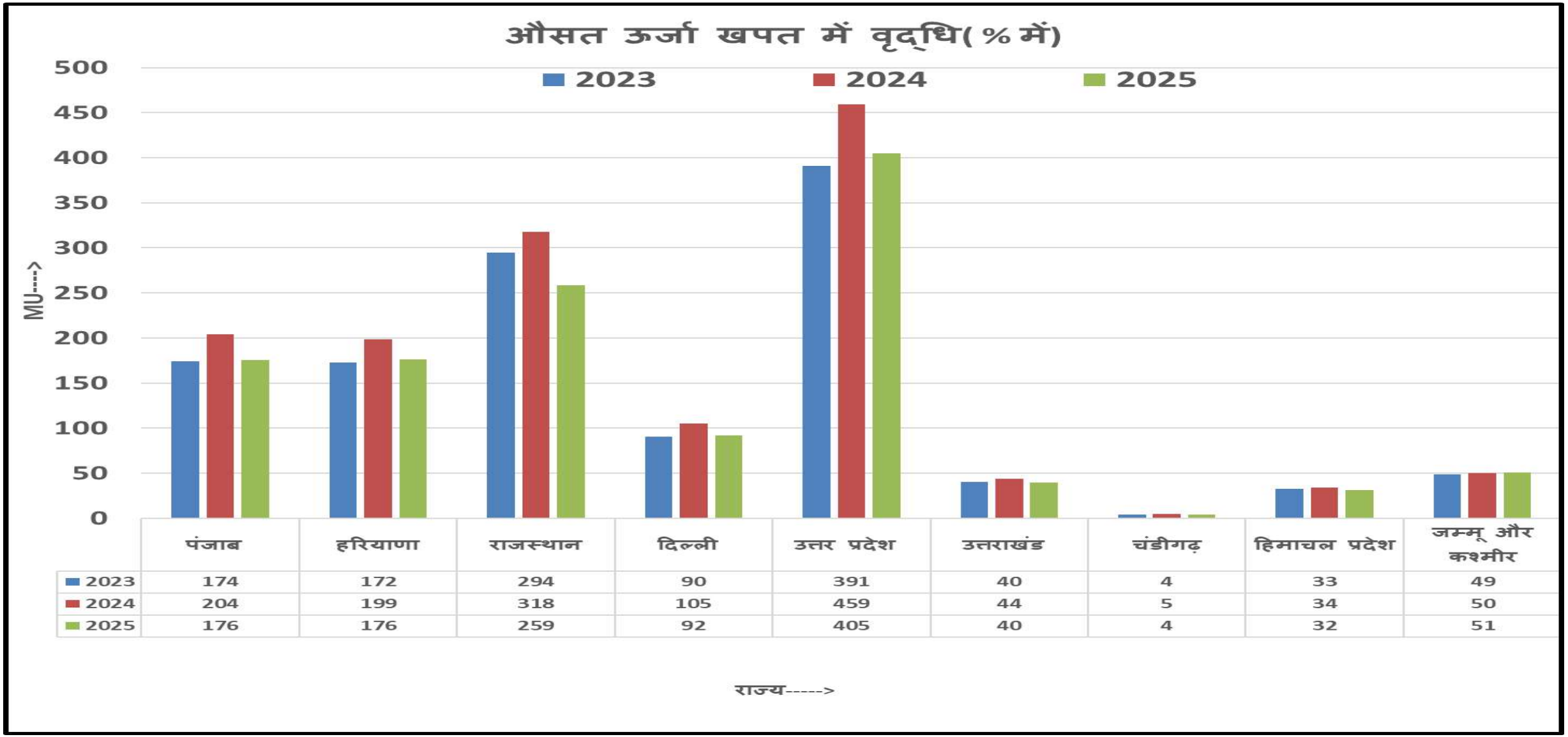


अक्टूबर -2024 की तुलना में अक्टूबर -2025 की औसत वद्युत आपूर्ति में 7719 MW कमी हुई

उत्तरी क्षेत्र की औसत ऊर्जा खपत में वृद्धि(% में) अक्टूबर-2025/ अक्टूबर-2024 / अक्टूबर-2023

