सत्यमेव जयते

भारत सरकार Government of India
विद्युत मंत्रालय Ministry of Power
उत्तर पूर्वी क्षेत्रीय विद्युत समिति
North Eastern Regional Power Committee
एन ई आर पी सी कॉम्प्लेक्स, डोंग पारमाओ, लापालाङ, शिल्लोंग-७९३००६, मेघालय
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No.: No. NERPC/SE (O)/OCC/2025/ 3794-3836 27th January, 2025

To
As per list attached

Sub: 222वीं ओ.सी.सी बैठक का कार्यवृत्त
Minutes of 222nd OCC Meeting.

महोदय/महोदया,

कृपया 17 जनवरी, 2025 को एन.ई.आर.एल.डी.सी कॉन्फ्रेंस हॉल, गुवाहाटी में आयोजित 222 वीं ओ.सी.सी बैठक के कार्यवृत्त को अपनी जानकारी और आवश्यक कार्रवाई के लिए प्राप्त करें। कार्यवृत्त एन.ई.आर.पी.सी की वेबसाइट: www.nerpc.gov.in पर भी उपलब्ध है।

कृपया कोई भी टिप्पणी जल्द से जल्द एन.ई.आर.पी.सी सचिवालय को सूचित करें।

Sir/Madam,

Please find enclosed herewith the minutes of the 222nd OCC Meeting held at NERLDC Conference Hall, Guwahati on 17th January, 2025 for your kind information and necessary action. The minutes is also available on the website of NERPC: www.nerpc.gov.in.

Any comments/observations may kindly be communicated to NERPC Secretariat at the earliest.

भवदीय / Yours faithfully,

अनीक

(ए. दे/A. De)
(उप निदेशक / Deputy Director)

Encl: As above

Distribution List:

1. Managing Director, AEGCL, Bijuli Bhawan, Guwahati – 781 001
2. Managing Director, APGCL, Bijuli Bhawan, Guwahati – 781 001
3. Managing Director, APDCL, Bijuli Bhawan, Guwahati – 781 001
4. Managing Director, MSPCL, Electricity Complex, Keishampat, Imphal – 795 001
5. Managing Director, MSPDCL, Secure Office Bldg. Complex, South Block, Imphal – 795 001
6. Director (Transmission), MePTCL, Lumjingshai, Short Round Road, Shillong – 793 001
7. Director (Generation), MePGCL, Lumjingshai, Short Round Road, Shillong – 793 001
8. Director (Distribution), MePDCL, Lumjingshai, Short Round Road, Shillong – 793 001
9. Director (Tech.), TSECL, Banamalipur, Agartala -799 001.
10. Director (Generation), TPGCL, Banamalipur, Agartala -799 001.
11. GM (Transmission), TPTL, Bidyut Bhaban, Banamalipur, Agartala -799 001.
12. Chief Engineer (WE Zone), Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
13. Chief Engineer (TP&MZ), Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
14. Chief Engineer (Commercial) -cum- CEI, DoP, Govt. of Arunachal Pradesh, Itanagar- 791111
15. Engineer-in-Chief, P&E Department, Govt. of Mizoram, Aizawl – 796 001
16. Engineer-in-Chief, Department of Power, Govt. of Nagaland, Kohima – 797 001
17. ED (O&M), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
18. ED (O&M), NHPC, NHPC Office Complex, Sector-33, Faridabad, Haryana-121003
19. Group GM, NTPC, Bongaigoan Thermal Power Project, P.O. Salakati, Kokrajhar- 783369
20. Vice President (Plant), OTPC, Badarghat Complex, Agartala, Tripura – 799014
21. ED, PGCIL/NERTS, Dongtieh-Lower Nongrah, Lapalang, Shillong -793 006
22. AGM (BD), NVVN, Core 5, 3rd floor, Scope Complex, 7 Institutional Area, Lodhi Rd., N. Delhi-3
23. Vice President, PTCIL, 2nd Floor, NBCC Tower, 15, Bhikaji Cama Place, New Delhi – 110066
24. Dy. COO, CTUIL, "Saudamini", 1st Floor, Plot No. 2, Sector-29, Gurugram, Haryana – 122001
25. Chief Engineer, GM Division, Central Electricity Authority, New Delhi – 110066
26. Chief Engineer, NPC Division, Central Electricity Authority, New Delhi – 110066
27. ED, NERLDC, Dongtieh, Lower Nongrah, Lapalang, Shillong -793 006
28. CGM, AEGCL, Bijuli Bhawan, Guwahati – 781001
29. CGM, APGCL, Bijuli Bhawan, Guwahati – 781001
30. CGM, DISCOM, Bijuli Bhawan, Guwahati – 781001
31. Head of SLDC, Dept. of Power, Govt. of Arunachal Pradesh, Itanagar – 791111
32. CGM, (LDC), SLDC Complex, AEGCL, Kahilipara, Guwahati-781 019
33. Head of SLDC, MSPCL, Imphal – 795001
34. Head of SLDC, MePTCL, Lumjingshai, Short Round Road, Shillong – 793 001
35. Head of SLDC, P&E Deptt. Govt. of Mizoram, Aizawl – 796 001
36. Head of SLDC, Dept. of Power, Govt. of Nagaland, Dimapur – 797103
37. Head of SLDC, TSECL, Agartala – 799001
38. Chief Engineer (Elect), Loktak HEP, Vidyut Vihar, Kom Keirap, Manipur- 795124
39. DGM (O&M), OTPC, Badarghat Complex, Agartala, Tripura – 799014
40. Director, NETC, 2C, 3rdFloor, D21Corporate Park, DMRC Building Sector 21, Dwarka, Delhi-77
41. AGM Regulatory & Commercial, NER II TL, 10th Floor, Berger Tower, Noida sector 16B-201301
42. Project Head, NERPSIP/PGCIL, Pub Suraj Nagar, Nutun Bazar, Kahelipara, Guwahati- 781019
43. ED, Comprehensive Scheme (Ar. Pradesh), PGCIL, Tayeng Building, Nitivihar, Itanagar-791111

अलीक

(ए. दे/A. De)

(उप निदेशक / Deputy Director)

MINUTES

OF

222nd OCC MEETING

Time of meeting : 10:30 Hrs.

Date of meeting : 17th January, 2025 (Friday)

Venue : NERLDC Conference Hall, Guwahati

Contents

NORTH EASTERN REGIONAL POWER COMMITTEE

MINUTES OF 222nd OCC MEETING HELD ON 17.01.2025 (FRIDAY) AT 10:30 HRS

1. PART-A: CONFIRMATION OF MINUTES

1.1. Confirmation of Minutes of 221st Meeting of OCC Sub-Committee of NERPC

The minutes of 221st meeting of OCC Sub-committee held on 17.12.2024 at NERLDC Conference Hall, Guwahati were circulated vide letter No. NERPC/SE (O)/OCC/2024/ 3463-3505 dated 23rd December, 2024.

As no comments were received, the sub committee confirmed the minutes of 221st OCC meeting.

2. PART-B: ITEMS FOR DISCUSSION

AGENDA FROM NERPC

2.1. Outage planning

I. Generation Planning (ongoing and planned outages)

a. In 217th OCCM, NEEPCO informed that they would provide daily inflow data for storage-type Hydro PS. NHPC also agreed to provide inflow data as per the NER operational data format. Based on that data provided from NEEPCO and NHPC present per day MU and projected number of days of operation.

Plants	Reservoir Level in meters (as on 15/01/2025)	MU Content	Present DC (MU)	No of days as per current Generation
Khandong + Khandong STG II	719.8	26.5	0.395	67
Kopili	608	89	1.21	74
Doyang	314.3	12	0.123	95
Loktak	767.66	71.75	2.49	28

b. The outage of other generating stations may be approved considering the present water levels in reservoirs.

c. Outage Planning of Transmission elements

As per the Outage planning procedure of NER the planned outages approved in the OCC forum has to be reconfirmed by the availing utilities on 10:00hrs. of D-4 to 12:00 hrs. of D-3) to NERLDC in order to either avail the approved shutdown or cancel it.

If an outage is to be availed on say 10th of the month, the shutdown availing agency would reconfirm to NERLDC between 10 hrs. of 6th of the month to 12:00 hrs. of 7th of the month. This practice is necessary to ensure optimal capacity utilization and the time required for associated system study/coordination by/amongst RLDC/NLDC.

Subsequently NER stakeholders have provided shutdown request for transmission elements for the month of December-2024. That is attached as **Annexure B 2.1(c)**

Deliberation of the sub committee

The sub-committee noted the shutdown proposals from each utility. All the shutdown proposals were deliberated extensively in the OCC forum as well as in the online outage meeting which was scheduled on 15/01/2025. The list of shutdowns approved for the month of January'25 is attached as Annexure B.2.1.

The sub committee noted as above.

AGENDA FROM NERLDC

2.2. Operational Performance and Grid discipline during December 2024:

NERLDC presented the Operational Performance and Grid Discipline Report for the month of December 2024 (Annexure B 2.2).

The sub committee noted as above.

2.3. Review of Day-ahead State Forecast Error

As per IEGC, 2023 Regulation 31.2.c:

Quote:

"The demand estimation by each SLDC shall be done on day ahead basis with time block wise granularity for the daily operation and scheduling. In case SLDC observes a major change in demand in real time for the day, it shall

immediately submit the revised demand estimate to the concerned RLDC for demand estimate correction."

Unquote:

The demand estimates are being received from all the states on day ahead basis in regular manner. The error (MAPE) table of the demand estimates sent by states for the previous month are as shown below:

Date	अरुणाचल प्रदेश/ Arunachal Pradesh	असम / Assam	मणिपुर/ Manipur	मेघालय/ Meghalaya	मिज़ोरम/ Mizoram	नागालैंड/ Nagaland	त्रिपुरा/ Tripura	उत्तर पूर्वी क्षेत्र/ NER
11/29/2024	16.02	6.26	8.78	4.18	10.75	12.60	4.48	5.97
11/30/2024	14.29	6.42	3.96	3.73	37.37	7.08	7.42	4.97
12/1/2024	11.69	53.81	8.54	17.67	23.43	21.14	12.79	29.58
12/2/2024	9.46	36.47	9.74	5.82	13.87	5.51	4.17	20.26
12/3/2024	7.97	11.67	10.60	1.99	10.19	14.04	6.39	7.70
12/4/2024	7.92	9.58	3.62	7.06	6.41	6.73	7.03	5.59
12/5/2024	7.35	10.14	5.44	7.72	6.77	8.87	3.36	4.99
12/6/2024	6.72	60.12	8.27	4.11	7.60	6.00	5.48	54.20
12/7/2024	10.44	3.66	9.60	4.17	11.05	6.66	5.97	2.49
12/8/2024	10.91	8.74	13.76	4.28	7.61	9.25	9.61	4.95
12/9/2024	8.64	8.95	15.46	5.11	5.77	4.67	2.73	4.65
12/10/2024	7.83	6.41	11.98	6.65	5.58	9.11	3.91	4.09
12/11/2024	11.08	5.08	13.40	6.37	4.11	12.08	4.14	7.90
12/12/2024	13.03	3.52	5.37	3.69	6.57	15.10	3.72	1.93
12/13/2024	9.47	3.80	7.76	2.80	4.99	16.19	6.63	2.32
12/14/2024	6.25	2.82	5.42	2.84	4.03	16.56	14.12	2.98
12/15/2024	5.89	7.30	5.79	7.17	9.22	18.88	6.60	5.33
12/16/2024	5.48	6.24	5.34	6.62	5.12	18.48	7.45	4.61
12/17/2024	5.25	4.48	4.65	7.70	14.39	20.27	37.68	6.53
12/18/2024	8.35	4.19	6.49	4.93	8.82	19.47	7.27	3.02
12/19/2024	7.39	2.77	4.31	2.66	5.74	19.27	6.17	1.60
12/20/2024	6.58	2.35	4.85	3.70	3.57	15.72	8.11	1.79
12/21/2024	5.80	2.47	7.23	7.58	6.07	13.78	7.30	2.04
12/22/2024	9.08	7.89	23.43	16.35	24.57	13.46	8.68	3.77
12/23/2024	6.66	2.97	3.97	4.10	21.25	14.99	6.64	2.78
12/24/2024	9.77	1.91	4.73	3.83	16.63	12.03	7.53	2.20
12/25/2024	7.84	3.86	10.18	5.58	23.61	16.97	8.66	3.47
12/26/2024	8.37	2.52	4.84	2.99	28.16	18.78	5.82	1.78
12/27/2024	9.65	2.85	4.63	2.91	14.79	16.53	8.19	1.74

12/28/2024	9.17	3.00	3.84	3.20	8.25	15.94	7.22	2.19
12/29/2024	10.20	4.84	39.10	3.87	19.83	19.92	8.01	3.39
12/30/2024	7.51	4.17	5.21	17.71	7.98	20.77	5.80	2.57
12/31/2024	10.60	9.08	4.04	3.53	4.95	11.97	7.97	4.46
1/1/2025	9.46	10.05	6.45	7.72	19.25	17.58	7.95	8.31
1/2/2025	7.16	13.81	5.53	3.99	17.42	22.84	8.50	7.74

It has been observed that due to high error percentages, incorrect forecasts are being incorporated in the operational planning in day ahead manner. In view of the above it is requested to analyze the above errors and make necessary changes in the data/methodology for forecasting for a much reliable day ahead forecast and resource adequacy.

Deliberation of the sub committee

NERLDC apprised the forum that a draft methodology of day-ahead/week ahead/month ahead demand forecasting has been prepared after collecting information about the demand forecasting methods from all the NER states to reduce the day ahead state forecast error. The forum invited comments from all the NER states on the draft methodology by the next OCC meeting.

The subcommittee noted as above.

2.4. Sharing of Methodology of Day-Ahead/ week ahead/ Month ahead Demand Forecasting

As per deliberation in Agenda Item C.21 of 219th OCC meeting held on 22nd October 2024, all the NER SLDC's were requested to share the respective methodology of the states for demand forecasting in Day-Ahead/ week ahead/ Month ahead Demand Forecasting horizon.

As per verbal communication with all the SLDC's and respective forecasting personnel, a draft methodology as communicated by respective SLDC's was prepared and shared with all the SLDCs for any comments/correction on 12th December 2024. Any comments/ corrections to the draft methodology are still awaited.

In view of the above, it is requested to accept the draft methodology. Further, proper analysis of the methodologies is requested for a more reliable demand forecast. The relevant methodology is attached in **Annexure B 2.4**.

Deliberation of the sub committee

NERLDC apprised the forum that the draft methodology of day-ahead/week ahead/month ahead demand forecasting has been prepared after collecting information about the demand forecasting methods from all the NER states. The forum invited comments from all the NER states on the draft methodology by the next OCC meeting.

The sub committee noted as above.

2.5. Performance of online network estimation tools at RLDC

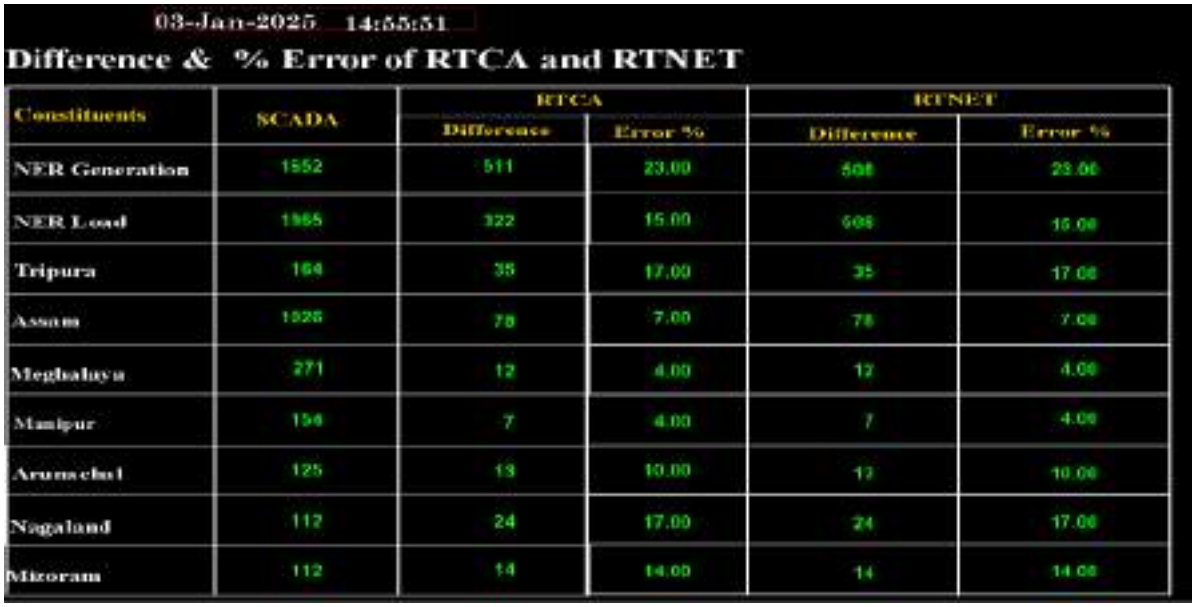
IEGC mandates RLDCs and SLDCs to utilize the network estimation tool integrated in their EMS and SCADA systems for the real time operational planning study. Also, performance of the online estimator tools shall be reviewed in monthly operational meetings as per IEGC Regulation 33(2).

Quote:

"SLDCs, RLDCs and NLDC shall utilize network estimation tool integrated in their EMS and SCADA systems for the real time operational planning study. All users shall make available at all times real time error free operational data for the successful execution of network analysis using EMS/SCADA. Failure to make available such data shall be immediately reported to the concerned SLDC, the concerned RLDC and NLDC along with a firm timeline for restoration. The performance of online network estimation tools at SLDC and RLDC shall be reviewed in the monthly operational meeting of RPC. Any telemetry related issues impacting the online network estimation tool shall be monitored by RPC for their early resolution."

Unquote:

The performance of online network estimation tools at NERLDC is shown below:



03-Jan-2025 14:55:51

Difference & % Error of RTCA and RTNET

Constituents	SCADA	RTCA		RTNET	
		Difference	Error %	Difference	Error %
NER Generation	1552	511	23.00	508	23.00
NER Load	1965	322	15.00	606	15.00
Tripura	164	35	17.00	35	17.00
Assam	1026	78	7.00	78	7.00
Meghalaya	271	12	4.00	12	4.00
Manipur	156	7	4.00	7	4.00
Arunachal	125	13	10.00	13	10.00
Nagaland	112	24	17.00	24	17.00
Mizoram	112	14	14.00	14	14.00

Similarly, SLDC's are requested to present their online network estimation tool performance in the monthly operational meeting of RPC to comply with IEGC regulation 33(2).

Deliberation of the sub committee

NERLDC apprised the forum that a workshop shall be organised for all the states for handholding purpose. Details of the workshop shall be finalised in the upcoming 30th NETeST meeting.

The sub committee noted as above.

2.6. Submission of datasheet for NER Black Start Procedure 2025

In compliance with IEGC 2023, the following clauses mandate the preparation and updating of grid restoration procedures:

Regulation 34. (1), Based on the template issued by NLDC, SLDC of each State and the RLDC of each region shall prepare restoration procedures for the grid for their respective control areas, which shall be updated every year by the concerned SLDC and RLDC taking into account changes in the configuration of their respective power systems.

Regulation 34. (2), Each RLDC, in consultation with the NLDC, CTU, and the concerned STUs, SLDCs, users and RPC, shall prepare detailed procedures

for restoration of the regional grid under partial and total blackouts which shall be reviewed and updated annually by the concerned RLDC.

Regulation 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.

In view of the above, the respective datasheet has been shared with all concerned NER utilities dated 03.01.2025 as per **Annexure B 2.6**.

All concerned NER utilities/ISGS are kindly requested to update their respective datasheets and submit them at the earliest by 18th Jan 2025 to facilitate the preparation of the NER Black Start Procedure 2025.

Deliberation of the sub committee

NERLDC apprised the forum that the requisite information for NER Black Start Procedure 2025 has been obtained from AGBPP Kathalguri, Doyang HEP and OTPC Palatana only. The forum requested NERLDC to share a datasheet detailing all the required information and requested all the utilities to update the datasheet accordingly.

The sub committee noted as above.

2.7. Impact of 132kV Loktak – Ningthoukhong D/C in Manipur Power System

The generation from Loktak HEP is evacuated through the following transmission lines in the Manipur system:

1. 132 kV Loktak – Ningthoukhong TL
2. 132 kV Loktak – Imphal (PG)
3. 132 kV Loktak – Jiribam (PG)
4. 132 kV Loktak – Rengpang (MA) - Jiribam (MA) - Jiribam (PG)

However, the 132 kV Rengpang (MA) - Jiribam (MA) line has been under long outage since 18:18 Hrs of 17-11-2023.

Considering the current scenario, studies suggest tripping of 132 kV Loktak–Jiribam (PG) or 132 kV Loktak–Imphal (PG) line would result in high loading in 132 kV Loktak–Ningthoukhong line:

Long-Term Measures:

1. Reconductoring of the 132 kV Loktak – Ningthoukhong line.
2. Commissioning of the second circuit of the 132 kV Loktak – Ningthoukhong (Ckt II).

Short-Term Remedial Measures:

An SPS (Special Protection Scheme) may be designed at Loktak HEP to ensure the following:

If any circuit of the 132 kV Loktak–Jiribam (PG) or 132 kV Loktak–Imphal (PG) line trips, and the loading on the 132 kV Loktak–Ningthoukhong line exceeds 70 MW (as per Manipur), the generation at Loktak HEP will be instantly backed down to 70 MW.

Deliberation of the sub committee

Manipur apprised the forum that the 132 kV Rengpang(MA)-Jiribam(MA) is under outage due to the law & order situation in the state and the ongoing tower shifting works due to developments in NH-37 (Imphal-Jiribam) by NHIDCL.