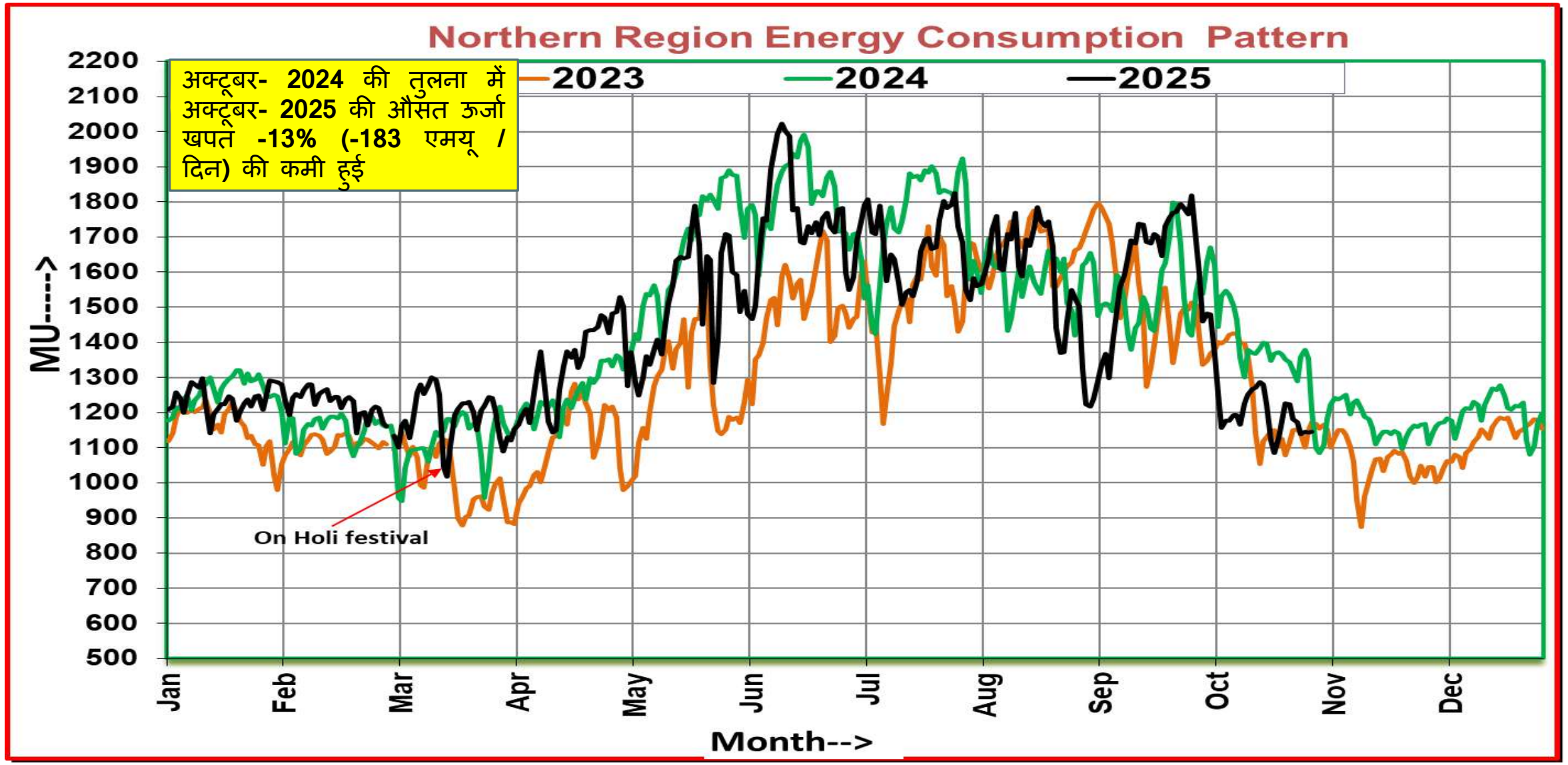
राज्य	अक्टूबर-2023	अक्टूबर-2024	अक्टूबर-2025	% वृद् ध (अक्टूबर-2024 vs अक्टूबर-2023)	% वृद् ध (अक्टूबर-2025 vs अक्टूबर-2024)
पंजाब	174	204	176	17.6%	-14.1%
हरियाणा	172	199	176	15.3%	-11.4%
राजस्थान	294	318	259	7.8%	-18.5%
दिल्ली	90	105	92	15.9%	-12.3%
उत्तर प्रदेश	391	459	405	17.4%	-11.8%
उत्तराखंड	40	44	40	10.4%	-9.5%
चंडीगढ़	4	5	4	14.6%	-9.3%
हिमाचल प्रदेश	33	34	32	5.6%	-8.1%
जम्मू और कश्मीर (UT) तथा लद्दाख़ (UT)	49	50	51	2.8%	2.6%
उत्तरी क्षेत्र	**1251**	**1422**	**1239**	**13.6%**	**-12.9%**

उत्तरी क्षेत्र की औसत ऊर्जा खपत में वृद्धि(% में) अक्टूबर-2025/ अक्टूबर-2024 / अक्टूबर-2023