Regarding the 2nd circuit of 132 kV Loktak-Ningthoukhong, Manipur apprised the forum that negotiations are under way to resolve RoW issues. NERLDC informed the forum that reconductoring of the 132 kV Loktak-Ningthoukhong line will be possible only after the 2nd circuit comes to service. Member Secretary, NERPC advised that of reconductoring of 132 kV Loktak-Ningthoukhong may be refereed to C-METS and DPR in this regard to be submitted to PSDF committee after approval of RPC.

PGCIL submitted that CT replacement is required in 132 kV Loktak-Jiribam line at Loktak end by NHPC to avoid underutilisation of the line. The forum advised NHPC to carry out the CT replacement works on priority at the

earliest. NHPC apprised the forum that procurement of new CTs is under progress .

The sub committee noted as above.

2.8. Multiple Grid constraints in Assam Power system:

The Assam system is facing severe constraints during summer season and same has been raised in several OCC and RPC forums. The list of the constraints are given below.

Constraints in System	**Comments**	**Long term solution**
Non-Compliant of N-1 criteria of 2x160 MVA ICTs at 220/132 kV BTPS (AS)	Due to High demand in Bongaigaon, Kokrajhar, Gauripur, Gosssaigaon, Bilasipara, Dhaligaon and Rangia areas majors load are fed radially and thus tripping of any 132 kV lines leads to grid disturbance in Assam system. 1. It is also to be mentioned that 220/1322 kV ICT I & II at BTPS(AS) are kept segregated at different buses and thus feeding the separate load radially. 2. 132 kV Bongaigaon (BTPS)-Kokrajhar-Bilasipara-Gauripur link operate radially.(132 kv Gossaigaon - Gauripur line generally kept in open condition) 3. 132 kV Dhaligaon-Gossaigaon link operate radially. 4. 132 kV Bornagar buses are kept split, thus forming radial connection;	The 220kV Salakati - Alipurduar line is planned to be LILO at Gossaigaon (Agimaoni), providing some load relief to BTPS, potentially negating the need for an additional ICT (Minimum 100 MW increase in TTC of Assam. The Assam can draw more power from Gossaigaon side based on the development of downstream network)

	one is 132 kV Dhaligaon-Bornagar line and other one is 132 kV Rangia-Nathkuchi-Bornagar link. 5. 132 kV Nalbari-Barpeta line kept in open condition. Due to this 132 kV Dhaligaon-Barpeta and 132 kV Rangia-Nalbari line operate in radial mode.	
Non-Compliant of N-1 criteria of 2x100 MVA ICTs at 220/132 kV Rangia	Due to high demand in Rangia area majors load are fed radially and thus tripping of any 132 kV lines lead to grid disturbance in Assam system. 1. 132 kV Tangla and 132 kV Sipajhar load fed radially eithther through Rangia or Sonabil side. Thus, tripping of any line would lead to GD in Assam system. 2. 132 kV Kamalpur load fed radially through Rangia side. Thus, tripping of any line would lead to GD in Assam system. 3. 132 kV Sishugram bus operate in split mode, thus forming radial connection; one is 132 kV Rangia-Kamalpur-Amingaon-Sishugram link and other one is 132 kV Sarusajai-Kamakhya-Sishugram link. 4. It has been observed that the voltage levels at multiple 132 kV nodes, particularly in the Assam power system, are dropping below	1. Commissioning of 400/220 kV Rangia substation and associated transmissions lines 2. Upgradation of 220/132 kV ICTs at Rangia substaion

	122 kV during peak times, which is a cause for concern	
Non-Compliant of N-1 criteria of 220 kV Balipara-Sonabil D/C	1. TTC/ATC of NER is limited due to high loading on 220 kV Balipara-Sonabil D/C 2. Impact on reliability of Capital area of Assam system.	1. Utilization of Balipara ICT by Assam: Due to reconfiguration of 132kV Balipara-Sonabil and 132kV Balipara-Ghoramari as 132 kV Sonabil-Ghoramari line, the ICTs at Balipara is not being utilized by Assam. Commisioning of 132 kV Balipara-Misamari D/C (approved in C-METS) 2. Re-conductoring of 220 kV Balipara-Sonabil D/C with high Ampacity conductor
Non-Compliant of N-1 criteria of 220 kV Misa-Samaguri D/C	Impact on reliability of Capital area of Assam system.	1. Commissioning of 400/220 kV Sonapur substation and associated transmissions lines
Non-Compliant of N-1 criteria of 220 kV Sarusajai-Azara D/C	Impact on reliability of Capital area of Assam system.	1. Commissioning of 400/220 kV Sonapur substation and associated transmissions lines,

Non-Compliant of N-1 criteria of 132 kV Tinsukia-Ledo-Rupai - Chapakhowa-Roing-Pasighat-Along-Basar-Daporijo-Ziro-Panyor HEP lik	132 kV Tinsukia-Ledo-Rupai link are having very old conductor, the links is not able to sustain more than 60 MW load for longer period, thus grid disturbance occured on triping of link from the farthest end i.e. 132 kV Tinsukia-Ledo or 132 kV Tinsukia - Rupai or 132 kV Panyor HEP-Ziro line.	Reconductoring of 132 kV Tinsukia-Rupai, 132 kV Tinsukia-Ledo and 132kV Ledo-Rupai line with ampacity conductor
Non compliant of N-1 critera of 132 kV Sarusajai-Kahelipara tripple circuit	Due to High demand in capital area during peak hours, majors load are fed radially and may lead to grid disturbance in capital area of Assam. Following lines are kept in open condition in Capital region for controlling the loading of critical elements. 1. 132 kV AIIMS- Amingaon line 2. 132 kV Bus at Sishgram operate in Split mode	Reconductoring of 132 kV Sarusajai-Kahelipara tripple circuit with high ampacity may be done
N-1 Reliability of Upper Assam Power System	The Upper Assam System is vulnerable under N-1-1 contingency. Considering the worst scenario like continuous shutdown or Force Outage of 220 kV Samaguri-Mariani (AS) line or 220 kV AGBPP-New Mariani (PG) line, the flow gate of	1. Commissioning of 2nd ckt of 220 kV Mariani-Mariani(PG) line: Approved by CEA 2. Early Commissioning of 220 kV Samaguri – Mariani 1(Latest Status:

	Upper Assam Power System needs to be monitored.	Kaziranga Forest Clearance pending)

SLDC Assam is requested to address these issues urgently by implementing the planned assets and solutions to relieve congestion in the network. Proactive implementation of the proposed measures will significantly enhance the reliability and efficiency of Assam's power system.

Deliberation of the sub committee

Constraints in System	**Deliberation in 222nd OCC meeting**
Non-Compliant of N-1 criteria of 2x160 MVA ICTs at 220/132 kV BTPS (AS)	Assam apprised the forum that, the 220kV Salakati - Alipurduar line is planned to be LILO at Gossaigaon (Agimaoni), providing some load relief to BTPS, and is expected to be completed by December-2025. The development of down stream network is also expected to be completed by December-2025.
Non-Compliant of N-1 criteria of 2x100 MVA ICTs at 220/132 kV Rangia	1. Commissioning of 400/220 kV Rangia substation and associated transmissions lines- **Expected completion by July-2026**. 2. Upgradation of 220/132 kV ICTs at Rangia substation- **Expected completion by February-2025.**

Non-Compliant of N-1 criteria of 220 kV Balipara-Sonabil D/C	Commisioning of 132 kV Balipara-Misamari D/C (approved in C-METS)-**SLDC Assam apprised the forum that funding issue is yet to be resolved**. 2. Re-conductoring of 220 kV Balipara-Sonabil D/C with high Ampacity conductor-**SLDC Assam apprised the forum that approval has been obtained from the government and Assam is currently preparing the estimate.**
Non-Compliant of N-1 criteria of 220 kV Misa-Samaguri D/C	1. Commissioning of 400/220 kV Sonapur substation and associated transmissions lines-**SLDC Assam apprised the forum that the work has been awarded in Nov-2024 and is expected to be completed by Nov-2026.**
Non-Compliant of N-1 criteria of 220 kV Sarusajai-Azara D/C	1. Commissioning of 400/220 kV Sonapur substation and associated transmissions lines-**SLDC Assam apprised the forum that the work is expected to be completed by Nov-2026.**
Non-Compliant of N-1 criteria of 132 kV Tinsukia-Ledo-Rupai - Chapakhowa-Roing-Pasighat-Along-Basar-Daporijo-Ziro-Panyor HEP lik	Reconductoring of 132 kV Tinsukia-Rupai, 132 kV Tinsukia-Ledo and 132kV Ledo-Rupai line with ampacity conductor- **SLDC Assam apprised the forum that the revised DPR has been submitted to PSDF.**
Non compliant of N-1 critera of 132 kV Sarusajai-Kahelipara tripple circuit	Reconductoring of 132 kV Sarusajai-Kahelipara tripple circuit with high ampacity may be done-**SLDC Assam apprised the forum that the work is expected to be completed by Feb-2025.**

N-1 Reliability of Upper Assam Power System	1. Commissioning of 2nd ckt of 220 kV Mariani-Mariani(PG) line: Approved by CEA-**SLDC Assam apprised the forum that the work is in planning stage.** 2. Early Commissioning of 220 kV Samaguri – Mariani 1(Latest Status: Kaziranga Forest Clearance pending)- **SLDC Assam apprised the forum that the funding issue is still not resolved**.

The sub committee noted as above.

2.9. Implementation of the AUFLS and df/dt schemes

As deliberated in 15th meeting of NPC held on 14.12.2024 against Agenda 6: "Report on Automatic Under Frequency Load Shedding (AUFLS) and df/dt scheme:"

Quote:

"The following quantum of load relief settings of AUFLS scheme for year 2024-25 were approved by the Committee:

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%	3802	3214	3425	1383	174	11998
2	Stage 2	49.2 Hz	6.00%	4562	3857	4109	1659	208	14395
3	Stage 3	49.0 Hz	7.00%	5322	4500	4794	1936	243	16795
4	Stage 4	48.8 Hz	7.00%	5322	4500	4794	1936	243	16795
			Total (in MW):	19008	16071	17122	6914	868	59983

"The implementation of the AUFLS and df/dt schemes must be completed by March 2025. RPCs are required to regularly monitor the implementation of the UFR scheme as a whole including the bulk consumers connected at the ISTS level. RPCs may communicate above decisions to the respective States for implementation."

Unquote:

SLDCs are requested to conduct meetings with their DISCOMs to find solutions for feeder mapping and expedite the same. Minutes of 15th meeting of NPC held on 14.11.2024 is attached as per **Annexure B 2.9**.

Deliberation of the sub committee

Member Secretary informed the forum that matter of implementation of revised AULF in all region (including NERPC) was approved in 15th NPC meeting. It was also decided in the NPC meeting:

i) The AUFLS scheme must ensure Pumped storage hydro plants operating in pumping mode or ESS operating in charging mode shall be automatically disconnected before the first stage of UFR.

ii) Bulk consumers connected to ISTS and STU networks must implement the UFR scheme. Compliance should be ensured during the grant of connectivity by CTU and STU.

Assam representative apprised the forum that the new AUFLS scheme has been completed. Manipur apprised the forum that the scheme shall be implemented by June-25.Meghalaya apprised the forum that the scheme has been finalised and rearrangement of loads is required in stages I,II and III & IV, The work shall be completed by the next OCC meeting. Mizoram apprised the forum that the new AUFLS scheme has been completed. Tripura apprised the forum that the work shall be completed by the next OCC meeting.

Arunachal Pradesh apprised the forum that the loads have been identified and approval is pending. AP,SLDC also apprised the forum that since RTU is not available at Bandardua for mapping, it is proposed to shift the loads to Nirjuli substation.

The sub committee noted as above.

2.10. Agenda of operational issues of DISCOMs at RPC level and Monitoring of 30 GW of capacity under the PM Surya Ghar Yojana scheme

As per Agenda 12 of the 15th NPC meeting (Annexure B 2.10) held on 14.11.2024, and Agenda 14.3 of the 14th NPC meeting held on 03.02.2024, following decision of the NPC committee was agreed upon:

i) Only the operational aspects of DISCOMs may be discussed at the RPC level.

ii) Monitoring of the installation of 30 GW of capacity under the PM Surya Ghar Yojana scheme at Discom level may be discussed under this agenda item.

Hence, DISCOM's are requested to deliberate their operational issues and may update the present status of monitoring of roof-top solar integration at DISCOM level.

Deliberation of the sub committee

The forum opined that NERPC Secretariat would send written communication to the head of all the DISCOMs of NER in order to discuss and resolve operational issues of DISCOMs at RPC Level by conducting separate meeting.

The sub committee noted as above.

2.11. Responsibility of Users for compliance monitoring as per IEGC:

This is a general information to all, as per IEGC 2023, a list of various responsibilities that have to be performed by each user have been prepared and attached as Annexure 4. The same has to be performed and intimated to the concern person as mentioned in the list.

Hence, all the users are requested to submit the compliance as per **Annexure B 2.11**

Deliberation of the sub committee

The forum requested all the users to submit the compliance report as per IEGC mandate.

The sub committee noted as above.

2.12. Early implementation of FGMO as per IEGC:

IEGC 2023 was effective for 01st October 2023 for all the utilities. Accordingly, the generating stations and units thereof with governors shall be under Free Governor Mode of Operation in accordance with Regulation 30. (10). (d) of IEGC 2023. The inherent dead band of a generating unit or frequency controller shall not exceed +/- 0.03 Hz and the governor shall be set with respect to a reference frequency of 50 Hz and response outside the dead band shall be with respect to a total change in frequency in compliance with Regulation 30. (10). (k).

As per deliberation in 221st OCC, all the eligible generating stations (ISGS) have implemented the FGMO. Also, status of FGMO for intra-state generation to be updated by respective SLDCs.

Deliberation of the sub committee

NERLDC apprised the forum that all ISGS have implemented FGMO. The forum requested the intra state generating units to implement the FGMO at the earliest.

The sub committee noted as above.

2.13. Publication of "Reactive Power Management Document of North Eastern Region 2024.

With due course, it is to be informed that "Reactive Power Management Document of North Eastern Region 2024" has been published on 31st Dec'24 in NERLDC website.

Power and Voltage Control document of NER 2024 is updated as on Dec-2024 and uploaded on NERLDC website under following link

https://www.nerldc.in/wp-content/uploads/Reactive-power-Doc-NER-2024_RP_NER_2024-1.pdf

This document is in continuation to the previous edition for understanding the basics of reactive power and its management towards voltage control, its significance, and consequences of inadequate reactive power support. It also includes details of reactive power support available at present and efforts by planners from future perspective in respect of NER grid.

Deliberation of the sub committee

NERLDC informed that the Reactive Power Management Document of NER-2024 has been published in NERLDC website.

The sub committee noted as above.

2.14. Hunting in generators during oscillations

Severe forced oscillations were observed in the grid in the North Eastern region PMU's at 10:13-11:25 hrs & 12:21-13:04 hrs of 08-12-2024. The oscillations were observed in both active and reactive powers of all the phases in the grid.

It was informed to NERLDC control room that hunting of around 10 MW was observed in Unit 2 and Unit 3 at BGTPP and 10-12 MW fluctuations in both the modules of OTPC. Similarly, it was conveyed from NLDC that such kind of hunting in the machines were observed in many power generating units throughout the country. Such simultaneous hunting in is a serious concern for power security of the grid. The oscillations observed in the grid are suspected to be forced kind of oscillations that might have been caused due to RE penetration in the country.

In lights of such critical situation, it is requested to:

Ensure PSS is properly tuned and available at all times for damping the low frequency oscillations.

Provide necessary DAS and PSS performance data during the events to NERLDC for PSS performance verification.

Deliberation of the sub committee

The forum requested all generating utilities to share necessary DAS and PSS performance data during the events to NERLDC for PSS performance verification.

The sub committee noted as above.

2.15. Philosophy and logic for FSC auto switching and auto disconnection in 400 kV Bongaigaon-Balipara 3 &4 at 400 kV Balipara S/S

As per deliberation in Agenda 2.7: “Restoration of FSC (Fixed Series Compensator) Operation for Balipara-Bongaigaon Lines 3 & 4” of 221st OCC

Meeting held on 17th December 2024, the issue of the bypass circuit breaker of the FSC at the Balipara substation has been resolved for Ckt 3 and work is going on for Ckt 4.

In view of the requirement of FSC as per real time grid conditions, it is requested to share the philosophy and logic for FSC auto switching and automatic disconnection in 400 kV Bongaigaon-Balipara 3 & 4 at 400 kV Balipara S/S. PGCIL is requested to update on the matter.

Deliberation of the sub committee

The forum advised PGCIL to complete the work on ckt-4 of 400 kV Bongaigaon-Balipara before commissioning of Lower Subansiri HEP .

PGCIL apprised the forum that the philosophy and logic for FSC auto switching and automatic disconnection in 400 kV Bongaigaon-Balipara 3 & 4 at 400 kV Balipara S/S has been shared with NERLDC.

The sub committee noted as above.

2.16. AP Islanding scheme logic activation status as per special meeting:

A meeting was held on 03rd January 2025 for activation of Itanagar Islanding Scheme Activation. Following are the actions need to be taken as per the meeting whose status may be updated by utilities:

1. UFR setting at the following action need to be set at 48.2 Hz with a time delay of 300ms:

Sl. No	UFR Location	Implementing Agency	Status Update(whether UFR setting is enabled)
1	132 kV Panyor HEP-Pare	NEEPCO	

	HEP line at 132 kV Panyor HEP		
2	132 kV Panyor HEP-Itanagar line at 132 kV Panyor HEP	NEEPCO	
3	132 kV Panyor HEP-Lekhi line at 132 kV Panyor HEP	NEEPCO	
4	132 kV Itanagar-BNC line at 132 kV BNC	PGCIL	
5	132 kV Itanagar-Gohpur line at 132 kV Gohpur	ASSAM	
6	132 kV Nirjuli-Gohpur line at 132 kV Gohpur	ASSAM	

7	132 kV Nirjuli-North Lakhimpur line at 132 kV North Lakhimpur	MUML	
8	North Lakhimpur -Pare HEP line at 132 kV North Lakhimpur	MUML	

2. SPS Implementation at Pare HEP: SPS for tripping of one unit of Pare in case of two units are running is to be implemented. NEEPCO may update the status.
3. UFR Post-Island Formation: UFR setting at SMS and Salasar fedders is to be changed to 48.0 Hz and 47.8 Hz (instantaneous trip) respectively. Also an additional feeders of around 5 MW is to be identified as an UFR post island and to be set at 47.7 Hz instantaneous trip. DOP, AP may please update the status.
4. The UFR for post Island Formation were for AUFLS purpose that quantum of load is to be shifted outside the island for AUFLS defence mechanism.

   DOP, AP may update the status.

Deliberation of the sub committee

1. Regarding the UFR settings (48.2 Hz with a time delay of 300ms) at the locations detailed below the following updates have been made in 222nd OCC forum:

Sl. No	UFR Location	Implementing Agency	Status Update(as per 222nd OCC)
1	132 kV Panyor HEP-Pare HEP line at 132 kV Panyor HEP	NEEPCO	Completion by 17/01/25
2	132 kV Panyor HEP-Itanagar line at 132 kV Panyor HEP	NEEPCO	Completion by 17/01/25
3	132 kV Panyor HEP-Lekhi line at 132 kV Panyor HEP	NEEPCO	Completion by 17/01/25
4	132 kV Itanagar-BNC line at 132 kV BNC	PGCIL	Will be completed by this week.
5	132 kV Itanagar-Gohpur line at 132 kV Gohpur	ASSAM	Will be completed by first week of February-25.
6	132 kV Nirjuli-Gohpur line	ASSAM	Will be completed by

	at 132 kV Gohpur		first week of February-25.
7	132 kV Nirjuli-North Lakhimpur line at 132 kV North Lakhimpur	MUML	Could not be discussed as representative of MUML was absent.
8	North Lakhimpur - Pare HEP line at 132 kV North Lakhimpur	MUML	Could not be discussed as representative of MUML was absent.

2. **SPS Implementation at Pare HEP**: SPS for tripping of one unit of Pare in case of two units are running is to be implemented- ***NEEPCO intimated the forum that the SPS logic at Pare HEP has been completed and duly shared with NERLDC.***

3. **UFR Post-Island Formation**: UFR setting at SMS and Salasar feeders is to be changed to 48.0 Hz and 47.8 Hz (instantaneous trip) respectively. Also an additional feeders of around 5 MW is to be identified as an UFR post island and to be set at 47.7 Hz instantaneous trip. -***DOP,AP updated the forum that additional feeders have been identified.***
4. The UFR for post Island Formation were for AUFLS purpose that quantum of load is to be shifted outside the island for AUFLS defence mechanism.

   The forum in principle agreed the AP islanding scheme (Itanagar islanding scheme) which will be implemented and operational by next month onward.

   The sub committee noted as above.

2.17. PSD withdrawal delay during Dec'2024

- NEEPCO delayed in returning SD of Monarchak GTG & STG by 10 days & 13 days respectively.
- NTPC delayed in returning SD of BgTPP Unit-1 by 6 days.

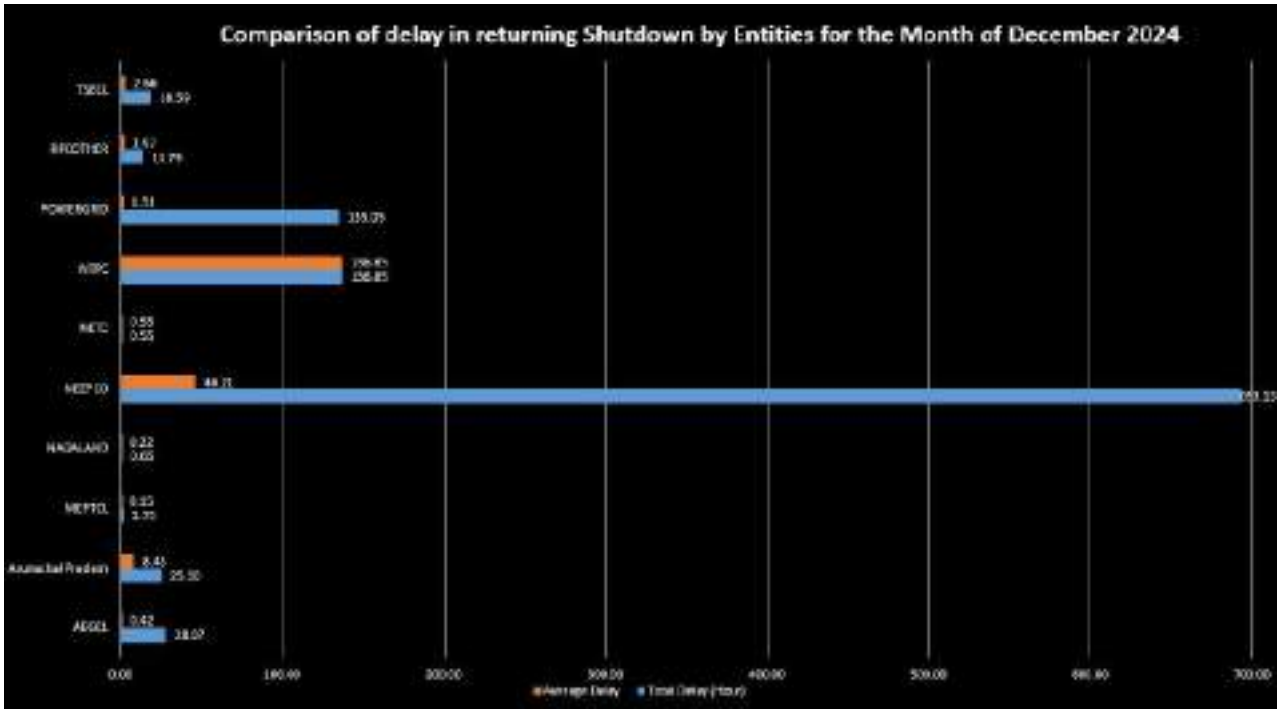


Fig: Comparison of delay in returning Shutdown by Entities for the Month of December 2024

Deliberation of the sub committee:

The forum requested all the utilities to return the shutdowns in time as per plan.

The subcommittee noted as above.

2.18. Communication for Revision of Schedule on account of forced outage

It has been observed that different information exchange practices are being followed by Generators in the North Eastern Region in the event of forced outages. To harmonise the process, the following may be adopted by entities.

With regard to the scheduling process, the relevant Regulation and Operating procedure are outlined below:

Clause 49.7 of IEGC Regulations 2023:

"Generating Stations shall immediately intimate the outage of the unit along with the requisition for revision of Declared Capacity and schedule and the estimated time of restoration of the unit, to SLDC or RLDC, as the case may be."

Also reproduced from Clause 12.16 of **Operating Procedure of NER 2024**

"Revised Declared Capacity and schedule shall be effective from 7th time block if email or written communication receipt at NERLDC is in the odd time block and from 8th time block if email or written communication receipt at NERLDC is in the even time block, counting the time block in which the request of email or written communication receipt considered the first-time block."

In the case of a forced outage (following a tripping) of a generating unit, the following may be considered:

1. The generating station shall provide written communication to NERLDC Control Room as early as possible, including details of the outage, the quantum of bilateral transactions to be curtailed if any.
2. Subsequently, Generating Station to communicate NERLDC Control room over Telephone.
3. The time block in which the email or written communication request is received shall be considered the first time block for scheduling practises.
4. The schedule revision details may be provided in WBES software by the Generating Station.

Deliberation of the sub committee

NERLDC highlighted the process that may be adopted by entities with regard to the scheduling process and revision of schedule on account of forced outage of a generating unit.

The forum agreed in principle to the mentioned operational procedure.

The sub committee noted as above.

2.19. Early implementation of SPS at BTPS S/s and non-compliance of BTPS ICT:

The 220/132 kV BTPS (Assam) substation is equipped with 2x160 MVA, 220/132 kV ICTs. The BTPS (Assam) substation supplies power supply to the areas of Kokrajhar, Bilasipara, Gauripur, Gossaingaon, Dhaligaon, APM, Barpeta, Nalbari, Barnagar, Nathkuchi, Kamalpur, Sipajhar, BGR, and Railway TSS within the Assam Power System.

As it is observed during the month of July: 84.21%, August: 88.43 % and September: 80.66% of the time loading of these elements together was more than 160 MW, thus not satisfying the N-1 contingency criterion. Tripping of one of these ICTs will result in reduction in reliability in BTPS (AS) Area of Assam Power System.

A short-term measure to address the N-1 contingency of the 2 x 160 MVA ICTs at BTPS, an SPS scheme was reviewed by NERLDC on 14th October 2024, with several suggestions provided for its implementation. However, no update has been received from AEGCL regarding the progress of this critical scheme. The delay in implementation remains a significant concern, as the non-compliance directly impacts the reliability and safety of the Assam Power System in the BTPS area. AEGCL is once again urged to prioritize the implementation and commissioning of the SPS at the earliest to mitigate risks and ensure system reliability and same has been intimate via mail dated 09-12-2024. (**Annexure B 2.19**)

Cooperation from all stakeholders is requested to support the safe, reliable, and integrated operation of the grid. This matter is submitted for the committee's kind information and necessary action.

As per the deliberations in 221st OCC forum, AEGCL representative intimated the forum that proposal for funding for procurement of one no. 160 MVA transformer at BTPS substation is already submitted to MoP. However, due to funding issues the scheme has not been finalised yet.

In 221st OCC meeting, the forum advised AEGCL that the proposal for the said project can be submitted to PSDF. SLDC, Assam also apprised the forum that the SPS shall be operational within one month.

Deliberation of the sub committee

SLDC, Assam intimated the forum that the SPS at BTPS substation will be operational by Febuary-2025.

The subcommittee noted as above.

2.20. Update on commissioning of 220kV AGBPP – Namsai DC to ensure reliability of Arunachal system:

The commissioning of the 132kV Chapakhowa-Roing D/C line on July 4th, 2023, has significantly contributed to stabilizing the power grid in Arunachal Pradesh by reducing grid disturbances and ensuring a reliable power supply. However, the limited capacity of the 132kV Tinsukia-Ledo and 132kV Tinsukia-Rupai lines, which can handle approximately 60 MW, has restricted the full utilization of the Assam-Arunachal Pradesh interconnection. Frequent tripping incidents, primarily due to jumper breakages, have caused partial blackouts in both states, highlighting the need to strengthen these lines.

To further enhance the reliability and robustness of the regional power system, the early commissioning of the 220kV Namsai-Kathalguri (AGBPP) D/C line is essential. This measure is critical for ensuring uninterrupted power flow, supporting economic growth, and fostering overall development in the region.

As per the 220th OCC forum, the expected commissioning of the 220kV Namsai-Kathalguri line is targeted for October 2025, subject to RoW issue.

As per the deliberations in 221st OCC meeting, representative of Powergrid apprised the forum that 220 kV bus bar replacement work at Kathalguri end is also a part of the original scope of work. And for the said work support from NEEPCO is required. The forum advised NEEPCO to extend necessary support to Powergrid in completing the bus bar replacement work.

Further, the forum advised Powergrid to expedite the commissioning of 220 kV Namsai-Kathalguri line.

On query of Member Secretary, NERPC on revised DPR for reconductoring of 132 kV Tinsukia-Rupai and 132 kV Tinsukia-Ledo to PSDF ,Assam

representative informed that the revised DPR was submitted to PSDF Secretariat on 12.12.2024.

Deliberation of the sub committee

Assam apprised the forum that the revised DPR for reconductoring of 132 kV Tinsukia-Ledo and 132 kV Tinsukia-Rupai lines have been submitted to PSDF committee.

PGCIL apprised the forum that work on commissioning of 220 kV AGBPP-Namsai D/C is in progress. PGCIL further updated that foundation works have been completed in 170 locations out of 181 locations, erection works have been completed in 118 locations out of 221 locations and stringing works have been completed in 19 out of 71 locations.

The sub committee noted as above.

AGENDA FROM POWERGRID

2.21. Procurement of cold spare transformers and reactor for Northern Eastern Region

CERC had set up a Committee on dated 15.03.2018 consisting of representatives from CERC, NLDC, CEA & POWERGRID under the Chairmanship of the Chief (Engineering) of the CERC to assess the requirement of regional spares including bus reactors, line reactors, ICTs, etc. This would ensure reliability of the grid and reduce downtime in case of any failure/outage.

1. As per CERC Committee recommendation, the following spares transformers & reactors are required to be kept as spare for North Eastern Region as per POWERGRID assets base:

Transformer:

MVA Rating of Transformers	Voltage Rating	Total Installed unit in POWERGRID	Spare Required as per CERC report	RPC Approved Spares	Qty Proposed for procurement	Location/State of spare requirement

3Ø-315MVA	400/132/33 kV	1	1	0	1	Assam
3Ø-160MVA	220/132kV	6	2	1	1	Nagaland
3Ø-100MVA	220/132kV	2	2	1	1	Assam
3Ø-50MVA	132/33kV	4	2	1	1	Manipur
TOTAL:			**4**			
Tentative Cost			**43.94 Cr**			

Reactors:

MVAR Rating of Reactors	**Voltage Rating**	**Total Installed unit**	**Spare Required as per CERC report**	**RPC Approved Spares**	**Qty Proposed for procurement**	**Spare requirement**
3Ø-125MVAR#	420kV	6	2	1	1	Manipur
3Ø-63MVAR*	420kV	32	3	2	1	Manipur
3Ø-31.5MVAR	245kV	1	1	0	1	Nagaland
3Ø-20MVAR	245kV	1	1	0	1	Assam
3Ø-20MVAR	132kV	7	3	0	3	Manipur, Mizoram, Tripura
TOTAL:			7			
Tentative Cost			**34.56 Cr**			

Quantity considered for both 125MVAR & 80MVAR reactors in Manipur. In case of failure of existing 80MVAR reactor, replacement can be done with 125MVAR.

Quantity considered for both 50MVAR & 63MVAR reactors. In case of failure of existing 50MVAR reactor, replacement can be done with 63MVAR.

In view of the above, it is requested for approval for procurement of cold spare transformers & reactors of various ratings as per CERC .The tariff for the investment made is to be shared by constituents as per the provisions of CERC Regulation.

As per the deliberation of the 220th OCCM, the forum requested PGCIL to submit the complete details regarding state wise requirement of spares as well details of available spares. Accordingly, PGCIL has submitted the requisite details via e-mail dated 29/11/24. The list is attached as **Annexure B 2.21**.

As per the deliberations in 221st OCC forum, representative of Tripura intimated the forum that they would submit their views in the next OCC forum. Further, NERPC advised NERLDC to conduct a detailed study about the requirement of reactors, installed in short T/Ls(<100kM) and their impact on grid voltage. And if any reactor is found to be redundant (having nominal effect on the grid voltage) after the due study, the same can be taken out and be used as a spare.

Deliberation of the sub committee

NERLDC presented the study regarding the requirement of reactors and their impact on grid voltage particularly for 400 kV Balipara-BNC corridor. The study also highlighted that the line reactor (switchable) at Balipara end is necessary to maintain the grid voltage once the commissioning of Lower Subansiri HEP.

The forum agreed in principle to the proposed number of spare reactors at different locations and further deliberations shall follow in commercial subcommittee meeting.

The sub committee noted as above.

2.22. Request for continuous shutdown of 132kV S/C Loktak-Imphal line for construction works:

It is to bring to your kind attention that reconductoring works for 132 kV S/C Loktak-Imphal Transmission Line under NERES-XIX Project have been awarded in North Eastern Region which is to be executed by POWERGRID. All the materials have been supplied at site and the executing agency has also deployed the required manpower for taking up the reconductoring works.

It may be mentioned that POWERGRID had requested M/s NHPC on 29.10.2024 for continuous shutdown of the subject line for the months of Nov-24 & Dec-24. However, NHPC had expressed that shutdown of their HEP in the current season would not be viable as the water level in the dam is at the highest levels and all 3 nos. generating units are running at full capacity.

Further, M/s NHPC has intimated that the scheduled maintenance of all 3 units have also been postponed to Jan25 & Feb25. A copy of the minutes of meeting between POWERGRID and M/s NHPC at Loktak is enclosed.

The timely completion of above works is important for the improvement of power system in the state of Manipur as well as the region as a whole. As the shutdowns have not been concurred, the mobilized manpower by the agencies have also become idle.

Hence, we are requesting your good self to look into this matter and make necessary arrangements for sanctioning the shutdown for 45 days from 15.12.2024 onwards, so that the above transmission line can be upgraded to carry more power, which improves overall grid stability.

As per the deliberations in 221st OCC forum, NERLDC informed that in case of s/d of the said line, only two lines (132kV Loktak-Jiribam and 132kV Loktak-Ningthounkong) will remain for evacuation of Loktak Power (135 MW) and considering the N-1 criteria of any of the lines, outage of one unit of Loktak is required in order to allow the s/d.

NHPC Loktak apprised the forum that the water level in the reservoir is full and in case of outage of any unit, spillage will occur. This will cause not only wastage of the natural resources but also the financial loss to NHPC.

He further intimated that the water level is expected to decrease by February-2025 and the shutdown can be allowed once the water level decreases to avoid spillage.

Deliberation of the sub committee

NHPC Loktak apprised the forum that water level has reducing trend and again it will be reduced in February-2025 and accordingly agreed to allow the shutdown of 132 kV S/C Loktak-Imphal line (proposed by PGCIL) from 10th February-2025 and complete the reconductoring works at the earliest.

The sub committee noted as above.

AGENDA FROM KMTL

2.23. Proposal for Common Pool of Emergency Restoration System (ERS) Equipment in the North Eastern Region:

Following the discussions during the 27th TCC and NER Power Committee Meetings on 7th and 8th November 2024 in Guwahati, it is to highlight the challenges faced by Kohima Mariani Transmission Limited (KMTL) regarding Emergency Restoration System (ERS) arrangements.

KMTL operates a 254 km transmission line across Assam, Nagaland, and Manipur, with over 60% of the route passing through hilly and highly vulnerable terrain. Additionally, ongoing ethnic conflicts in Manipur have disrupted ground patrolling in certain areas, as communicated to the Manipur authorities and shared with NERPC.

As a private entity, KMTL is not eligible for ERS procurement under the PSDF fund, and the high cost of ERS systems makes independent maintenance challenging. In light of this, we propose creating a common pool of ERS

equipment in the North Eastern region, managed by PGCIL and NETC. This pool would ensure the efficient utilization of resources and provide access to ERS equipment for all stakeholders including KMTL, during emergencies.

KMTL is willing to formalize this arrangement through a Memorandum of Understanding (MoU) to ensure seamless access to the common ERS pool when needed.

The forum's kind consideration and support in establishing this initiative will significantly enhance the region's ability to respond to emergencies effectively.

Deliberation of the sub committee

The matter could not be discussed as representative of KMTL was absent during deliberation.

The sub committee noted as above.

AGENDA FROM NEEPCO

2.24. Requirement of 8 nos. of energy meters for 2X23 MW Khandong Power Station

NEEPCO requires 8 nos. of energy meters in respect of 2X23 MW Khandong Power Station for the following:

1. Main and check meters for the 132 kV Khandong-Kopili 1 feeder.
2. Main and check meters for the 132 kV Khandong-Khleriat 1 feeder.
3. HV and LV meters for Khandong unit 1.
4. HV and LV meters for Khandong unit 2.

Deliberation of the sub committee

The forum advised NERLDC to study the requirement of the 8 nos. of meters as proposed by NEEPCO for 2X23 MW Khandong Power Station. PGCIL also agreed to look into the availability of the meter.

The sub committee noted as above.

AGENDA FROM NERPC

2.25. Formation of a Committee for identifying a suitable location(s) for a Transit Camp/Guest House of NERPC in Guwahati

NERPC Secretariat plays a pivotal role in organizing meetings, conducting audits, and facilitating communication among the power sector stakeholders of the North Eastern Region. Many of these meetings are held in Guwahati, which serves as a central hub with excellent connectivity to the rest of the region.

Currently, officers from the NERPC Secretariat and representatives of constituent members are required to stay in hotels during their visits to Guwahati, which is often inconvenient. To enhance convenience and provide better accommodation facilities, the 27th NERPC forum approved the establishment of a transit camp/guest house in Guwahati.

The proposed transit camp/guest house will have around 10-15 rooms, and the expenses for its establishment and operation will be borne from the "NERPC Board Fund."

To identify a suitable location for setting up the transit camp, a committee is proposed to be formed. The committee will survey potential properties in Guwahati and recommend the most appropriate location based on the requisite requirements.

Deliberation of the sub committee

The committee will have the following members:

1. **Representative from NERPC**
2. **Representative from Power Grid Corporation of India Limited (PGCIL)**
3. **Representative from Assam**

Further, the committee may co-opt additional members if required.

The Committee shall:

1. Conduct a detailed survey to identify suitable properties in Guwahati for setting up the transit camp/guest house.
2. Evaluate the identified properties based on criteria such as location, accessibility, amenities, and cost implication.
3. Prepare a comprehensive report with recommendations for the most suitable property.

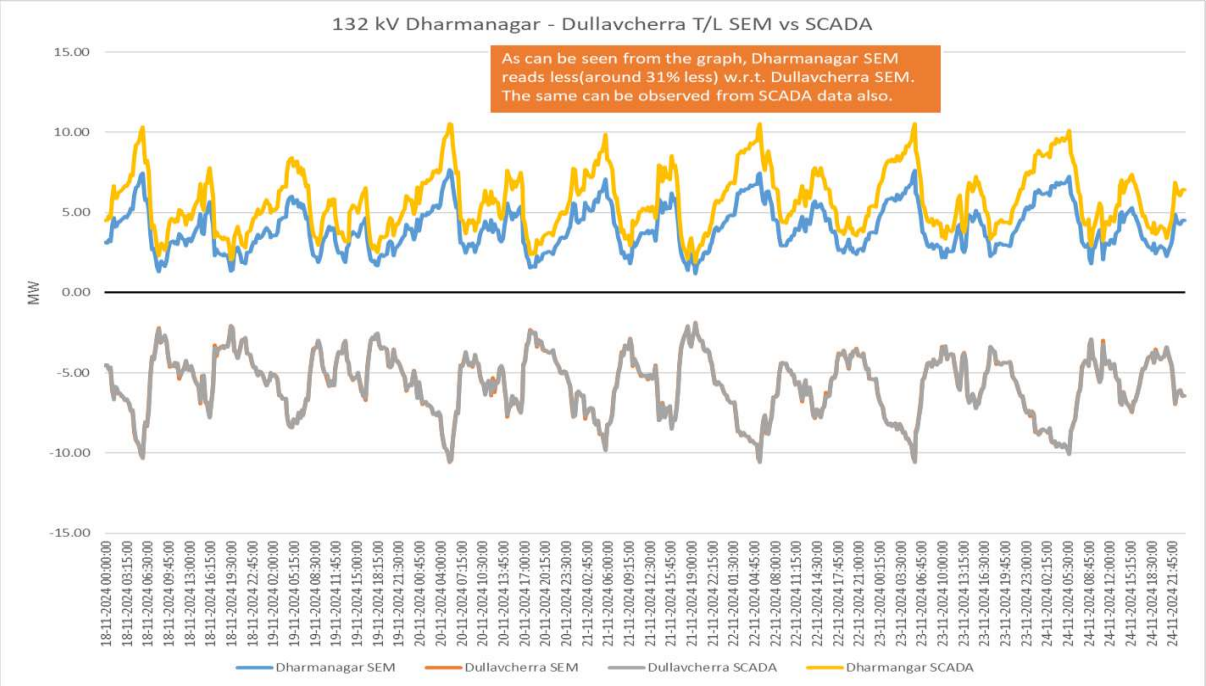
The committee is required to submit its report to the **Member Secretary, NERPC**, for final approval and further action.

The sub committee noted as above.

3. PART-C: METERING ITEMS

3.1. Issue in SEM data of 132 kV Dharmanagar end of Dullavcherra Feeder

It has been observed that the data received from Dharmanagar end is erroneous and the same neither matches with SCADA data nor with data from Dullavcherra end. Several follow ups have been initiated regarding the matter with utility (here POWERGRID Kumarghat due to non-availability of DCD with concerned utility), however, matter is yet to be resolved.



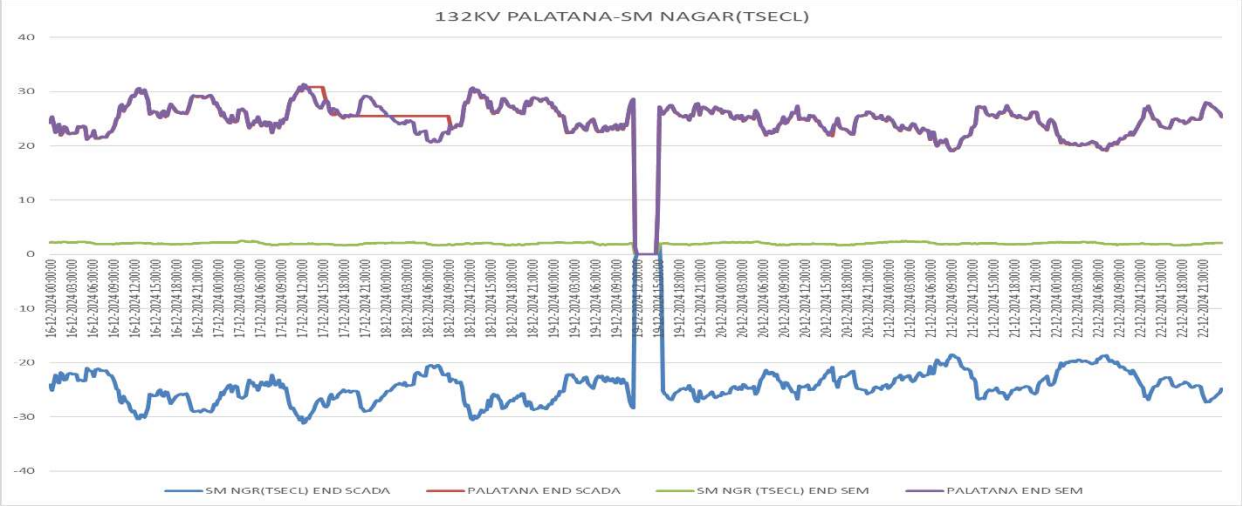
Deliberation of the sub committee

NERLDC apprised the forum that the metering issue was identified at Dharmanagar end. SLDC Tripura apprised the forum that the matter could not be resolved despite the receipt of DCD due to non-availability of Vinplus software. PGCIL agreed to help Tripura with the software issue.