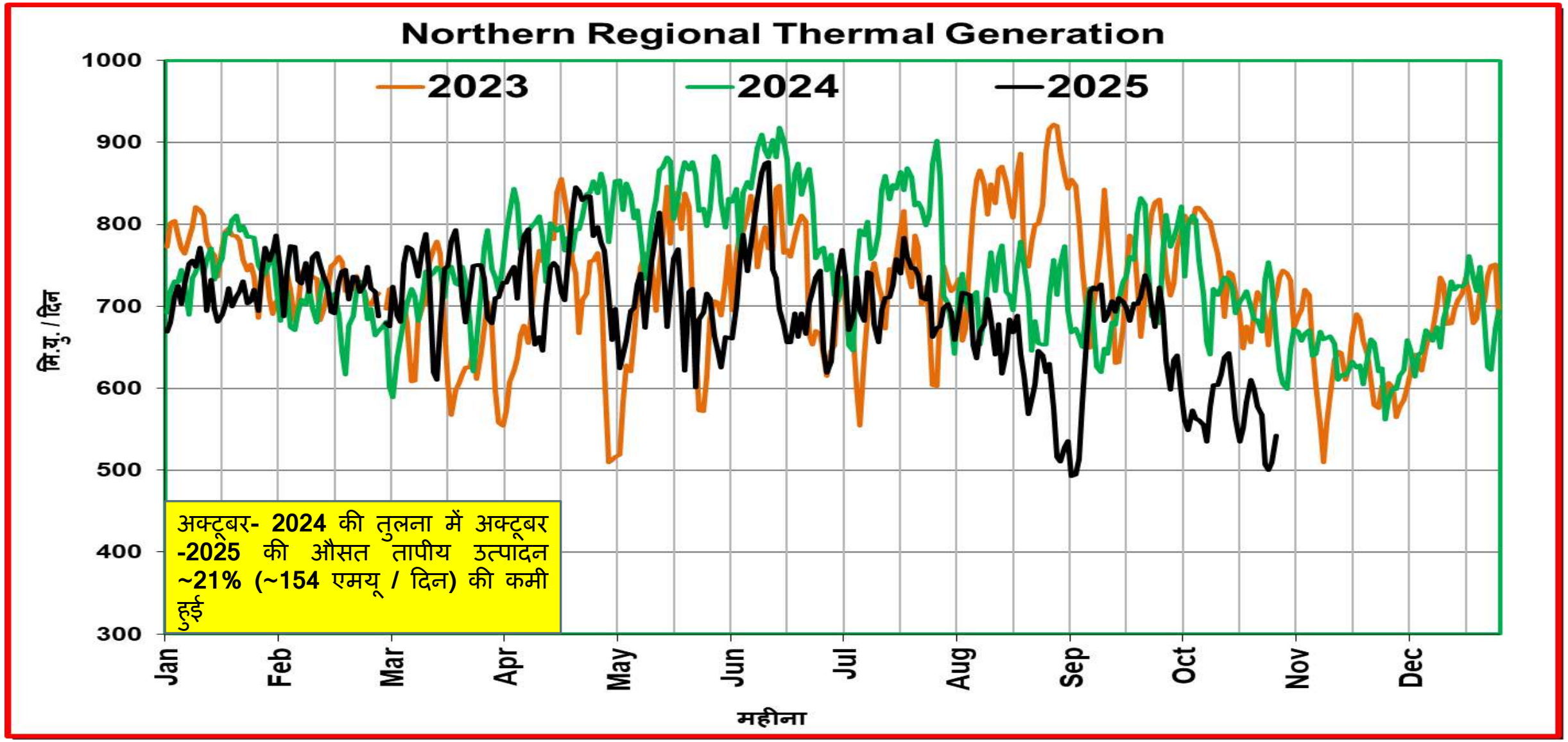


	पंजाब	हरियाणा	राजस्थान	दिल्ली	उत्तर प्रदेश	उत्तराखंड	चंडीगढ़	हिमाचल प्रदेश	जम्मू और कश्मीर
2023	174	172	294	90	391	40	4	33	49
2024	204	199	318	105	459	44	5	34	50
2025	176	176	259	92	405	40	4	32	51

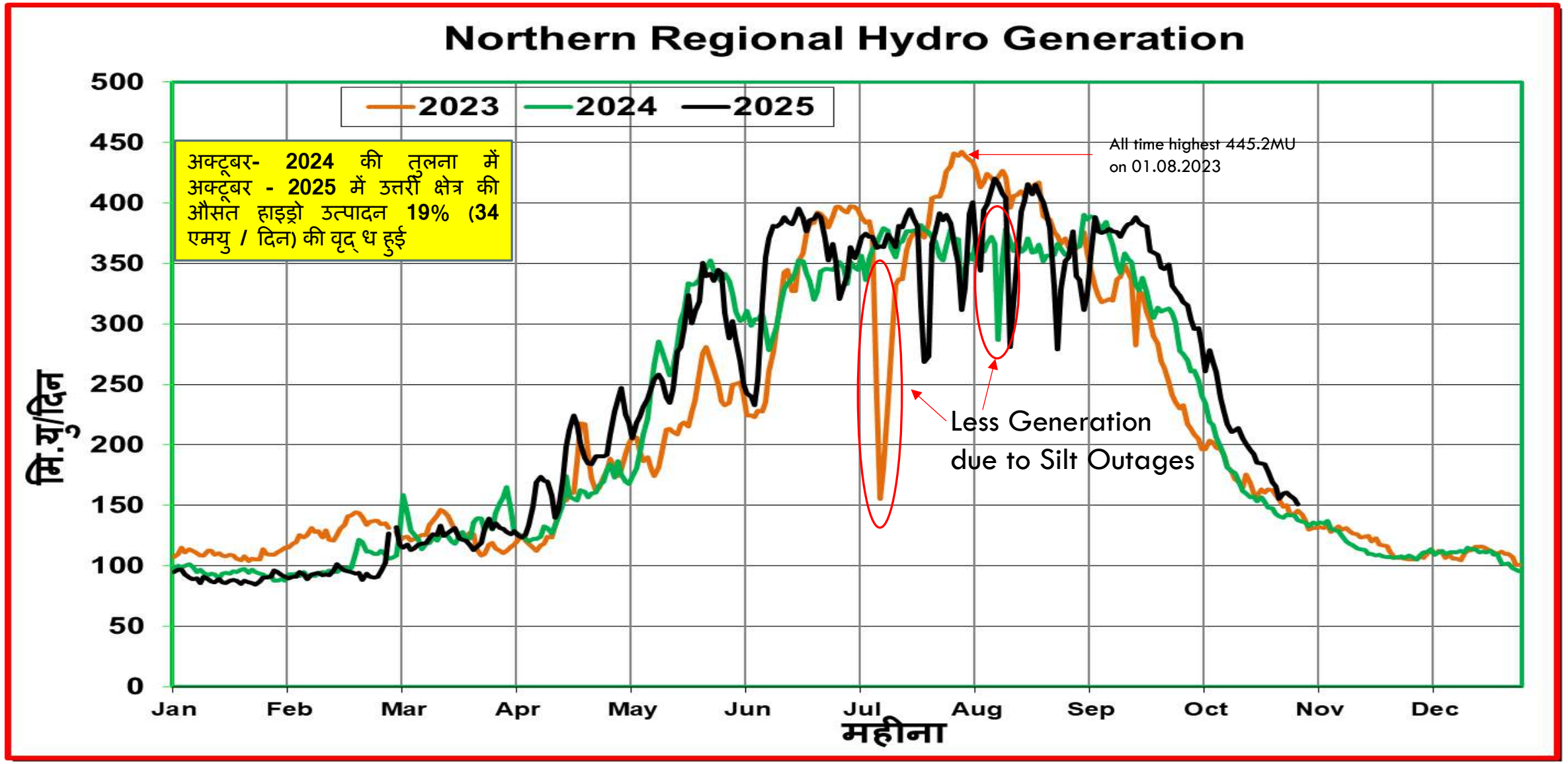
उत्तरी क्षेत्र की ऊर्जा खपत(MUs)