The sub committee noted as above.

3.2. Issue in SEM data of 132 kV SM Nagar (TSECL) end of Palatana Fdr. (400 kv T/L charged at 132 kV):

Weekly SEM data of 132 kV SM Nagar (TSECL) is essential for accounting of Tripura Drawal. Recently, Planned Shutdown was availed dated 02-12-2024 for Installation of ABT meter under SAMAST Project at SM Nagar end. On return of S/D, meter for SM Nagar end was reading close to zero (0). On intimation of the same to utility, S/D was availed again on 19-12-2024 to resolve the issue. However, the same could not be resolved. It is pertinent to mention that similar issue has already been discussed in 207th and 208th OCCM. Tripura & POWERGRID may kindly look into the issue on priority basis.



Deliberation of the sub committee

The forum advised Tripura to resolve the issue by next OCC meeting.

The sub committee noted as above.

3.3. Issue in receipt of data from 132 kV Tipaimukh S/S

Weekly SEM data from 132 kV Tipaimukh (Manipur) S/S is essential for accounting of Manipur Drawl. However, SEM data for said substation is not being received. On query, downloading data from DCD to laptop has been failing.

Deliberation of the sb committee

Manipur apprised the forum that the problem in downloading data from DCD to laptop still persists. PGCIL agreed to help Manipur in resolving the issue.

The sub committee noted as above.

3.4. Issue in Receipt of Data from Luangmual S/S

Weekly SEM data from 132 kV Luangmual(Mizoram) Substation is important for accounting of Mizoram drawal. However, SEM data for said substation is not being received since 11/11/2024. Issue with licence of Vinplus Software in Designated laptop has been reported by the concerned Substation.
In 221st OCCM, forum advised Mizoram to take up the matter with L&T and resolve the issue by next OCCM. Data is yet to be received from said Substation.

Deliberation of the sub committee

Manipur apprised the forum that the issue with licence of Vinplus Software in designated laptop has not been resolved yet and SLDC Manipur is taking up the matter with M/s L&T. PGCIL also agreed to help Manipur in resolving the issue.

The sub committee noted as above.

3.5. Receipt of SEM data from 132 kV Budhjungnagar, 132 kV Ambassa, 132 kV Dharmanagar, 132 kV PK Bari & 132 kV SM Nagar (TSECL) Substations:

As per 175th OCCM dated 18th Feb 2021 agenda D.12, Indigrid and Powergrid NERTS were given responsibility to collect and send SEM data on weekly basis for Tripura owned substations viz 132kV Ambassa S/s,132kV Budhjungnagar S/s, 132 kV PK Bari S/s and 132 kV SM Nagar S/s for the interim period, due to shortage of DCDs. The relevant extracts are furnished below

Quote:

"The forum noted that due to the existing shortage of DCDs, the same cannot be provided to Tripura for some time for new locations. This creates difficulty in getting SEM data from Budhjangnagar, Ambasa, PK Bari and SM Nagar. The Matter was discussed and it was decided that during the interim period

Powergrid NERTS will provide readings from PK Bari and SM Nagar of Tripura and Sterlite will provide readings from Budhjangnagar and Ambassa of Tripura."

Unquote

As per IEGC 2023 Clause 49(12)(e) entity shall be responsible to send weekly meter data to RLDC. The relevant extracts are furnished below

Quote:

"Entities in whose premises the IEMs are installed shall be responsible for (i) monitoring the healthiness of the CT and PT inputs to the meters, (ii) taking weekly meter readings for the seven day period ending on the preceding Sunday 2400 hrs and transmitting them to the RLDC by Tuesday noon, in case such readings have not been transmitted through automatic remote meter reading (AMR) facility (iii) monitoring and ensuring that the time drift of IEM is within the limits as specified in CEA Metering Regulations 2006 and (iv) promptly intimating the changes in CT and PT ratio to RLDC."

Unquote

In 221st OCCM, Tripura confirmed the receipt of 3 nos. of DCDs and that the same have been dispatched to Dharmanagar, Ambassa and SM Nagar(State) S/Ss. Tripura further intimated that the remaining works shall be completed by 21/12/2024 and the meters shall be reporting successfully from 23/12/24.

However, data is yet to be received from concerned utilities on weekly basis.

Deliberation of the sub committee

The forum advised Tripura to resolve the issue by next OCC meeting.

The sub committee noted as above.

3.6. Issue with SEM data from Udaipur S/S:

Time Drift issue was observed in Udaipur meter (NP-8470-A). Replacement of said meter was approved in 213th OCC forum. As per deliberation in 221st OCCM, Tripura appraised the forum that the replacement of the meter will be done by 21/12/2024. However, NERLDC is yet to receive data of replaced Udaipur Meter for Palatana T/L. Moreover, as per

Deliberation of the sub committee

The forum advised Tripura to resolve the issue by next OCC meeting.

The sub committee noted as above.

3.7. Metering Philosophy used in NERLDC for energy accounting:

As per IEGC Regulation 49. (12). (h), RLDCs shall forward IEM readings to the concerned RPC on a weekly basis by each Thursday for the preceding week. It is noted that on certain occasions, all the Main SEM data in the region are not available within the prescribed timelines due to any number of reasons (DCD failure, Internet issue, Local PC software/Hardware issue etc.). In such cases, it is required to substitute the Main meter data with Check/Standby Meter data. In absence of Check/Standby meters, Net Bus summation is used to substitute Main meter. The procedure used by NERLDC for the same is hereby annexed (**Annexure-C 3.7**).

Deliberation of the sub committee

The forum agreed in principle to the draft metering philosophy prepared by NERLDC until a unified approach is adopted by NPC. The forum also invited comments from all stakeholders and referred the draft metering philosophy to commercial forum for further deliberation.

The sub committee noted as above.

4. PART-D: ITEMS FOR UPDATE/FOLLOW-UP

4.1 Status of ADMS:

Status for Automatic Demand Management Scheme in 7 States of NER.

Name of the utility	SAT Completion	DoCO
DoP Ar.Pradesh	27-01-2021	Enabled & in-operation
AEGCL/APDCL	07-12-2020	Enabled & in-operation
MSPCL	24-11-2020	Enabled & in-operation
MePTCL/MePDCL	31-08-2020	Enabled & in-operation
P&ED Mizoram	22-02-2021	Enabled & in-operation
DoP Nagaland	17-11-2020	Enabled & in-operation
TSECL	24-12-2020	Enabled for two substations while yet to be enabled for other three substations

In 214th OCCM, TSECL updated that LoA for ADMS installation at Takerjhala, Bishalgarh, Khyarpur and Manu has been issued in Feb'24 and work to be completed by June'24

In 217th OCCM, TSECL updated that at Kyarpur and Manu, inspection has been done and LoA will be issued after receipt of the price offer this month.

In 218th OCCM they have started to identify load point that can be relieved in case of operation of ADMS for SM Nagar, and Bishalgarh.

Status of ADMS in Tripura

i. Feeders where ADMS is installed

Sl. No.	Name of Feeder	Area Under The Feeder	Load in MW
1	BISHALGARH 33-11 KV	STATION, LALSINGH MURA, DURGA NAGAR, KADAMTALI, BAZAR	4.9
2	TAKARJALA 33-11 KV	FACTORY GOLAGHAT, TAKARJALA, JAMPUIJALA, GABORDI, MOHARAM GOLAGHATI	4.4
2	S M NAGAR 132-33-11 KV	KANCHANMALA, ANANDA NAGAR, STATION, RANIKHAMAR, CHOWMUHONI BAZAR	3.8

ii. Expected load to be relieved when ADMS operates

Sl. No.	Name of Feeder	Area Under the Feeder	Load in MW
1	BISHALGARH 33-11 KV	LALSINGH MURA, DURGA NAGAR, KADAMTALI	3.2
2	TAKARJALA 33-11 KV	FACTORY GOLAGHAT, TAKARJALA, GABORDI, MOHARAM GOLAGHATI	3
2	S M NAGAR 132-33-11 KV	KANCHANMALA, ANANDA NAGAR, RANIKHAMAR	2.5

iii. Setting of each feeder

Overdraw: 40MW or 20% of schedule when frequency < 49.85 Hz

Note: 1. ADMS not operated in last 6-7 months (Jan'24 – August'24).

2. Shifting work is completed for Bishalgarh and Takarjala Sub-station.

In 219th OCC, TSECL apprised the forum that the shifting works are still underway and is expected to be completed in 3 months time.

Members may update the latest status via email to NERPC.

4.2 Implementation/Review of Islanding schemes of NER:

As per Clause 10 of the Central Electricity Authority (Grid Standards), Regulations, 2010: "Islanding Schemes- (1) The Regional Power Committees shall prepare Islanding schemes for separation of systems with a view to save healthy system from total collapse in case of grid disturbance. (2) The Entities shall ensure proper implementation of the Islanding Schemes". In this regard the Islanding schemes which are being planned/have been implemented in NER are mentioned below, along with the updates from 218th OCCM.

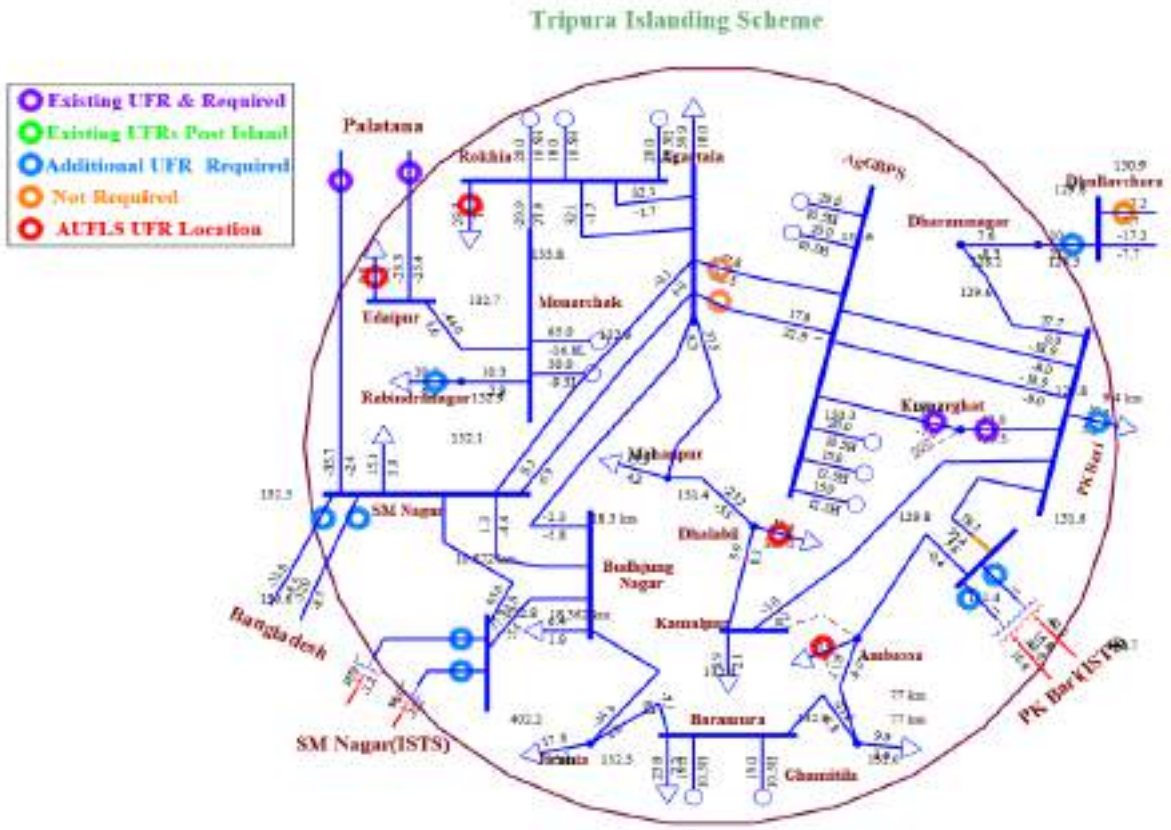
A. Guwahati Islanding Scheme

Assam updated that modified DPR has been sent to PSDF.

B. Tripura/Agartala Islanding Scheme

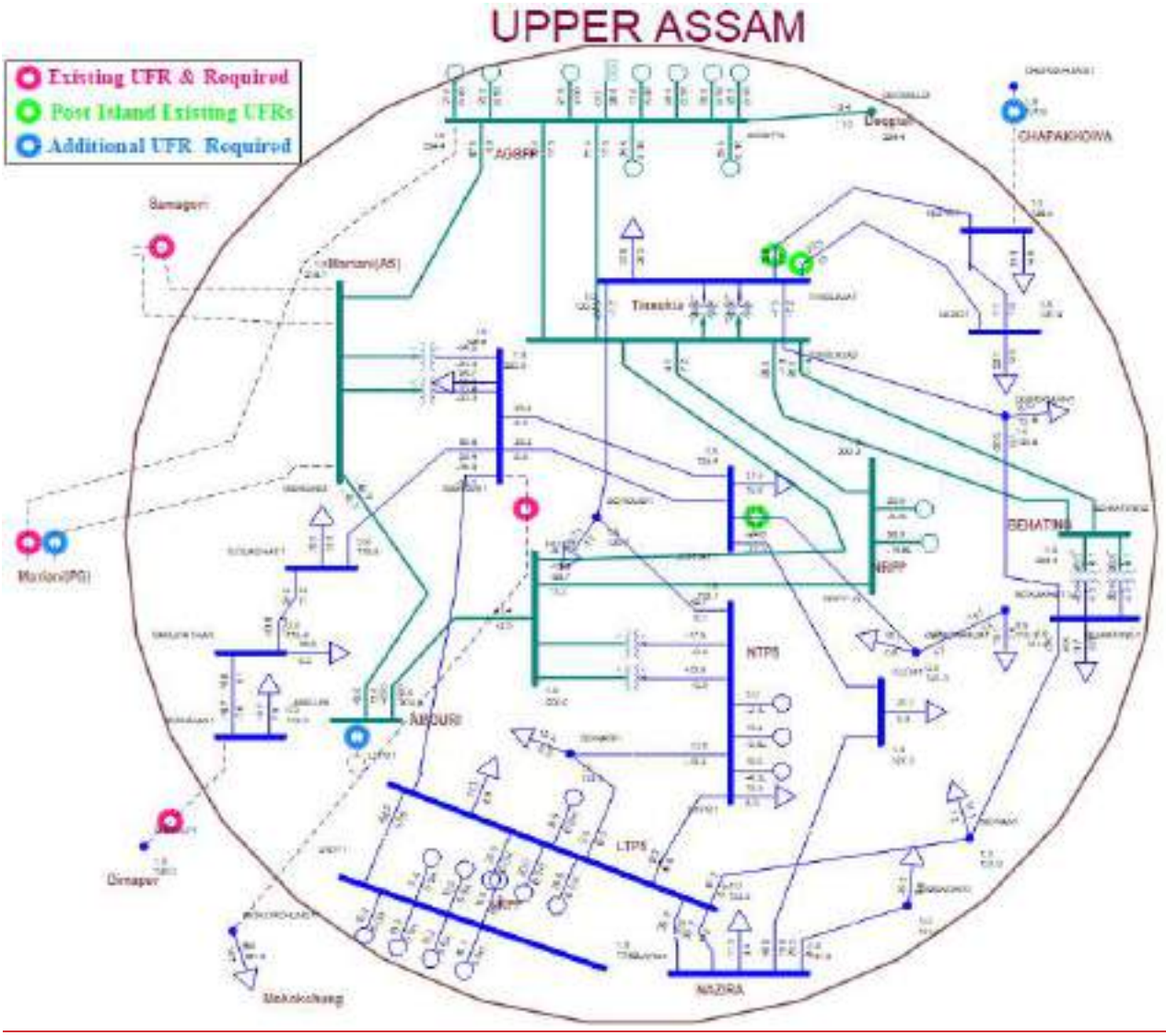
NERLDC informed forum that required format was shared with Tripura.

NERLDC have also apprised forum that generation data form Tripura along with load data yet to be received from Tripura. Forum requested Tripura to provide all the required data at earliest.



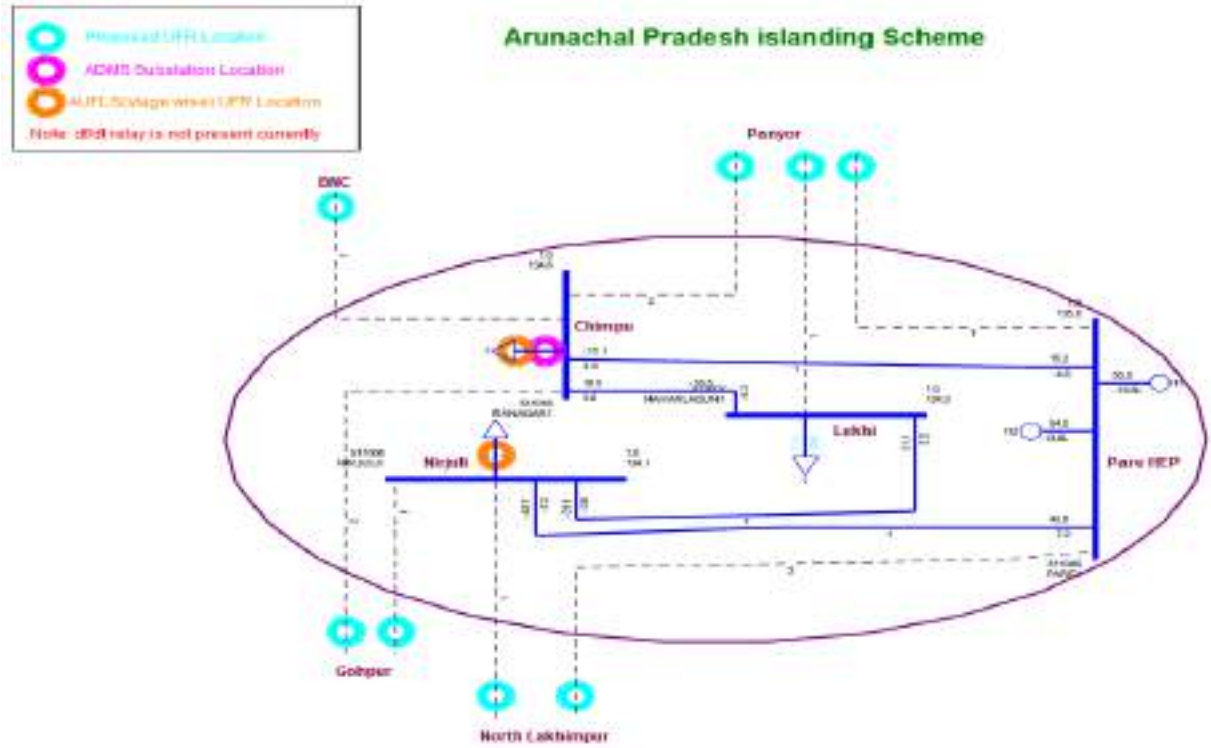
C. Upper Assam Islanding Scheme

Assam informed forum that NTPS was a very old power station and they did not have the data as required for updation for islanding scheme. For LTPS, regarding change in frequency settings, communication has been done with BHEL and we are awaiting response from their end. For LRPP, Stage I frequency setting is alarm and Stage II frequency setting is Trip. Forum asked NEEPCO and AEGCL to make the necessary changes and update their settings in consultation with their respective OEMs.



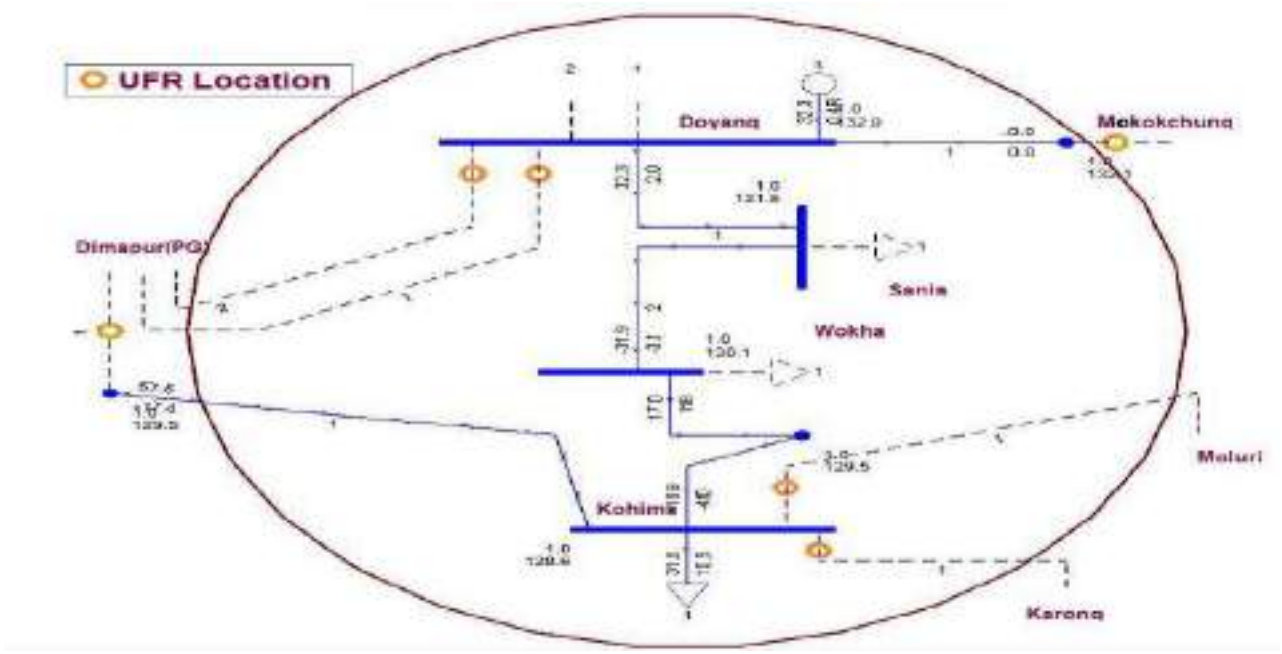
D. Itanagar Islanding Scheme

Arunachal Pradesh informed that the required load data had been submitted to NERLDC.



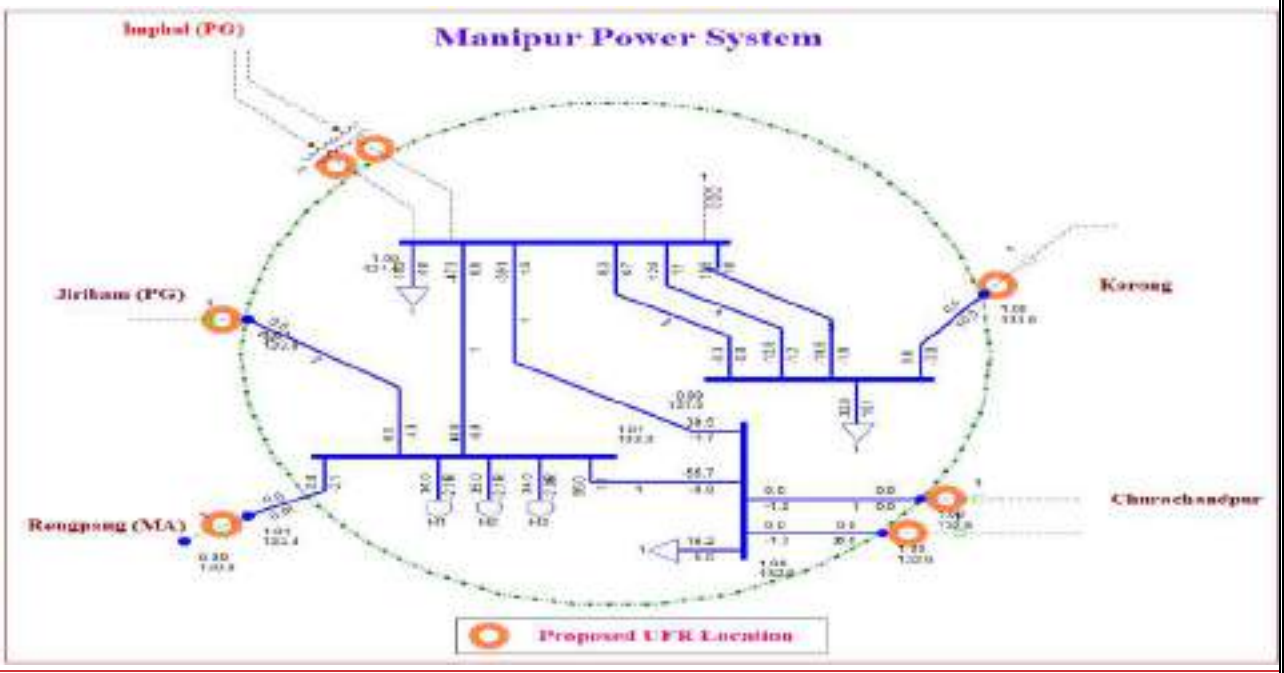
E. Kohima Islanding scheme

DoP Nagaland updated that the DPR preparation was underway, as they have not received budgetary offer from vendor. MS, NERPC urged DoP Nagaland to take the budgetary offer from a vendor at the earliest so that the same may be got approved in the upcoming RPC meeting.



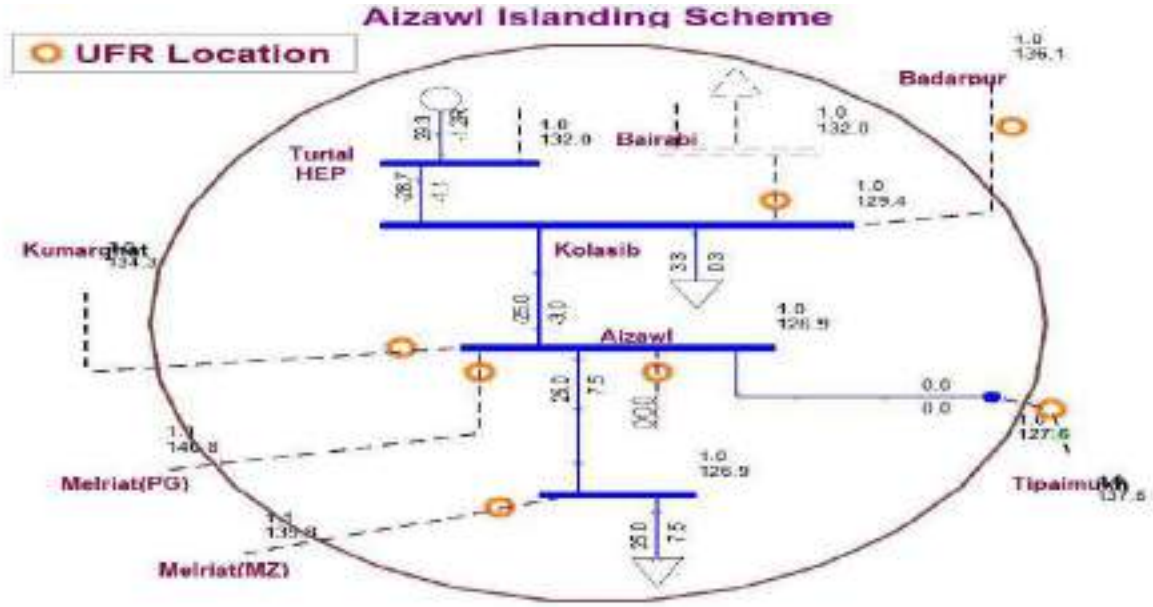
F. Imphal Islanding scheme

Manipur informed forum that due to law-and-order situation AUFLS mapping was pending from sub-station's end and assured to provide the required data shortly. NERLDC stated that data from NHPC was yet to be received. NHPC stated that they would provide required data shortly.



G. Aizawl Islanding scheme

Mizoram informed that the required load data had been provided to NERLDC. The forum stated that a special meeting would be held shortly to finalize the scheme.



H. Meghalaya/Shillong Islanding Scheme

NERLDC requested Meghalaya utilities to provide the load and generation data at the earliest as format for data had already been shared with Meghalaya.

MS, NERPC has urged all the stakeholder to expedite the process so that this Islanding Scheme can be approved in next RPC meeting. Schematic diagram is under process.

The following deliberations followed in 220th OCCM:

Tripura/Agartala Islanding Scheme:

NERLDC apprised the forum that all the data has been received from Tripura. Dynamic study has been completed and Load-Generation study is under way.

Upper Assam Islanding Scheme:

NERLDC apprised the forum that dynamic study as well as Load-Generation study has been completed. However, NEEPCO is required to submit the UFR settings for 2 nos. of units of AGBPP. NEEPCO agreed to

submit the information at the earliest. Assam may prepare the DPR post submission of data by NEEPCO.

Itanagar Islanding Scheme:

NERLDC apprised the forum that all necessary study has been completed. Arunachal Pradesh may prepare the DPR for Itanagar Islanding Scheme.

Kohima Islanding Scheme:

NERLDC apprised the forum that dynamic data has not been received from Doyang completely. As such dynamic study is pending. NEEPCO agreed to share the data at the earliest to NERLDC.

Imphal Islanding Scheme:

NERLDC apprised the forum that data from NHPC Loktak has been received. Manipur has identified the 33 kV feeders but are yet to share load-generation data for the identified feeders. Dynamic study is going on.

Aizawl Islanding Scheme:

NERLDC apprised the forum that dynamic data has not been received from Turial. NEEPCO agreed to share the data at the earliest. Mizoram also intimated the forum that exploration for a change in feeders is under way as per priority. Load-generation data for such feeders shall have to be shared with NERLDC.

Shillong Islanding Scheme:

Meghalaya apprised the forum that the old machine at Umium stage III is being replaced with a new machine. As such, NERLDC requested Meghalaya to share dynamic data for Umium Stage I, Stage II and Stage IV and also for New Umtru.

Members may update the latest status via email to NERPC.

4.3 Automatic Under Frequency Load shedding (AUFLS) scheme of NER:

Status as updated in 219th OCCM

Name of the State/utility	Installation of UFRs	Status of mapping
Ar. Pradesh	Completed	DoP Arunachal Pradesh stated that mapping of feeder at Lekhi SS (Industry feeder, stage 1) will be carried out by end of Oct'24. For rest of the feeders and substations, coordination with GE is underway and will be taken up gradually.
Assam	Completed	Completed
Manipur	UFR installed but not enabled as system integration work is underway, to be completed by Aug'24.	Mapping is pending from substations end, which is being hampered due to Law & Order situation in the State. It is in the last stage of integration (90%) and will be completed by Aug'24.
Meghalaya	Completed	Completed
Mizoram	Completed	Coordination with GE is underway for mapping, completion by Sep'24.
Nagaland	Completed	Completed
Tripura	Completed	All mapping done except for Ambassa SS due to communication link issue. To be done by next NeTEST meeting.

Forum noted the status updated as provided in the above table. NERPC informed that AUFLS quantum has been revised for NER for the FY 2024-25 and presented the revised quantum for load shedding to the forum, which is provided below:–

UFR load shedding for NER States for the FY 2024-25

State	stg I (MW)	Stg II	Stg III	Stg IV
Ar. Pradesh	8.659594937	10.39151392	12.12343291	12.12343291
Assam	112.3419494	134.8103392	157.2787291	157.2787291
Manipur	11.54612658	13.8553519	16.16457722	16.16457722
Meghalaya	18.85556962	22.62668354	26.39779747	26.39779747
Mizoram	7.542227848	9.050673418	10.55911899	10.55911899
Nagaland	8.100911392	9.721093671	11.34127595	11.34127595
Tripura	16.85362025	20.2243443	23.59506835	23.59506835
Total	183.9	220.68	257.46	257.46

For FY 2023-24 (already under operation)

State	stg I (MW)	Stg II	Stg III	Stg IV
Ar. Pradesh	10	14	12	10
Assam	90	125	113	115
Manipur	10	10	10	10
Meghalaya	25	25	25	25
Mizoram	5	5	5	5
Nagaland	10	10	10	10
Tripura	15	12.2	21.2	30
Total	165	201	196	205

The forum requested the States to implement the revised load shedding quantum within two months.

As per IEGC provisions, Tripura is requested to provide the MW and CB status data for further mapping activities.

The forum requested RLDC to prepare a feeder-wise report (MW and CB status) for those States that have completed the mapping and present it at the next OCC meeting

The following deliberations followed in 220th OCCM:

DoP, AP apprised the forum that new loads have been identified but new UFR scheme has not been implemented yet. DoP,AP further apprised the forum that the new UFR scheme shall be implemented by March-2025.

Assam apprised the forum that revised load quantum shall be implemented in 10-12 days.

Manipur apprised the forum that the new UFR scheme shall be implemented in three months' time.

Meghalaya updated that the additional load identification (for stg III and IV) is underway.

Mizoram apprised the forum that new loads have been identified and UFR will be implemented on these feeders shortly

Tripura apprised the forum that new loads have been identified for implementation of UFR. He further informed that Mapping at Ambassa is still pending due to communication link issue.

In 221st OCC meeting, Arunachal Pradesh, Assam and Meghalaya apprised the forum that the new UFR load shedding scheme shall be implemented by January-2025.

Deliberation of the sub committee

The matter already deliberated at agenda item Number 2.9.

The sub committee noted as above.

4.4 Monthly Review of LGBR

PARTICULARS (Peak Demand in MW as per LGBR vs Actual)	Aug-24 (LGBR)	Aug-24 (Actual)	Sep-24 (LGBR)	Sep-24 (Actual)	Oct-24 (LGBR)	Oct-24 (Actual)
Arunachal Pradesh	170.24	186	174.39	194	180.84	170
Assam	2933.00	2524	2823.00	2812	2756.00	2262
Manipur	225.00	213	223.60	235	223.40	226
Meghalaya	385.00	359	390.00	317	380.00	354
Mizoram	137.00	130	147.00	148	145.00	136
Nagaland	191.60	188	191.20	184	187.00	176
Tripura (exc. Bangladesh)	368.06	359	379.65	376	354.00	333
NER DEMAND (exc. Bangladesh)	3851.10	3764	4045.80	3936	3759.80	3482

PARTICULARS (Energy Requirement in MU as per LGBR vs Actual)	Aug-24 (LGBR)	Aug-24 (Actual)	Sep-24 (LGBR)	Sep-24 (Actual)	Oct-24 (LGBR)	Oct-24 (Actual)
Arunachal Pradesh	177.87	98.627	148.91	92.642	111.04	85.779
Assam	1647.00	1379.249	1476.00	1399.326	1156.00	1071.669
Manipur	92.00	74.102	89.00	76.968	97.00	80.690
Meghalaya	218.32	172.613	219.00	136.361	220.00	154.880
Mizoram	78.76	54.084	79.80	56.046	78.76	56.529
Nagaland	106.00	80.122	96.30	84.694	89.00	77.279
Tripura (excl. Bangladesh)	200.40	209.847	176.72	190.18	174.38	220.047
NER DEMAND (exc. Bangladesh)	2520.35	2068.642	2285.73	2036.217	1926.18	1747.493

LGBR projection for November'24, December'24 and January'25

PARTICULARS (Peak Demand in MW as per LGBR)	Nov-24 (MW)	Nov-24 (MU)	Dec-24 (MW)	Dec-24 (MU)	Jan-25 (MW)	Jan-25 (MU)
Arunachal Pradesh	185.00	92.32	184.70	108.85	187.37	111.21
Assam	2020.00	935.75	1761.00	923.00	1761.00	951.00
Manipur	252.73	98.00	283.65	118.00	275.31	129.00
Meghalaya	425.00	234.00	450.00	253.00	465.00	259.00
Mizoram	157.00	78.77	166.00	82.91	184.00	86.02
Nagaland	190.00	82.00	190.00	86.00	190.00	82.00
Tripura (exc. Bangladesh)	321.56	116.63	279.53	99.17	282.00	110.60
NER DEMAND (exc. Bangladesh)	3324.98	1637.48	3250.16	1670.92	3247.18	1728.83

Deliberation of the sub committee

The sub committee noted the LGBR projections as detailed above.

The sub committee noted as above.

4.5 Long Outage of NER State Generator and transmission lines:

The following NER State generators and Transmission lines are under long outage since long time. Considering the increasing demand trend and reliable power supply in the Region, respective utilities are requested to take necessary action to restore the mentioned units as follows:

Unit Details	Outage time	Reason	Expected Date
Baramura Unit 4	11:15 Hrs of 08-02-2023	Excitation problem.	
NTPS Unit 2	15:04 Hrs of 02-09-2023	Low Gas Pressure.	
Baramura Unit 5	20:17 Hrs of 26-03-2024	Gas fuel hydrolic trip low.	

Transmission Line	Outage time	Reason	Expected Date
400kV Imphal - Thoubal I	13:32 Hrs of 18-10-2021	Tripped on DP, ROW issue. Expected revival not furnished	
132kV Kohima - Meluri	10:05 Hrs of 27-09-2023	S/D taken by Kohima transmission div for dismantling of Tower no. AP 130	
132 kV Jiribam-Rengpang	18:18 Hrs of 17-11-2023	Tripped on Earth fault	

In 219th OCCM, utilities updated as under: -

Generating units-

Sl. No	Unit details	Utility	Update on revival
1	Baramura Unit 4	TPGCL (Tripura)	Out due to shortage of gas
3	Baramura Unit 5	TPGCL	Out due to shortage of gas
4	LTPS Unit 7	APGCL	OEM parts ordered. Expected by Feb-25

Transmission lines-

Sl. No	Element	utility	Update on revival
1	400 Imphal-Thoubal ckt I &II	MSPCL	Ckt I - ROW, Litigation pending in court. Ckt II is already charged on 14th September 2024.

2	132kV Kohima-Meluri	DoP Nagaland	NHIDLC payment pending. 3 months after the payment
3	132kV Jiribam-Rengapng	MSPCL	Line partially charged. i.e. sectionalize charged upto Nongba from the Rengpang end (a distance of 5 km). The section from Nongba to Jiribam (Manipur) is yet to be charged which is around 45 km. Full charging will take time as no access to the affected area. Expected by December-24.

Deliberation of the sub committee

Members will update the latest status via e-mail to NERPC.

The sub committee noted as above.

4.6 Methodology for calculation of FRO of Intra-State entities:

Methodologies to assign FRO to its intra-state entities. These are given below:

Method-I: FRO allotted to a State control area to be distributed only among the intra-State generating stations giving due consideration to generation within the State control area and details as given in Table 4 under sub-clause(g) of Reg. 30 Clause (10) of CERC (IEGC) Regulations, 2023. The FRO in MW/Hz shall be calculated as:

$$\textbf{FRO} = \left(\frac{\textit{Average Generation of individual generating station}}{\textit{Sum of Avg. Generation of all considered generating stations}}\right) * \textit{FRO alloted to the state control area}$$

Method-II: FRO allotted to a State control area to be distributed among the

intra-state generating stations and load, giving due consideration to generation and load within the State control area and details as given in Table 4 under sub-clause(g) of Reg. 30 Clause (10) of CERC (IEGC) Regulations, 2023. The FRO in MW/Hz shall be calculated as**:**

FRO =

$$\left(\frac{\textit{Average Generation of individual generating station}}{\textit{Sum of Avg. Generation of all considered generating stations+ Average Demand of State Control Area}}\right) *$$

FRO alloted to the state control area

Method-III: FRO alloted to a State control area to be distributed among the intra-state generating stations and load giving due consideration to generation within the State control area and details as given in Table 4 under sub-clause(g) of Reg. 30 Clause (10) of CERC (IEGC) Regulations, 2023. The demand response to be considered equal to the maximum 4% of Average Demand per Hz

FRO =

$$\left(\frac{\textit{Average Generation of individual generating station}}{\textit{Sum of Avg. Generation of all considered generating stations}-\textit{Demand Response}(4\%\ \textit{of Avg.Demand per Hz}}\right) *$$

FRO alloted to the state control area

Method –IV: FRO alloted to a State control area to be distributed only among the intra-State generating stations giving due consideration to generation and load within each control area across the All-India grid and details as given in Table 4 under sub-clause(g) of Reg. 30 Clause (10) of CERC (IEGC) Regulations, 2023. The FRO in MW/Hz shall be calculated as

FRO = $\left(\frac{\textit{Average Generation of individual generating station}}{\textit{Sum of Avg. Generation and Avg.Demand of all control areas}}\right) *$

FRO alloted to the state control area

As per 220th OCCM deliberation, NERLDC has prepared case studies for all the above-mentioned methods. The case studies shall be shared with all the states. The forum requested the states to go through the case studies and finalize the method for calculation of FRO for intra-state entities.

Members will update the status via e-mail to NERPC.

5. PART-E: ITEMS FOR STATUS

5.1 Implementation of projects funded from PSDF:

The status as informed in 219thOCCM:

State	R&U scheme	ADMS	Capacitor Installation	SAMAST**	Line Differential Protection
Ar. Pradesh	Package-I (Diagnostic tools) Complete in all respects. P-II (for PLCC & communication) Supply completed. Erection WIP. 50% requisition submitted. P-III (Substation equipment) Agreement signed and 10% requisition submitted. Total 90% requisition by Apr'22. Completion by Dec'22. (Approval from TSA and Account opening in 3 months)	Project completed in all respects.	-	30% requisition submitted. Amount not received in the TSA account.	By Aug.'24
Nagaland	Completed in all respects.	Work completed in all respects. UC submitted	-	30% requisition submitted	Lines identified. Under DPR preparation stage.

Mizoram	Final 10% disbursed. UC to be submitted.	Work completed in all respects. Remaining part of final 10% to be disbursed ASAP.	To reply to TESG queries.	30% requisition submitted.	Revised DPR including both 132kV Aizawl-Luangmual and 132kV Khamzawl-Khawiva to be submitted.
Manipur	Package-II: completed Package-I: all stations complete except Ningthoukhong. By May'22.	Work completed in all respects. UC submitted in Oct'21.	WIP.	10% disbursed for IT portion, no disbursement for Meter, AMR portion. 20% disbursement for IT portion after completion of 3rd milestone. 30% to be disbursed for Meter, AMR portion	Revised DPR for LDP of 132kV Imphal-Yurembam-III to be submitted by June'22.
	33kV System Integration with SLDC	In tendering stage			
	Reliable Communications for grid connectivity	In tendering stage			
Tripura	Completed. Final UC submitted on 04th May'22.	Final 10% requisition submitted.	Not relevant in present scenario with commissio	10% successfully disbursed. 20% fund reversed back from vendor	For 132kv 79Tilla-Budhjungnagar line and for Rokhia link

			ning of ISTS lines. Issue dropped	account. Will be resolved soon.	LDP at own cost. Tendering undergoing . DPR preparation for rest of the lines
Assam	Work completed except CRP, SAS work in 8stations which have been retendered and awarded to M/s SIEMENS. Completion by Dec'22	Project completed in all respects.	-	30% funds yet to be fully disbursed. 60% requisition sent.	Lines identified. DPR submitted.
Meghalaya	MePTCL – completed in all respects. MePGCL – Completed in all respects.	Project completed in all respects.	-	90% works completed. Communication pending.	All works except OPGW done

Members will update the latest status via e-mail to NERPC.