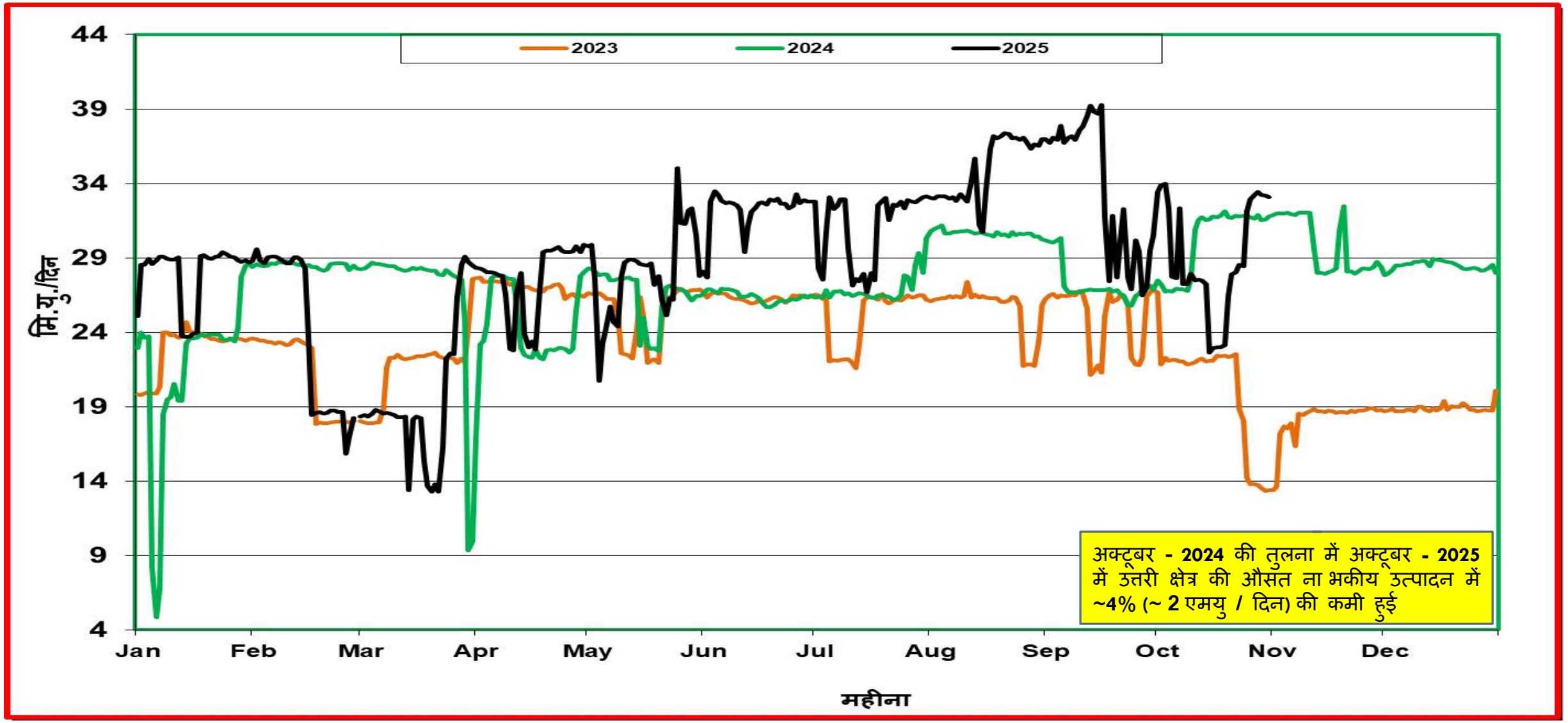
उत्तरी क्षेत्र की तापीय (Thermal) उत्पादन की स्थिति(MUs/Day)