5.2 Status update of important grid elements under prolonged outage impacting system operation:

Sl. No	Element	Owner	Status up to the 218thOCCM	Latest Status
1	132kV Mariani – Mokokchung (*out since April'2008*)	AEGCL	DPR sent to PSDF	
2	132kV Roing-Pasighat (*charged through ERS tower*	NERTS	September'24	
3	132kV Srikona – Panchgram	AEGCL	task will be completed by Sept.'24	

4	400kV Imphal – Thoubal-I and 315MVA 400/132kV ICT at Thoubal	MSPCL	RoW, litigation pending in court.	
5	63MVAR Bus Reactor at Byrnihat to be replaced with 80MVAR Reactor	MePTCL	Installed. Relay system pending. To be completed shortly.	
6	Permanent restoration of Tower loc. No. 4 of 132kV Jiribam-Haflong line	NERTS	line was restored on ERS on 8th July. For permanent restoration survey is underway and the work will tentatively be completed within six months.	

Members will update the latest status via e-mail to NERPC.

5.3 Status of commissioning for upcoming projects

Sl. No	**Name of the element**	**Utility**	**Status up to the 218th OCCM**	**Latest Status**
1	132kV Monarchak-Surjamaninagar	TSECL	20 km stringing left, 2 tower foundation pending and pending 8 nos. tower erection. Tentative completion by Sept.'24	
2	PLCC for 132kV Loktak-Ningthoukong and 132kV Loktak-Rengpang(existing lines)	MSPCL	Sept.'24. Work hampered due to Law & order situation in Manipur	
3	220kV Samaguri – Mariani-I	AEGCL	Survey completed. Cost estimate being prepared.	
4	220kV AGBPP –Namsai D/C	TBCB	Oct'25, subject to RoW issue	
5	Upgradation of 132kV Surjamaninagar-Surjamaninagar(ISTS),	TSECL	Resolution adopted in 26th RPC. Sent to MoP, GoI	

	132kV Bodhjungnagar-SMNagar, 132kV P.K.Bari-Ambassa, 132kV P.K. Bari-P.K.Bari(ISTS)			
6	LILO of 132kV Leshka-Khliehriat-I at Mynkre and Mynkre SS and 33kV downstream at Mynkre.	NERPSIP	LILO line charged. SS by Sept.'24	
7	220kV Rangia – Amingaon D/C and 220/132kV 2x160MVA Amingaon S/S	NERPSIP	SS charged; Line idle charged. Load charging to be done shortly	
8	132kV Rengpang-Tamenglong and 132/33kV 4x6.67MVA at Tamenglong at Manipur	NERPSIP	Works hampered due to present law and order condition.	.
9	132/33kV West Phaileng S/S at Mizoram	NERPSIP	Ready for charging.	
10	132/33kV 2x12.5MVA Marpara S/S at Mizoram	NERPSIP	20 km stringing left, 2 tower foundation pending and pending 8 nos. tower erection. Tentative completion by August'24	
11	132/33kV 2x12.5MVA Lungsen S/S at Mizoram	NERPSIP	Sept.'24. Work hampered due to Law & order situation in Manipur	
12	132kV Chawngte – S.Bungtlang S/S at Mizoram	NERPSIP	Ready for charging.	.
13	132kV W.Phaileng-Marpara S/C at Mizoram	NERPSIP	Sept.'24, works hampered due to delay in tree cutting in forest area	

14	220kV Zhadima – Mokokchung at Nagaland	NERPSIP	Ckt 1 charged in Mar'23. Other ckt waiting for finalization of MoU	
15	132kV Wokha-Zunheboto – Mokokchung at Nagaland	NERPSIP	WokhaZunheboto section has been completed. Balance section by By Sept.'24	
16	132kV Tuengsang – Longleng at Nagaland	NERPSIP	Tuensang SS upgradation package has been awarded. August'24	
17	132/33kV Amarpur S/S at Tripura	NERPSIP	Sept.'24	
18	132/33kV Manu(new) S/S at Tripura	NERPSIP	Sept.'24	
19	132kV Dharmanagar-Kailashor	NERPSIP	Sept.'24	
20	132kV Ziro-Yazali and 132/33kV Yazali S/S	POWERGRID-Comprehensive	Sept.'24	
25	132kV Chimpu – Holongi and 132/33kV Holongi S/S	POWERGRID - Comprehensive	Clearance form AAI for SS and line is pending	
26	Unit 1 and 2 of Lower Subansiri HEP	NHPC	Sept.'24	
27	400kV Lower Subansiri-BNC line2	PGCIL	Line idle charged	
28	Gantry for LS-BNC line 2	NHPC	Sept.'24	
29	Bus reactor at Lower Subhansisri	NHPC	Sept.'24	
30	Conversion of MT to DM at (i)132kV Khliehriat, (ii)132kV		Imphal-depends upon the law and order in Manipur. No contracts coming up.	

	Badarpur, (iv) 132kV Imphal	NERTS	Badarpur and Khleihriat-order yet to receive	
31	220kV New Shillong-NangalBibra(ISTS 220/132kV) TL	MEPTCL	As updated by PGCIL, survey completed and report also completed	
32	220kV Bongaigaon-Nangalbibra (ISTS) DC and 220/132kV Nagngalbibra (ISTS) substation	Sterlite	Tentative completion by Sept.'24.	
33	HTLS reconductoring of 132kV Hailakandi-Dullavcherra	AEGCL	During 23rd TCC RPC meeting, the forum recommended for the upgradation and preparation of DPR by AEGCL. AEGCL is already planning for reconductoring of the lines. However, Funding source is not finalized yet.	
34	HTLS reconductoring of 132kV Panchgram-Hailakandi	AEGCL	Included in CEA 2030 Augmentation Scheme. AEGCL is already planning for reconductoring of the lines. However, Funding source is not finalized yet	.
35	HTLS reconductoring of 132kV Srikona-Pailapool	AEGCL	Included in CEA 2030 Augmentation Scheme. AEGCL is already planning for reconductoring of the lines. However, Funding source is not finalized yet.	

Members will update the latest status via e-mail to NERPC.

5.4 Status of ISTS expansion scheme in NER

A. Status of downstream 220kV or 132kV network by STUs from the various commissioned and under-construction ISTS substations in NER

Sl	ISTS S/s	State	Voltage ratio, Trans. Cap	Down- stream Voltage level (kV)	Unutilized bays	Status of ISTS bay	STU Lines for unutilized bays	Status of Lines (as updated in 219thOCCM)	
								Date of Award	Completion schedule
1	New Mariani (POWERGRID)	Assam	400/220kV, 2x500MVA	220	2	Commissioned	New Mariani (POWERGRID) – Diphu (Assam) 220kV D/c line	Plan for route survey from Diphu to New Mariani is underway. The transmission route traverses designated forest area. Survey work is completed only funding is pending. Three years from date of LoA. Completion is expected by 2028.	Plan for route survey from Diphu to New Mariani is underway. The transmission route traverses designated forest area. Survey work is completed only funding is pending. Three years from date of LoA. Completion is expected by 2028.
2	New Kohima (TBCB)	Nagaland	400/220kV, 2x500 MVA	220	2	Commissioned	New Kohima (TBCB) – New Kohima (Nagaland) 220kV D/c line	LoA Feb'2021	OPGW and PLCC work will be completed by Oct 2023. All works are being implemented by Nagaland only. Line would be charged after completion of communication link.
3	Nangalbibra (TBCB)	Meghalaya	220/132kV, 2x160MVA	132	2	Under construction (Dec'23)	Nangalbibra (ISTS) – Nangalbibra (MePTCL) 132kV D/c	LoA is under process. Fund is yet to be	within 6 months after award.

							(HTLS,800A) Line:about 5km	released from the Govt. of Meghalaya .	

B. Status of 400kV substations and other important elements being implemented by STUs in NER under intra-state schemes to be connected through ISTS

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
B	**Tripura (to be implemented by TSECL)**			
I	**Surajmaninagar (TSECL)**	400/132kV, 2x315MVA	JV formation, between PGCIL and STU by Mar'23	12 months from Date of Award
a)	LILO of both circuits of Surajmaninagar (ISTS) – Palatana 400kV D/c line atSurajmaninagar (TSECL) S/s	400kV D/c	All works except 400kV termination at Surjamaninagar(TSECL) by POWERGRID to be done. Balance works under separate contract.	LILO completed for 400kV ckt 2 (by PGCIL) without bay readiness, LILO has been charged.Total completion subjected to Sub-station readiness at Surajmaninagar

Members will update the latest status via e-mail to NERPC.

5.5 Status Review for the Items Referred from previous OCCMs:

SL No.	Item for Discussion	Status as per 219thOCCM	Latest Status
1.	Voltage and MVAR issues at 400kV Kameng S/Sn (Agenda No. C7 of 189th OCCM)	Discussion with OEM M/s BHEL is underway.	
2.	Implementation of Bus Bar Protection at 132 kV Kahilipara (AEGCL)	CT under procurement. Tentative target is Dec'24	

	Substation (C.8 of 196th OCCM)		
3.	Installation of Line differential protection in Rokhia-N.Rokhia line	CBs arrived. Tentative completion by Sept.'24	
4.	Reconductoring of Umiam stg I stg III, upgradation of CT ratio to 800/1	Approaching PSDF for funding	
5.	Restoration of tower no. 3 and 12 of LILO of Nirjuli-Dikrong Transmission line to Lekhi Substation (B.23. of 193rd OCCM)	Tower locations in spate of floods. Works stalled. Expected completion after monsoon.	
6.	Upgradation of Tuensang substation to 132kV level, under NERPSIP. (item B.15 of 203rd OCCM)	NERPSIP updated that tender has been awarded by the end of June'23 and the work will be completed in Sept.'24	
7.	Khandong Bus A, Kopili ckt 1 bay and Khliehriat ckt 1 bay at Khandong SS	NEEPCO updated that LoA has been awarded on 30th August 2023 and work to be tentatively completed by Sept.'24	
8.	400kV Bus Bar 2 at Panyor Lower HEP (Item C.9 of 216th OCCM)	NEEPCO informed that the isolator spares had arrived and for SF6 breaker, retendering was underway. He further stated that the work would be tentatively completed by May'25.	

Members will update the latest status via e-mail to NERPC.

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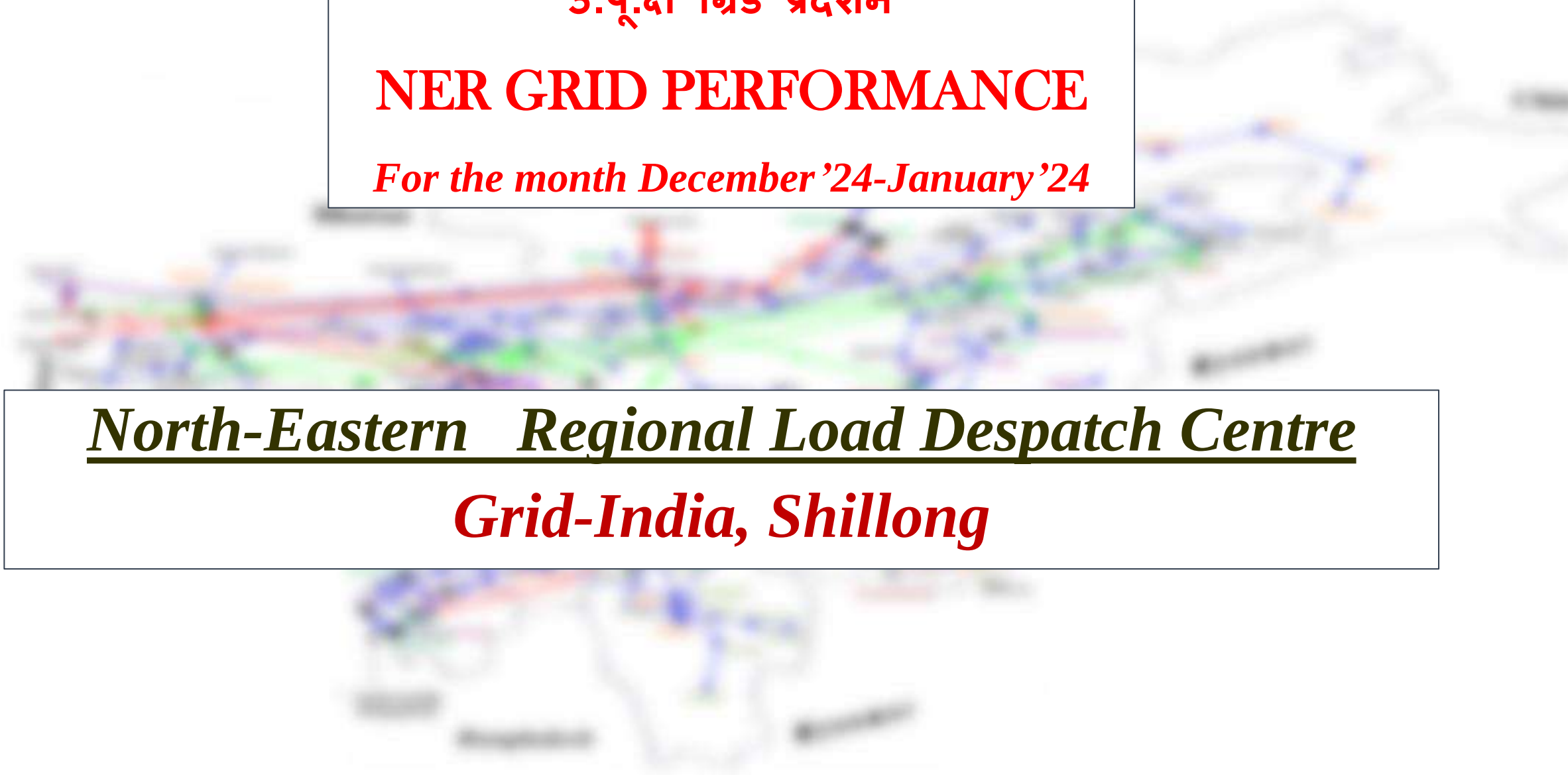
उ.पू.क्षे ग्रिड प्रदर्शन

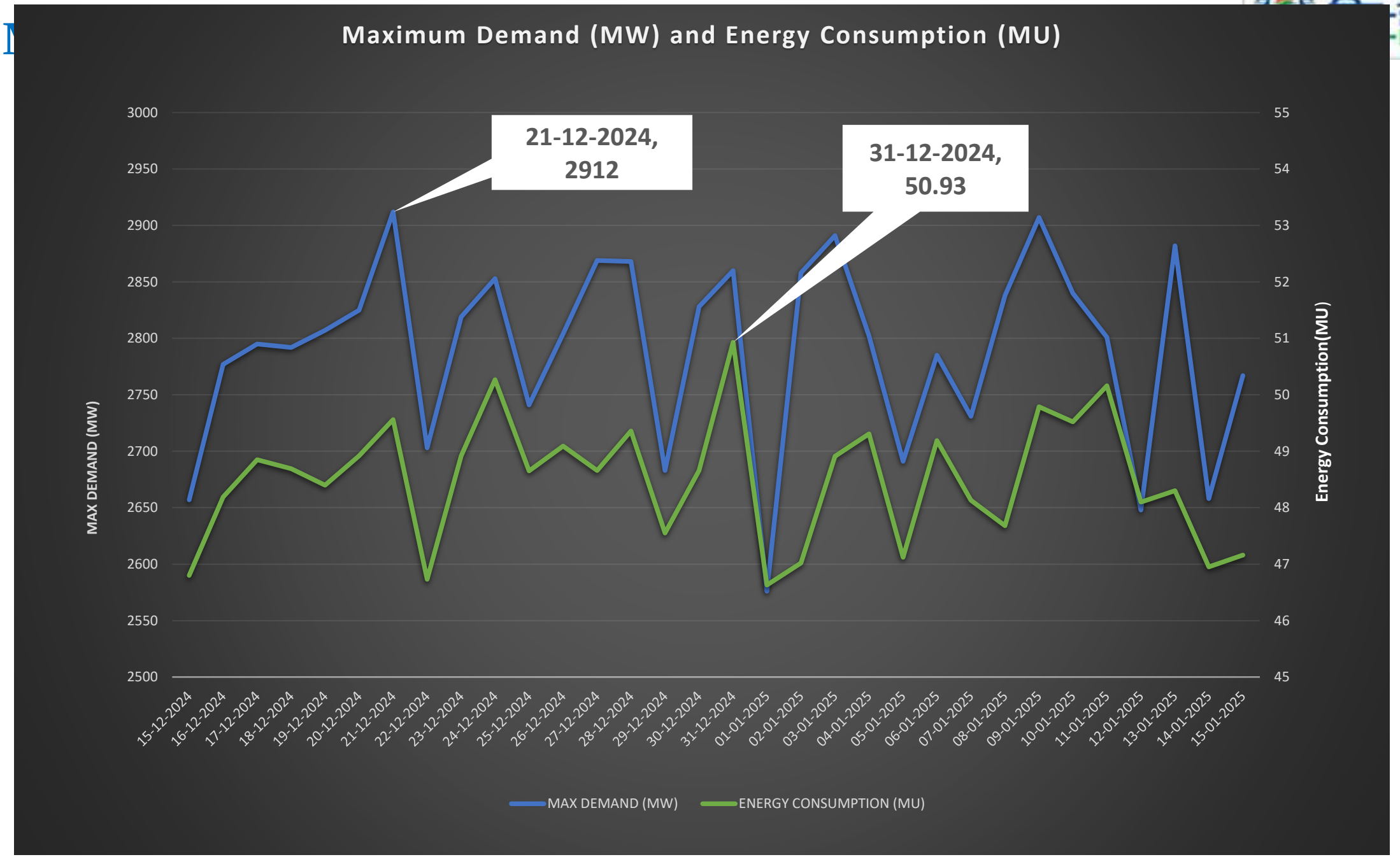
NER GRID PERFORMANCE

For the month December'24-January'24



North-Eastern Regional Load Despatch Centre

Grid-India, Shillong


Maximum Demand (MW) and Energy Consumption (MU)
21-12-2024, 2912
31-12-2024, 50.93
MAX DEMAND (MW)
Energy Consumption(MU)
3000
2950
2900
2850
2800
2750
2700
2650
2600
2550
2500
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54
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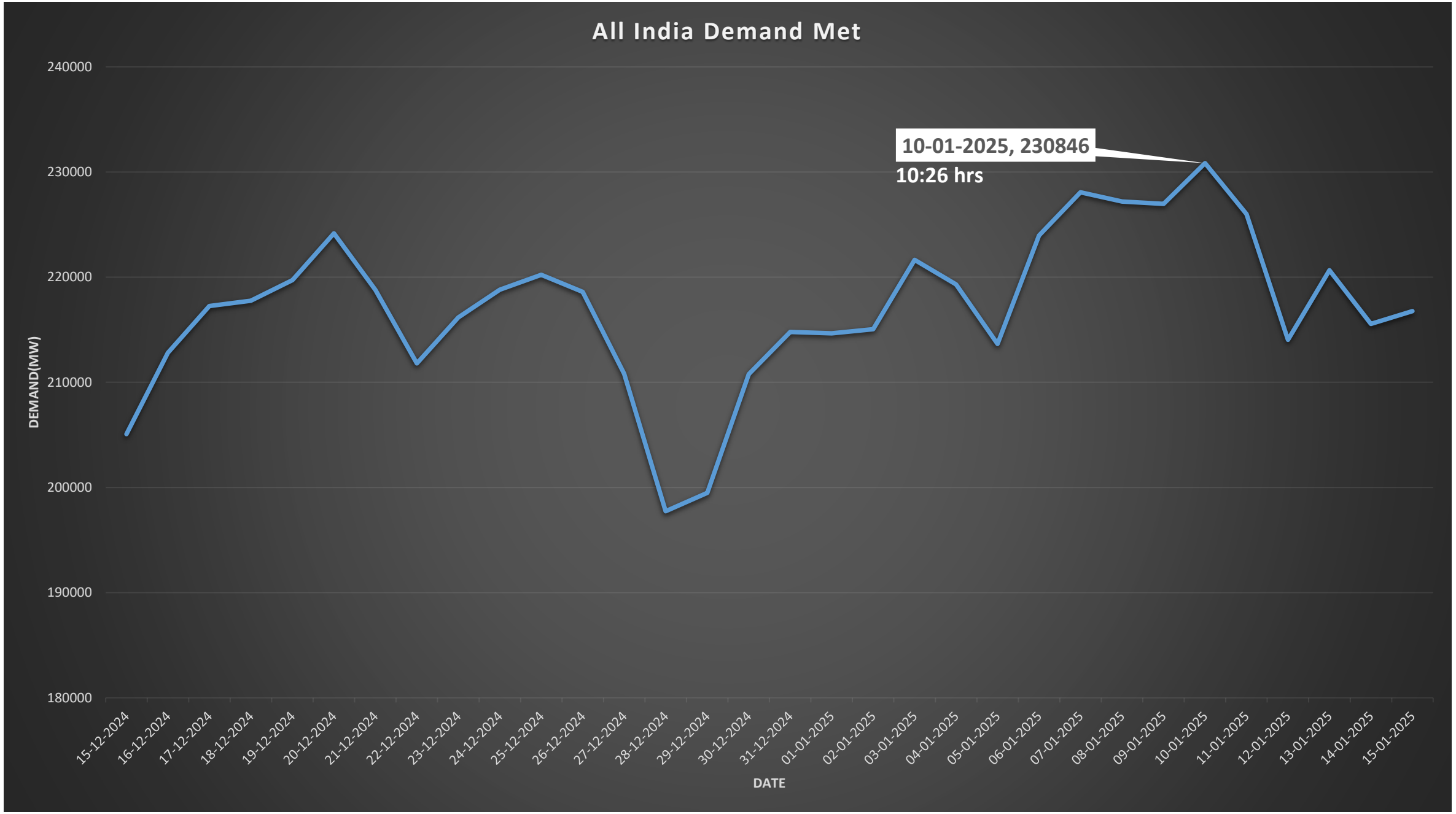
MAX DEMAND (MW)
ENERGY CONSUMPTION (MU)


All India Demand Met
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DEMAND(MW)
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210000
200000
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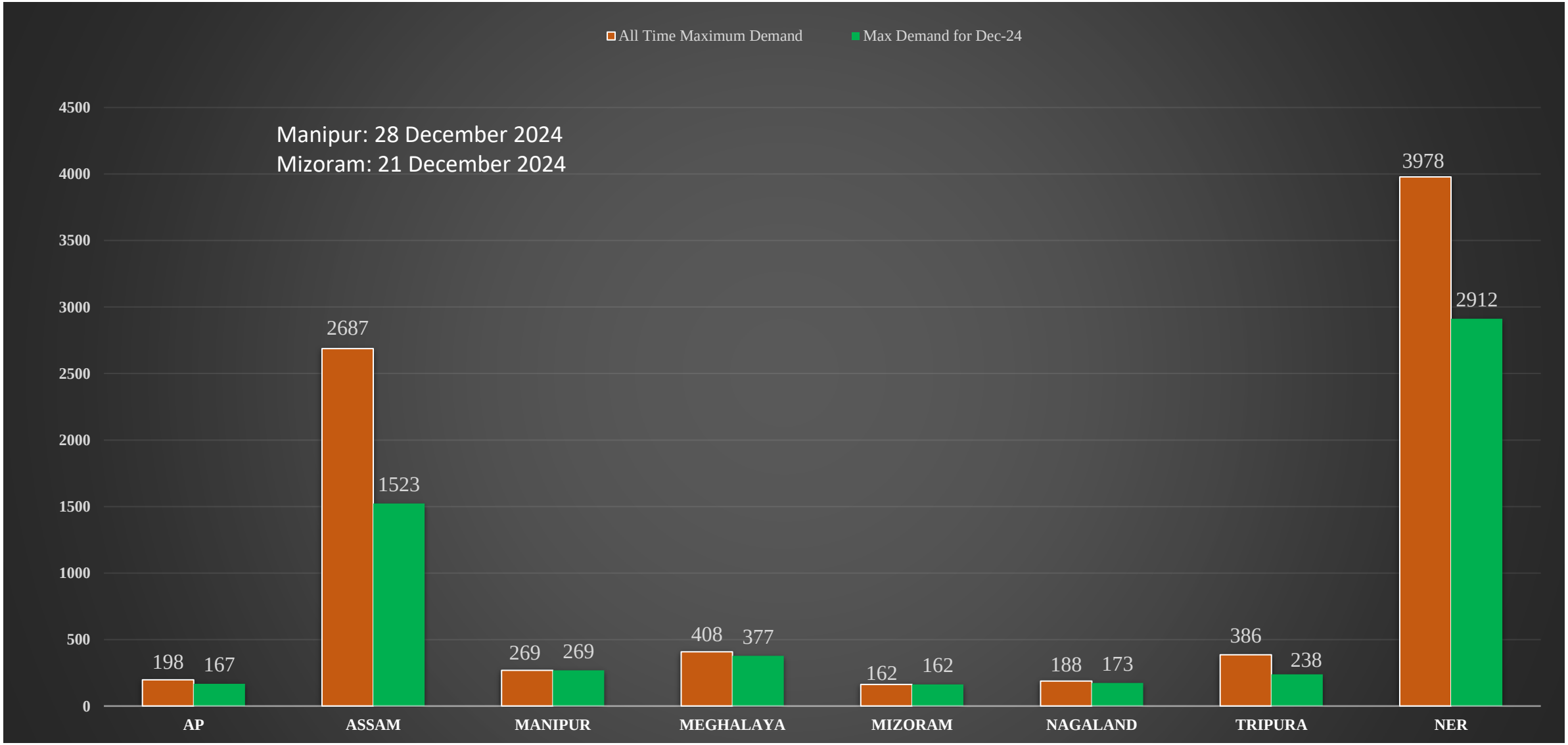
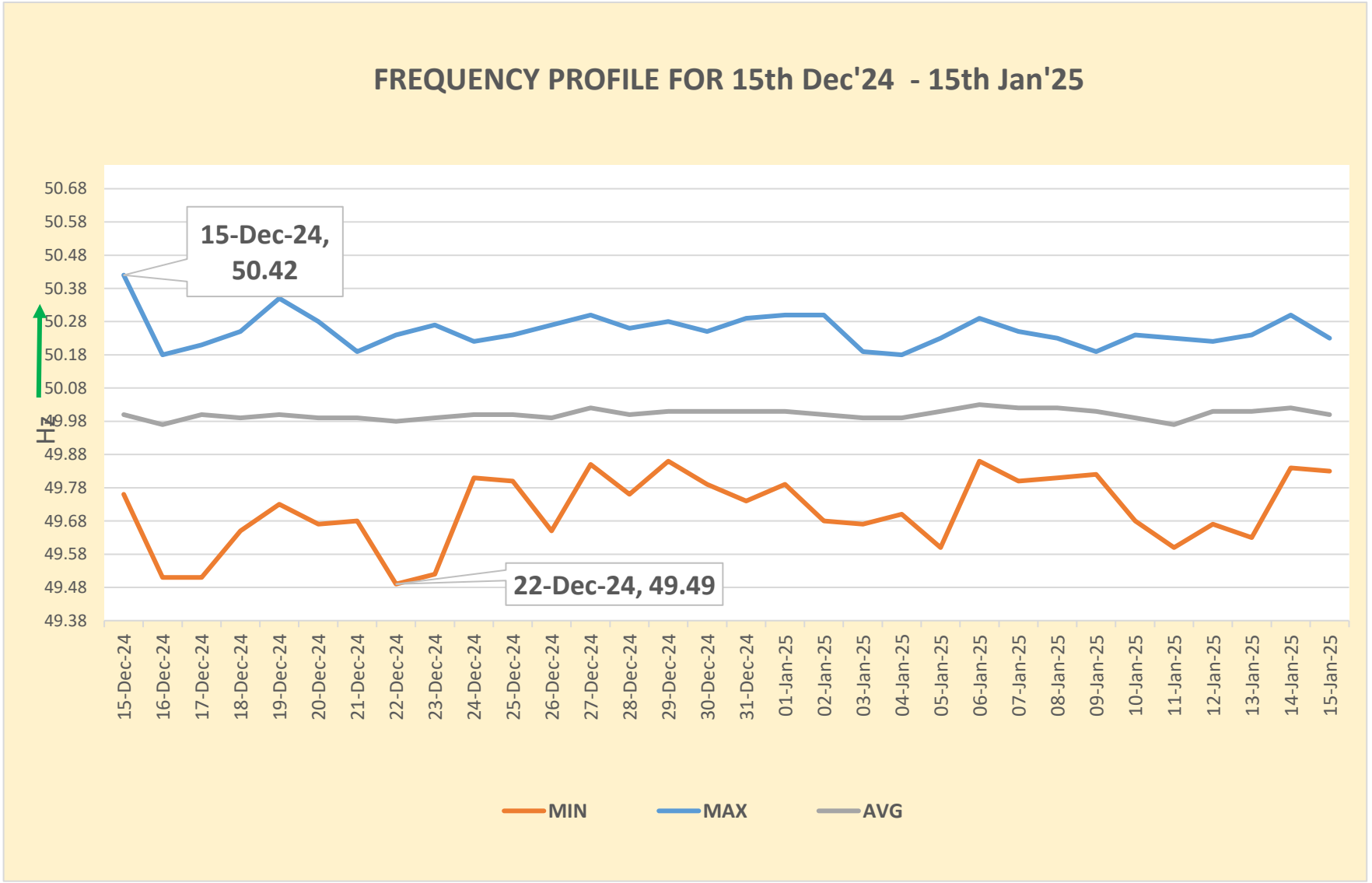
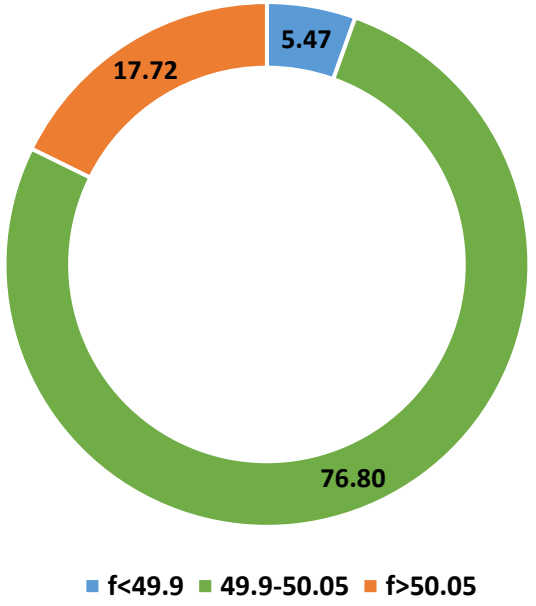
DEMAND MET COMPARISON



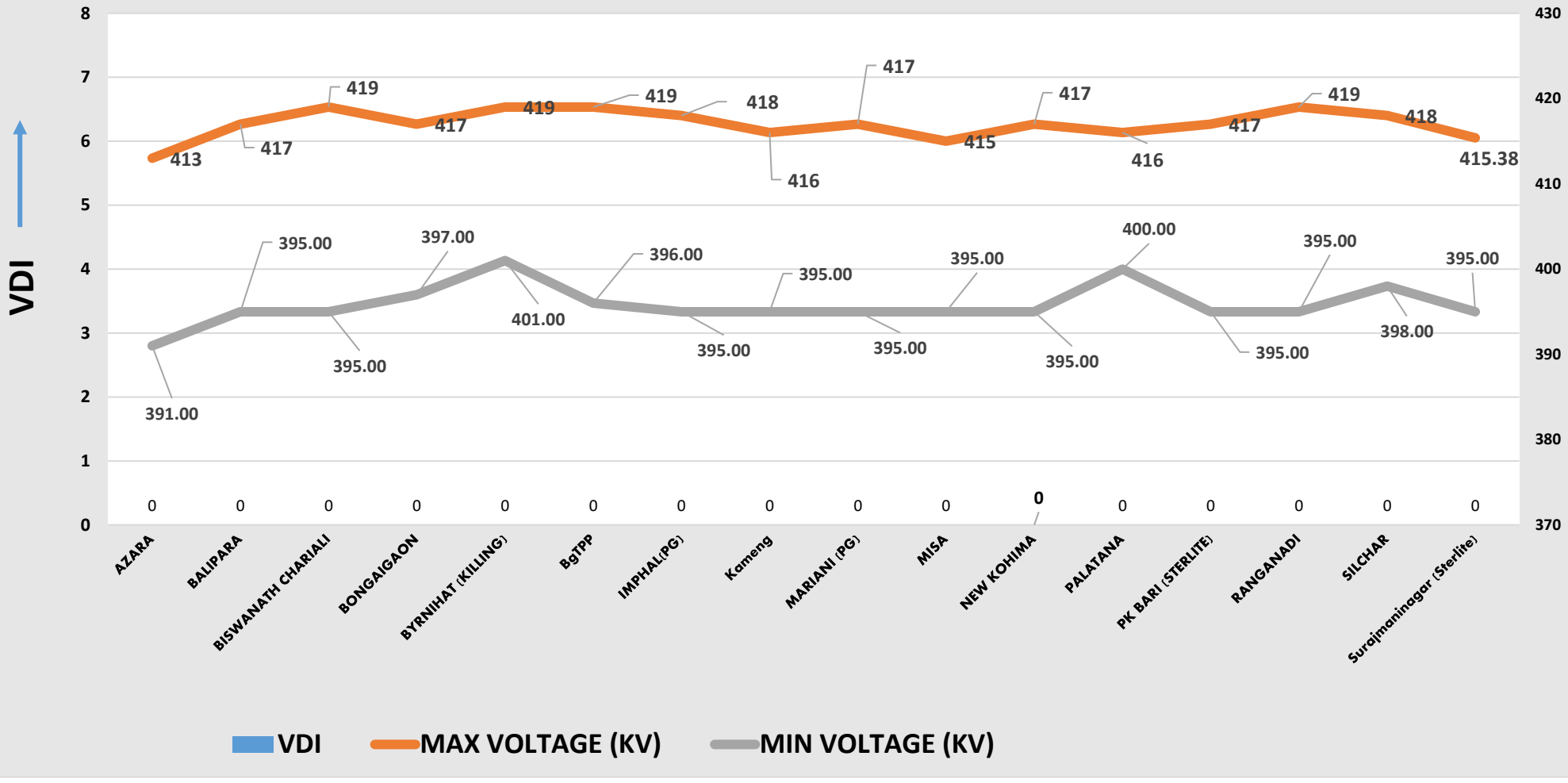
Frequency Profile



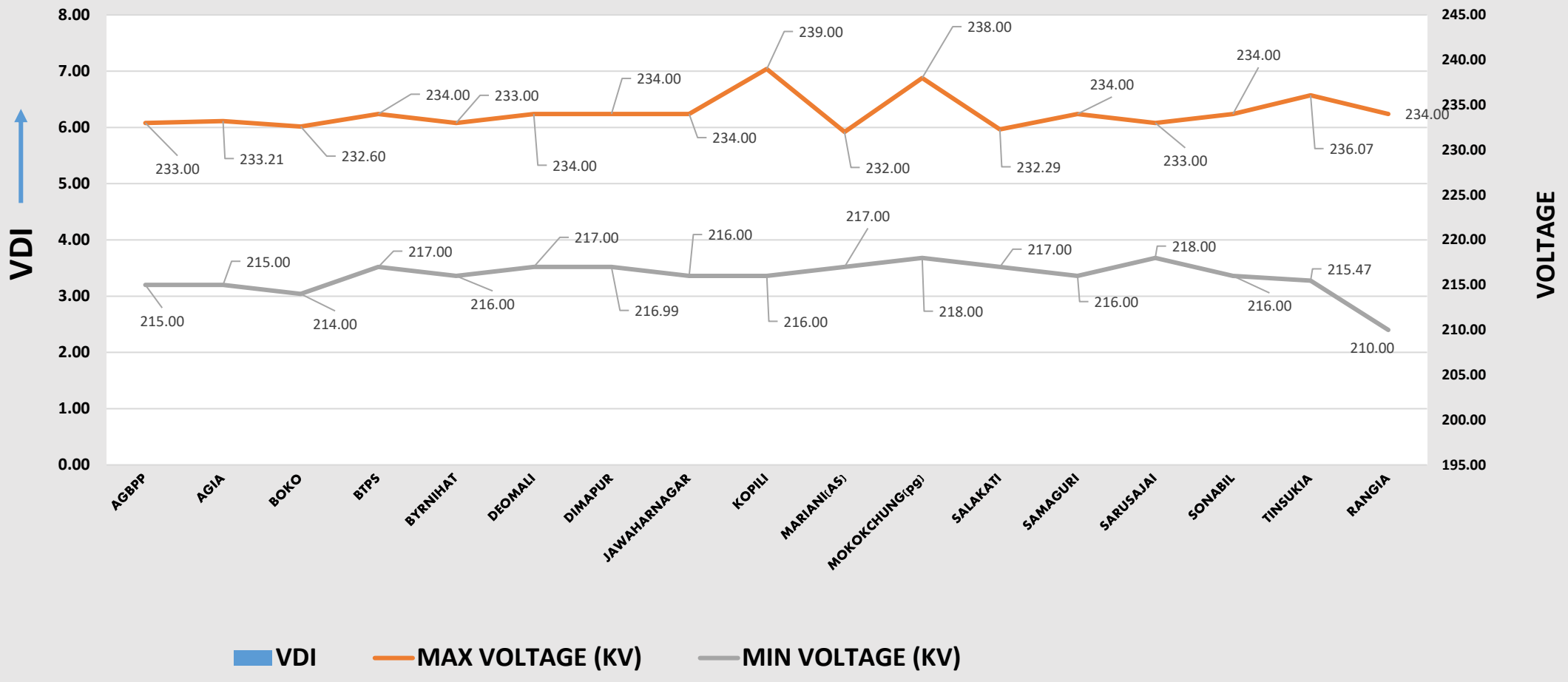


VDI (400 KV) for December 2024

No. of 400 kV lines kept open for over voltage : 0



VDI (220 KV) for December 2024

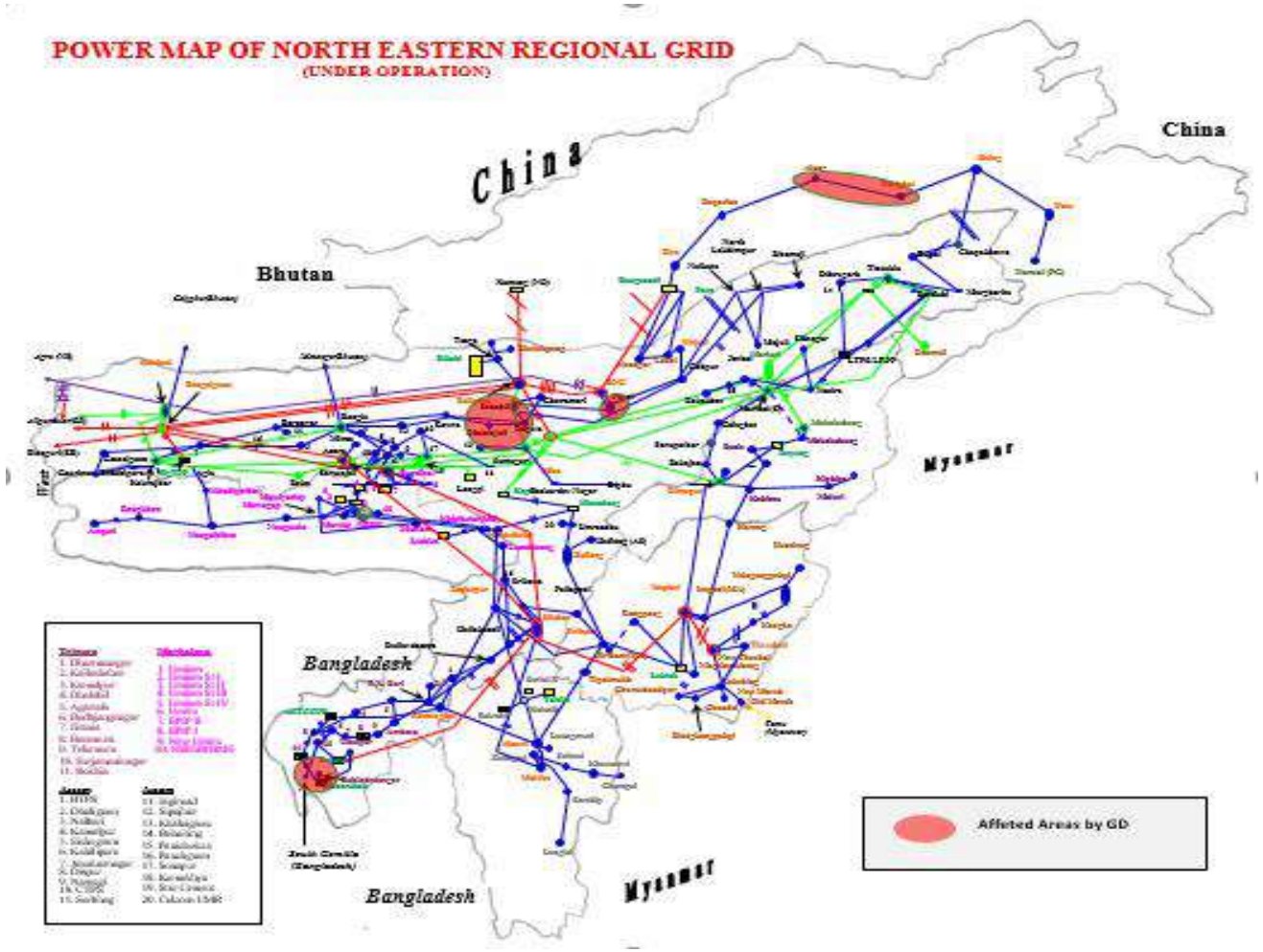


Projected Hydro Generation Availability

Plants	Reservoir Level in meters (as on 15/01/2025)	MU Content	Present DC (MU)	No of days as per current Generation
Khandong STG II	719.8	26.5	0.395	67
Kopili	608	89	1.21	74
Doyang	314.3	12	0.123	95
Loktak	767.66	71.75	2.49	28

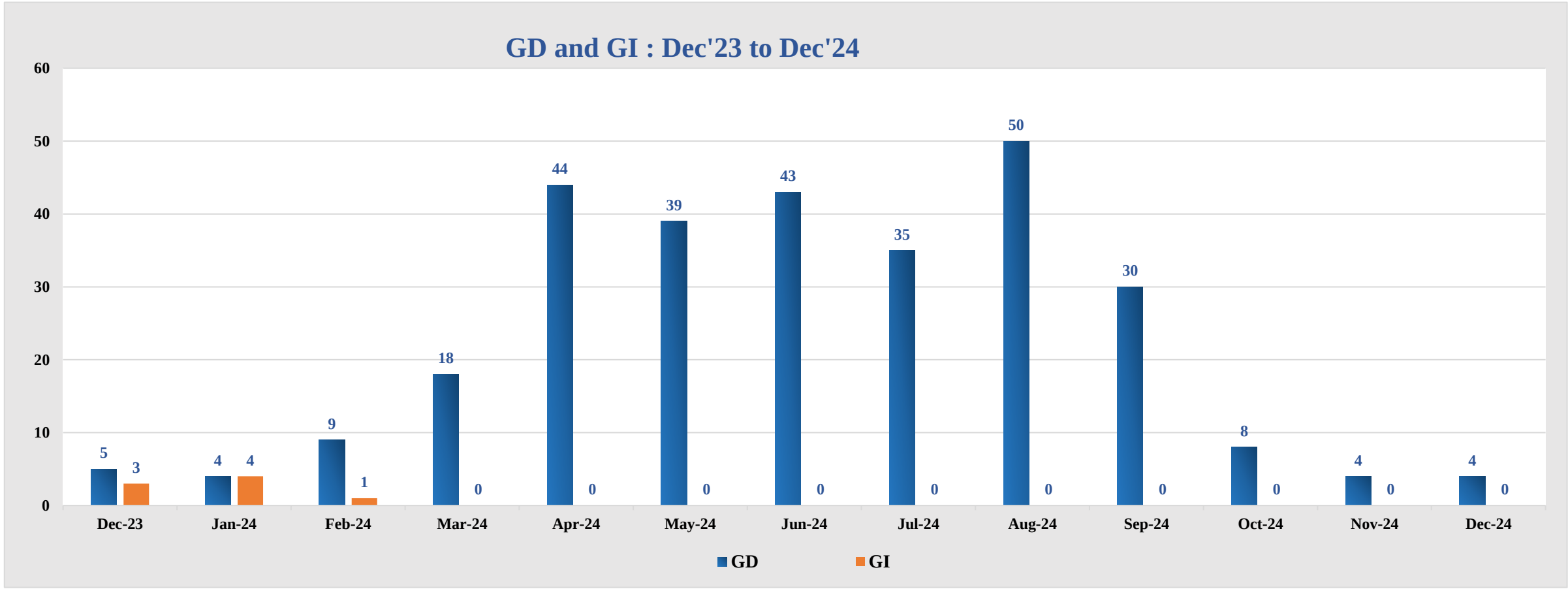
Grid Disturbance during November'24

No. of GD	4
No. of GI	0



Sl No	Area Affected	GD	Date & Time
1	Monarchak and Rokhia S/S of Tripura Power System	GD-I	06-12-2024 13:06 hrs
2	Along and Pasighat areas of Arunachal Pradesh Power System	GD-I	08-12-2024 03:46 hrs
3	Pavoi area of Assam Power System	GD-I	16-12-2024 15:43 hrs
4	Sonabil, Ghoramari, Depota, Dhekiajuli and Rowta areas of Assam Power System	GD-I	20-12-2024 15:04 hrs