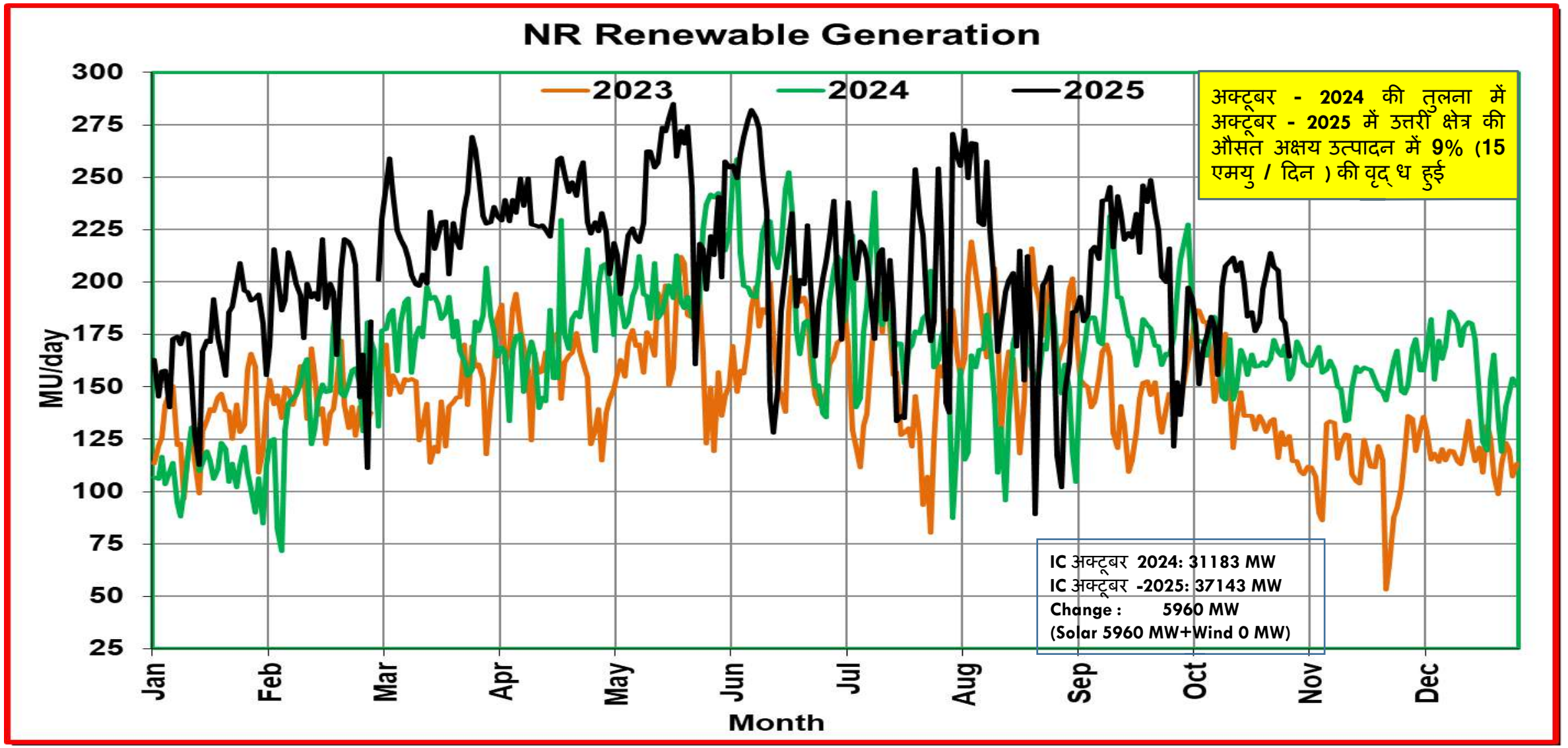
उत्तरी क्षेत्र की जलीय (हाइड्रो) उत्पादन की स्थिति(MUs/Day)



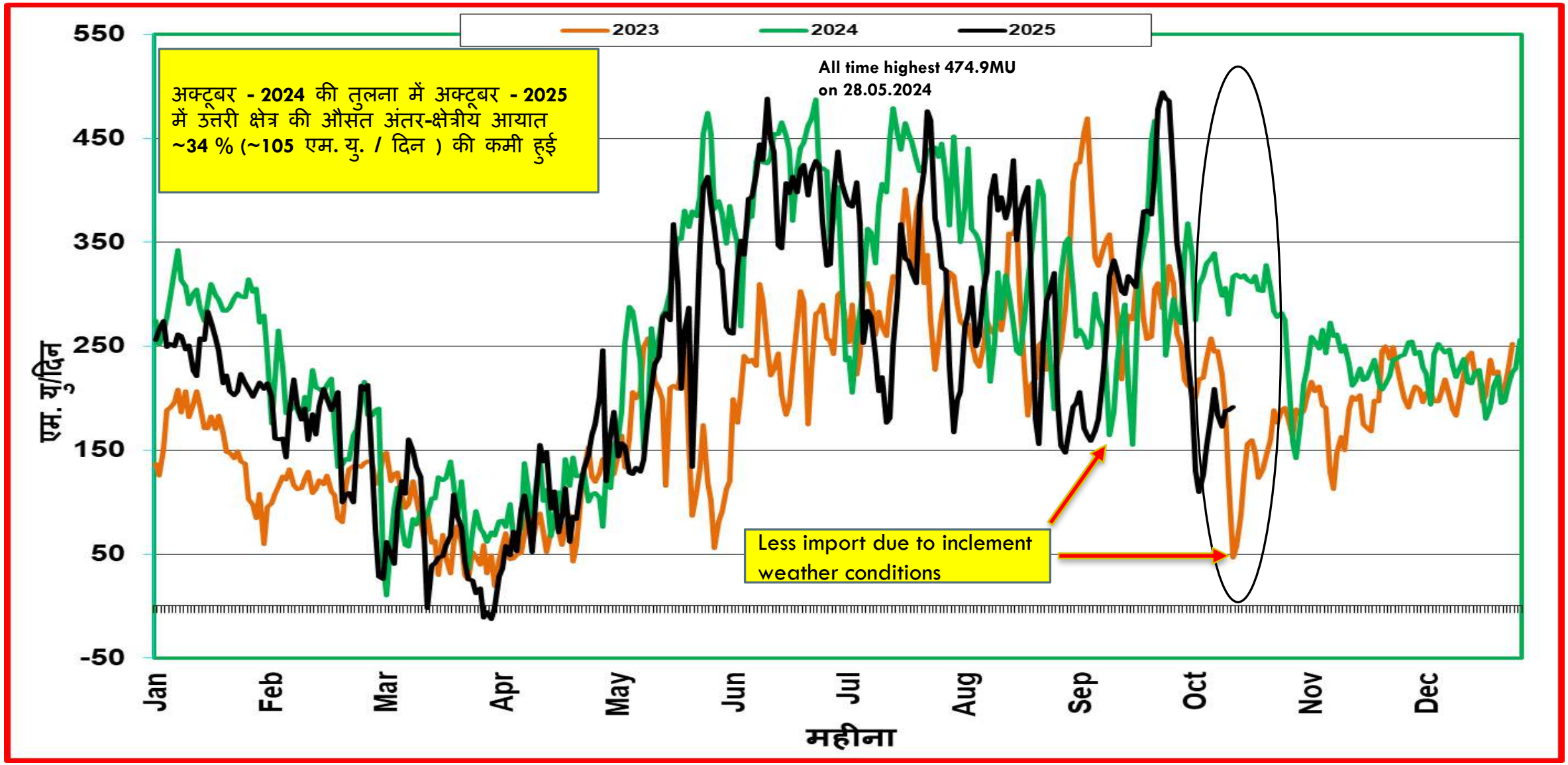
उत्तरी क्षेत्र की नाभिकीय उत्पादन की स्थिति (MUs/Day)



उत्तरी क्षेत्र की अक्षय (Renewable) उत्पादन की स्थिति (MUs/Day)



अंतर-क्षेत्रीय आयात(MUs/Day) की स्थिति



वास्तविक सारांश -
अक्टूबर-2024 बनाम अक्टूबर-2025

	अक्टूबर-2024 (म.यु. /दिन)	अक्टूबर-2025 (म.यु. /दिन)	अक्टूबर माह में वृद् ध (म.यु./दिन)
तापीय (Thermal) उत्पादन	732	578	-154
जलीय (Hydro) उत्पादन	182	216	34
ना भकीय (Nuclear) उत्पादन	30	28	-2
अंतर-क्षेत्रीय (Inter-Regional) कुल आयात	306	202	-105
अक्षय (Renewable) उत्पादन	171	186	15

नवीकरणीय ऊर्जा की क्षमता
(VRE PENETRATION)

	अ धकतम दैनिक (MU) क्षमता			
	अक्टूबर '2025		अक्टूबर '2025 तक का रिकॉर्ड	
	अ धकतम % क्षमता	दिनांक	अ धकतम % क्षमता	दिनांक
पंजाब	**4.85**	**22-10-2025**	**12.28**	**01-04-2020**
राजस्थान	**29.11**	**28-10-2025**	**36.47**	**22-10-2021**
उत्तर प्रदेश	**4.39**	**12-10-2025**	**6.03**	**05-03-2025**
उत्तर क्षेत्रीय	**18.08**	**26-10-2025**	**23.00**	**15-03-2025**

ग्रिड-इंडिया GRID-INDIA

OUTAGE SUMMARY FOR OCT-2025								
CONSTITUENTS	PLANNED (A)	FORCED OUTAGES (B=C+D)	EMERGENCY SHUTDOWNS (C)	TRIPPING (D)	PLANNED SHUTDOWNS (A/(A+B)) %	EMERGENY SHUTDOWNS (C/(A+B)) %	TRIPPING (D/(A+B)) %	TOTAL OUTAGES (A+B)
POWERGRID	305	200	129	71	60%	26%	14%	505
UPPTCL	170	163	70	93	51%	21%	28%	333
RRVPNL	49	108	59	49	31%	38%	31%	157
HVPNL	46	37	12	25	55%	14%	30%	83
BBMB	71	37	11	26	66%	10%	24%	108
PSTCL	88	33	10	23	73%	8%	19%	121
DTL	7	19	16	3	27%	62%	12%	26
PTCUL	14	17	0	17	45%	0%	55%	31
HPPTCL	8	11	5	6	42%	26%	32%	19
NTPC	5	10	7	3	33%	47%	20%	15
PDD JK	8	7	3	4	53%	20%	27%	15
APL	3	15	6	9	17%	33%	50%	18
NRSS XXIX	1	3	3	0	25%	75%	0%	4
NRSS36	2	24	24	0	8%	92%	0%	26

OUTAGE SUMMARY OF LAST FOUR MONTHS

MONTH	PLANNED	FORCED OUTAGES	EMERGENCY SHUTDOWNS	TRIPPING	% PLANNED as of total S/D	% EMERGENCY SHUTDOWNS as of total S/D	TOTAL OUTAGES
	(A)	(B=C+D)	(C)	(D)	(A/(A+C))	(C/(A+C))	(A+B)
July-25	634	860	412	448	60.61%	39.39%	1494
Aug-25	602	885	404	481	59.84%	40.16%	1487
Sep-25	1000	1189	529	660	65.40%	34.60%	2189
Oct-25	924	794	421	373	68.70%	31.30%	1718

New Elements First Time Charged During Oct 2025

S. No.	Type of transmission element	Total No
1	Transformer	11
2	AC & LILO Lines	3
3	Solar plant	1
4	Bus and Line Reactors	8
4	Harmonic filter	10
Total New Elements charged		32

Transformer

S.No	Name of element	Owner	Voltage Level (HV/LV/Tertiary)	MVA Capacity	HV Stattion	Transformer Details	OLD MVA Capacity	Actual date & time of charging	
								Date	Time
1	765/400/33kV, 1500 MVA, 3x1-Phase, BHEL, ICT - 1 at Narela(PNTL)	PNTL	765/400/33kV	1500	Narela(PNTL)	New	NA	01-Oct-2025	23:17
2	765/400/33kV, 1500 MVA, 3x1-Phase, BHEL, ICT - 2 at Narela(PNTL)	PNTL	765/400/33kV	1500	Narela(PNTL)	New	NA	02-Oct-2025	04:37
3	756/400/33kV, 1500 MVA, 3x1-Phase, BHEL, ICT - 3 at Narela(PNTL)	PNTL	756/400/33kV	1500	Narela(PNTL)	New	NA	02-Oct-2025	08:50
4	400/220kV, 500 MVA, 3-Phase, CGL, ICT - 2 at Dhanansu(PS)	PSTCL	400/220kV	500	Dhanansu(PS)	New	NA	15-Oct-2025	23:32
5	400/220/33kV, 500 MVA, 3-Phase, TOSHIBA, ICT - 6 at Fatehgarh_III(PG)	PRTL	400/220/33kV	500	Fatehgarh_III(PG)	New	NA	17-Oct-2025	04:10
6	400/220/33kV, 315MVA MVA, 3-Phase, SIEMENS, ICT - 1 at Nakodar(PSG)	PSTCL	400/220/33kV	500	Nakodar(PSG)	Replacement	500	17-Oct-2025	20:14
7	220/33kV, 160 MVA, 3-Phase, BharatBijli, ICT - 1 at Energizent_PPL_FTG3	Energizent_PPL	220/33kV	160	Energizent_PPL_FTG3	New	NA	18-Oct-2025	01:16
8	220/33kV, 160 MVA, 3-Phase, BharatBijli, ICT - 2 at Energizent_PPL_FTG3	Energizent_PPL	220/33kV	160	Energizent_PPL_FTG3	New	NA	18-Oct-2025	01:41
9	765/400/33kV, 1500 MVA, 3x1-Phase, GE Vernova T&D, ICT - 1 at DAUSA(PBDTL)	PB_DAUSA_TL	765/400/33kV	1500	DAUSA(PBDTL)	New	NA	18-Oct-2025	18:18
10	400/21kV, 855 MVA, 1-Phase, BHEL, GT - 8 at RAPS_D(NP)	NPCIL	400/21kV	855	RAPS_D(NP)	New	NA	24-Oct-2025	14:30
11	400/220/33kV, 500 MVA, 3-Phase, T & R, ICT - 3 at Bawana(DV)	POWERGRID	400/220/33kV	500	Bawana(DV)	Augmentation	315	27-Oct-2025	21:52

AC Lines

S.No	Name of element	Owner	Voltage Level (in kV)	Circuit No	Line Length	Conductor Type	Actual date & time of charging	
							Date	Time
1	220kV Energizent_PPL_FTG3-Fatehgarh_III(PG)-1	Energizent_PPL	220kV	1	10.39	HTLS	17-Oct-2025	23:18

LILO Lines

S.No	Name of element	Voltage Level (in kV)	Name of Line to be LILOed	Line Length of New Line after LILO (In Km)	LILO Portion Line Length (In Km)	Conductor Type	Agency/Owner	Actual date & time of charging	
								Date	Time
1	765kV Bhiwani(PG)-Narela(PNTL)-1(After LILO of 765kV Meerut-Bhiwani at Narela(PNTL))	765kV	765kV Meerut-Bhiwani	122.34	34.34	Hexa Zebra	PNTL	01-Oct-2025	02:29
2	765kV Meerut(PG)-Narela(PNTL)-1(After LILO of 765kV Meerut-Bhiwani at Narela(PNTL))	765kV	765kV Meerut-Bhiwani	124.34	34.34	Hexa Zebra	POWERGRID	01-Oct-2025	14:33

Anti-theft charged Lines

S.No	Name of element	Voltage Level (in kV)	Line to be charged upto	Line Length (In Km)	Conductor Type	Agency/Owner	Actual date & time of charging	
							Date	Time
1	400kV Kishenpur(PG)-Kishtwar(GIS)-1	400kV	upto last/dead end tower at Kishtwar Substation	120.634	Quad Moose	POWERGRID	17-Oct-2025	13:38

Solar plant

S.No	Plant Name	Pooling Sub-station	Added Capacity (MW)	Total Capacity Charged(MW)	Total Installed Capacity of Plant(MW)	Type of RE	Total No. of Solar ICR/Block Charged	Agency/ Owner	Actual date & time of charging	
									Date	Date
1	Energizent Power Private Limited	Fatehgarh_III	69	69	250	Solar	8	Energizent_PPL	29-Oct-2025	20:28

Bus Reactors

S.No	Name of element	Owner	Voltage LeveL	MVAR Capacity	Bus Reactor Details	OLD MVAR Capacity	Actual date & time of charging	
							Date	Time
1	765kV, 330 MVAR Bus Reactor 1 at Narela(PNTL)	PNTL	765kV	330 MVAR	New	NA	01-Oct-2025	02:39
2	400kV, 125 MVAR Bus Reactor at Mandola(PG)	POWERGRID	400kV	125 MVAR	Replacement	50 MVAR	01-Oct-2025	04:28
3	400kV, 125 MVAR Bus Reactor 1 at Narela(PNTL)	PNTL	400kV	125 MVAR	New	NA	03-Oct-2025	18:01
4	765kV, 330 MVAR Bus Reactor 2 at Narela(PNTL)	PNTL	765kV	330 MVAR	New	NA	03-Oct-2025	20:56
5	400kV, 125 MVAR Bus Reactor 125 MVAR Bus-Reactor-3 at Kala Amb(PKTL)	PKATL	400kV	125 MVAR	New	NA	19-Oct-2025	17:31
6	400kV, 125 MVAR Bus Reactor 2 at DAUSA(PBDTL)	PB_DAUSA_TL	400kV	125 MVAR	New	NA	29-Oct-2025	15:42
7	400kV, 125 MVAR Bus Reactor 1 at DAUSA(PBDTL)	PB_DAUSA_TL	400kV	125 MVAR	New	NA	29-Oct-2025	15:43

Line Reactors

S.No	Name of element	Owner	Voltage Level (in kV)	MVAR Capacity	Line Reactor Details	OLD MVAR Capacity	Actual date & time of charging	
							Date	Time
1	50 MVAR Non-Switchable Convertable LINE_REACTOR of 400 KV Ballabgarh-Manipuri-2 (with 450 Ohm NGR) at Ballabhgarh(PG)	POWERGRID	400kV	50 MVAR	New	NA	17-Oct-2025	05:42

Harmonic Filters

S.No	Name of element	Owner	Voltage Level (in kV)	Type of Capacitor	Capacitor Bank No	Sub Capacitor Bank MVAR Rating	Capacitor MVAR Rating	Actual date & time of charging	
								Date	Time
1	33kV, Harmonic Filter bank no-1 at RSJPL_SL_Ftg3(PG)	Renew Surya Jyoti Private Limited	33kV	Harmonic Filter Capacitor Bank	1	Band High Pass Filter, 7 MVAR(4 MVAr-4th Order, 2 MVAr-7th Order, 1 MVAr-11th Order)	7	03-Oct-2025	20:38
2	33kV, Harmonic Filter bank no-2 at RSJPL_SL_Ftg3(PG)	Renew Surya Jyoti Private Limited	33kV	Harmonic Filter Capacitor Bank	2	Band High Pass Filter, 7 MVAR(4 MVAr-4th Order, 2 MVAr-7th Order, 1 MVAr-11th Order)	7	03-Oct-2025	20:38
3	33kV, Harmonic Filter bank no-01 at Neemba_SPRVPL_SL	Neemba_SPRVPL	33kV	Harmonic Filter Capacitor Bank	01	Band Pass Filter, 7 MVAR(4MVAr-4th Order, 2MVAr-7th Order, 1MVAr-11th Order)	7	03-Oct-2025	21:52
4	33kV, Harmonic Filter bank no-02 at Neemba_SPRVPL_SL	Neemba_SPRVPL	33kV	Harmonic Filter Capacitor Bank	02	Band Pass Filter, 7 MVAR(4MVAr-4th Order, 2MVAr-7th Order, 1MVAr-11th Order)	7	03-Oct-2025	21:52
5	33kV,Harmonic Filter bank no-03 at RSVPL_SL_FTHG3_PG	RENEW SURYA VIHAAN PRIVATE LIMITED	33kV	Harmonic Filter Capacitor Bank	03	RLC Filter-Band Pass Filter, 7.629 MVAR(Harmonic Order-13.9)	7.629	03-Oct-2025	22:42
6	33kV, Harmonic Filter bank no-02 at RSVPL_SL_FTHG3_PG	RENEW SURYA VIHAAN PRIVATE LIMITED	33kV	Harmonic Filter Capacitor Bank	02	RLC Filter-Band Pass filter, 7.629 MVAR(Harmonic Order-13.9)	7.629	03-Oct-2025	22:42
7	33kV, Harmonic Filter bank no-01 at RSVPL_SL_FTHG3_PG	RENEW SURYA VIHAAN PRIVATE LIMITED	33kV	Harmonic Filter Capacitor Bank	01	RLC Filter -Band Pass filter, 4.459 MVAR(Harmonic Order-13.9)	4.459	03-Oct-2025	22:42
8	33kV, Harmonic Filter bank no-2 at RSDCL(PSS3)_SL_BHD2_PG	Nokh_SPPNL	33kV	Harmonic Filter Capacitor Bank	2	6MVAR MVAR(4.5 MVAR AND 1.5 MVAR UNITS (4.5 MVAR FOR arresting 5th Harmonics and 1.5 MVAR for arresting 11th Harmonics))	6MVAR	31-Oct-2025	21:41
9	33kV, Harmonic Filter bank no-1 at RSDCL(PSS3)_SL_BHD2_PG	Nokh_SPPNL	33kV	Harmonic Filter Capacitor Bank	1	6MVAR MVAR(4.5 MVAR AND 1.5 MVAR UNITS (4.5 MVAR FOR arresting 5th Harmonics and 1.5 MVAR for arresting 11th Harmonics))	6MVAR	31-Oct-2025	21:41
10	33kV, Harmonic Filter bank no-3 at RSDCL(PSS3)_SL_BHD2_PG	Nokh_SPPNL	33kV	Harmonic Filter Capacitor Bank	3	6MVAR MVAR(4.5 MVAR and 1.5 MVAR Units (4.5 MVAR for arresting 5th Harmonic and 1.5 MVAR for arresting 11th Harmonics))	6MVAR	31-Oct-2025	21:41