Grid Disturbance/Incidences for last 12 Months



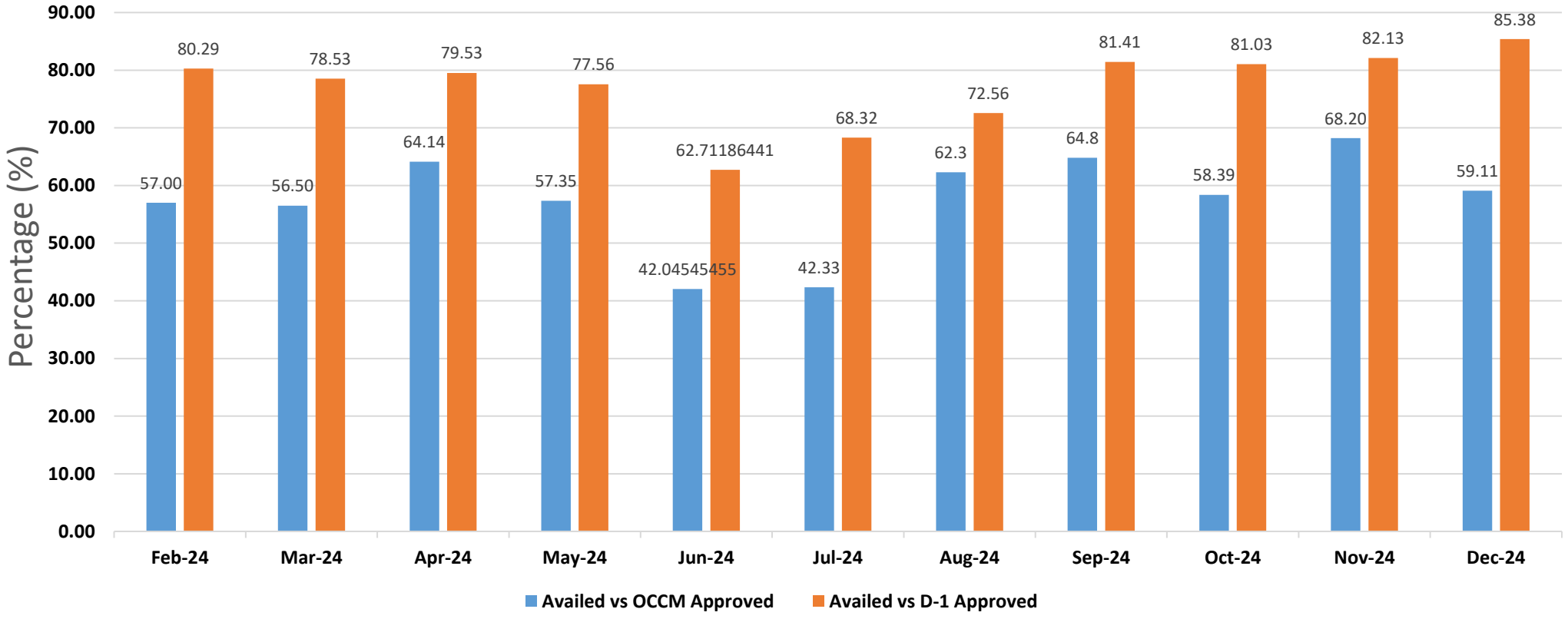
OCC approved shutdown availing status for the month of 2024

SUMMARY OF NER OUTAGE							
MONTH	PLANNED IN OCC	APPROVED IN D-1	AVAILED IN REAL TIME	NOT AVAILED	AVAILED Vs PLANNED %	AVAILED Vs APPROVED %	DEFFERED BY RLDC DUE TO SYSTEM CONSTRAINT
December 24	247	171	146	25	59.11	85.38	2

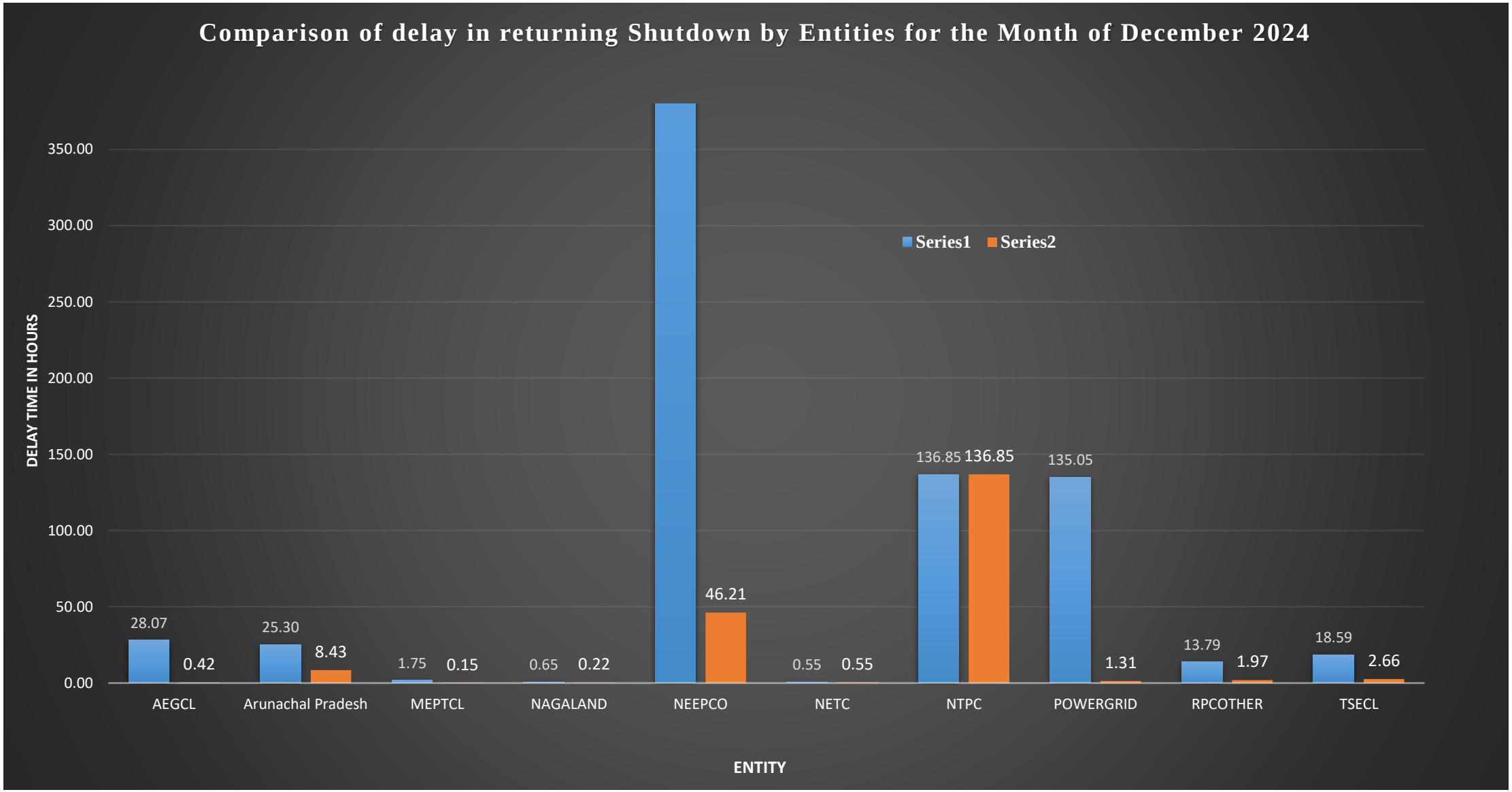
Shutdown Statistics

	OCC Approved	D-1 Approved	Availed	Not Availed	RLDC Deferred
NER	247	171	146	25	2
	150	88	68	20	1
NERTS	66	60	57	3	1
ASSAM	0	0	0	0	0
MANIPUR	14	14	12	2	0
MEGHALAYA	3	3	3	0	0
NAGALAND	0	0	0	0	0
MIZORAM	0	0	0	0	0
TRIPURA	3	3	3	0	0
Arunachal Pradesh	0	0	0	0	0
NETC	0	0	0	0	0
KMTL	11	3	3	0	0
NEEPCO	0	0	0	0	0
NTPC	0	0	0	0	0
OTPC	0	0	0	0	0
INDIGRID	0	0	0	0	0
NHPC	0	0	0	0	0

Approved Shutdown availing trend in percentage



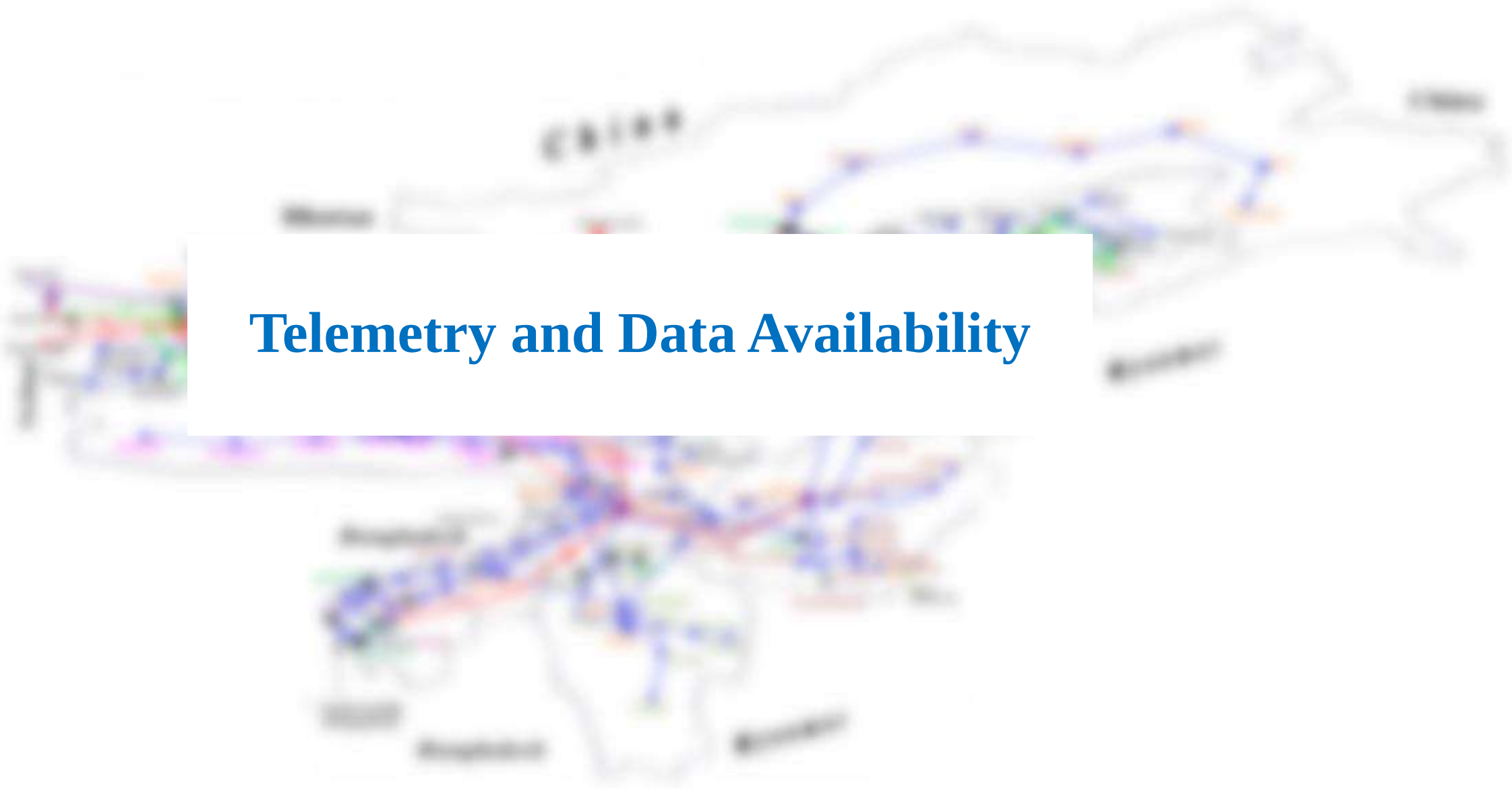
Shutdown Delay statistics



Shutdown Delay statistics

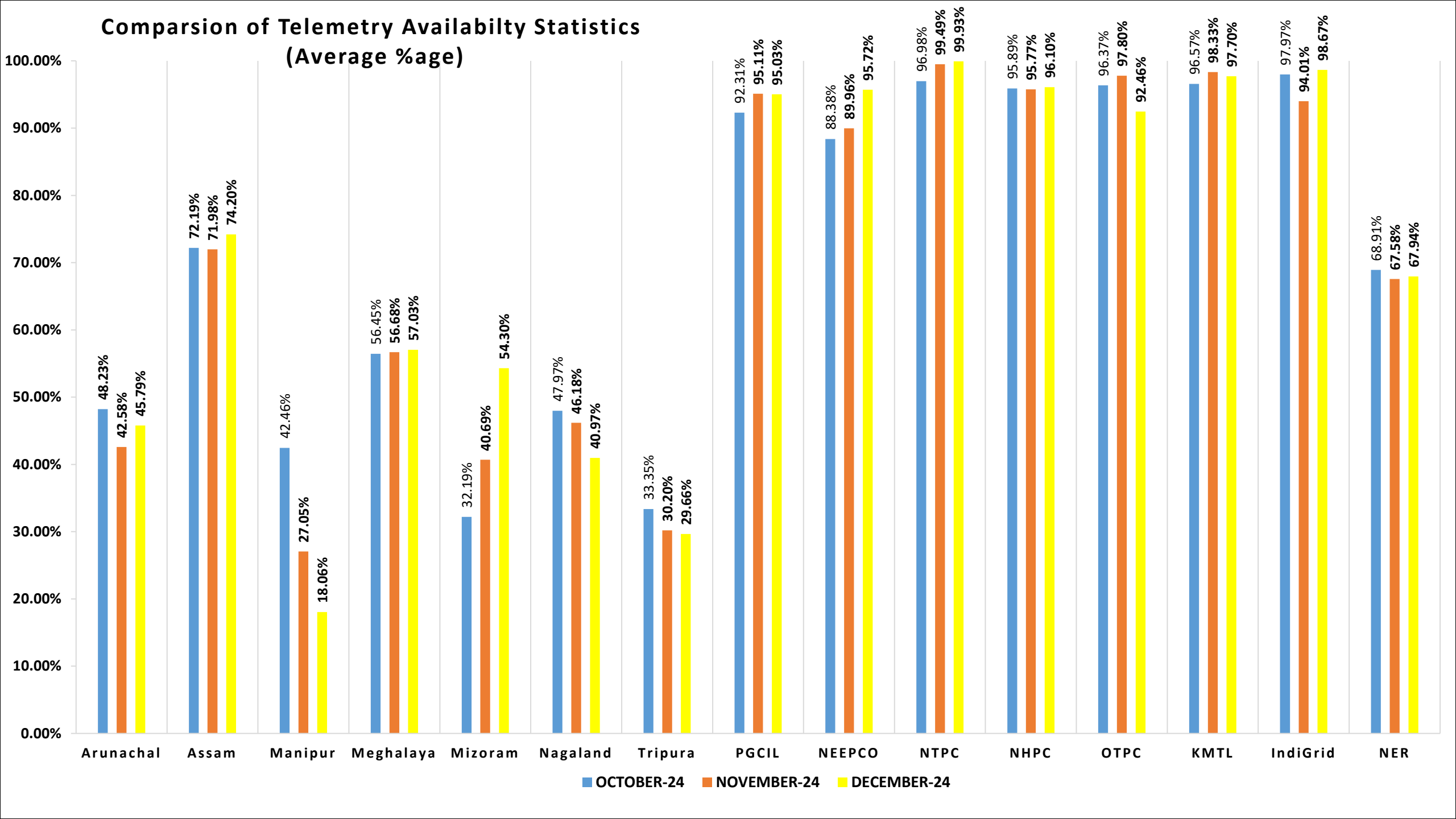
Availing Utility	Total SD	Total Delay (Hour)	Average Delay
AEGCL	**67**	**28.07**	**0.42**
Arunachal Pradesh	**3**	**25.30**	**8.43**
MEPTCL	**12**	**1.75**	**0.15**
NAGALAND	**3**	**0.65**	**0.22**
NEEPCO	**15**	**693.13**	**46.21**
NTPC	**1**	**0.55**	**0.55**
OTPCL	**1**	**136.85**	**136.85**
POWERGRID	**103**	**135.05**	**1.31**
RPCOTHER	**7**	**13.79**	**1.97**
TSECL	**7**	**18.59**	**2.66**

Telemetry and Data Availability

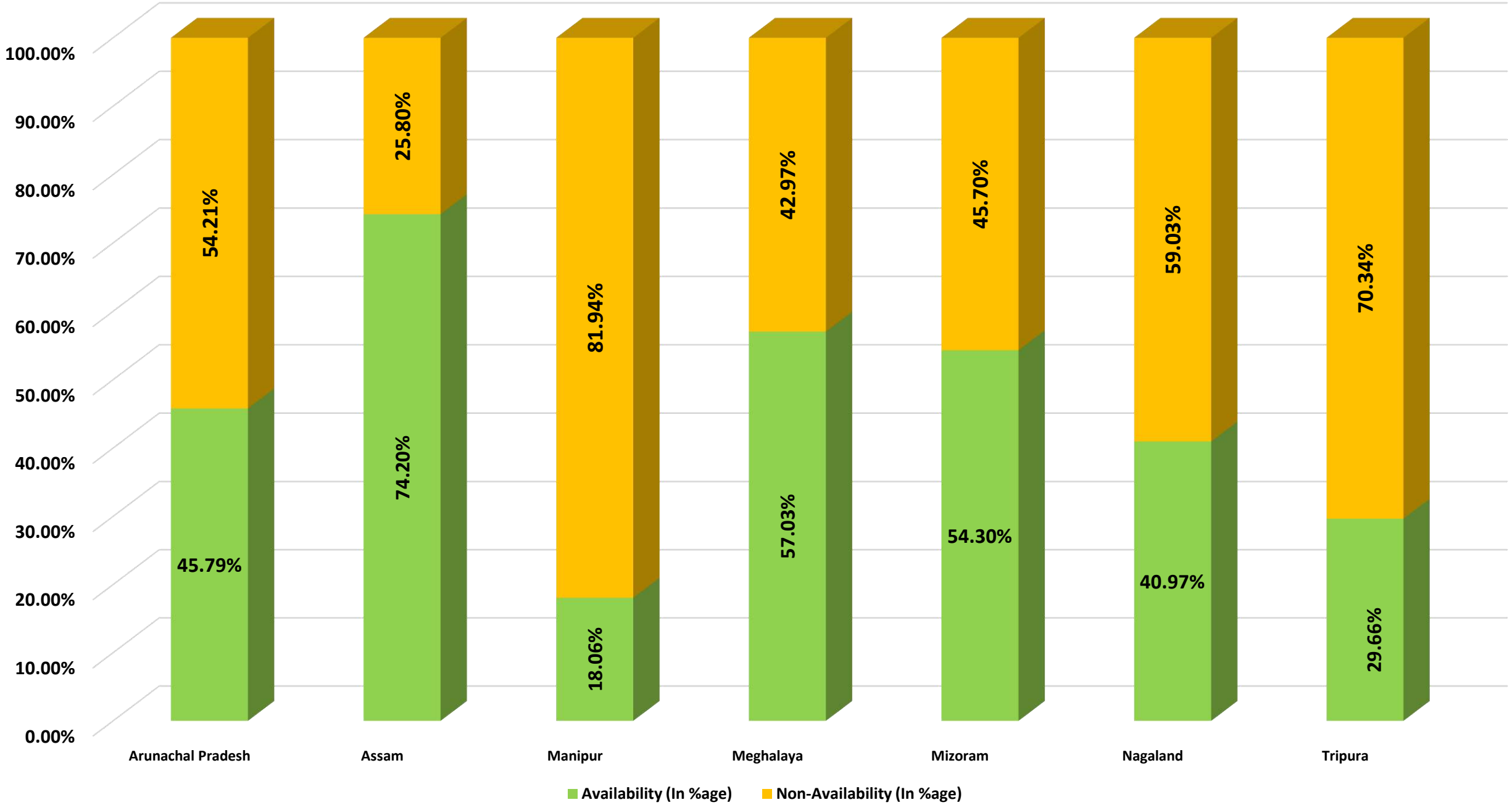


Telemetry Statistics for the month of December 2024

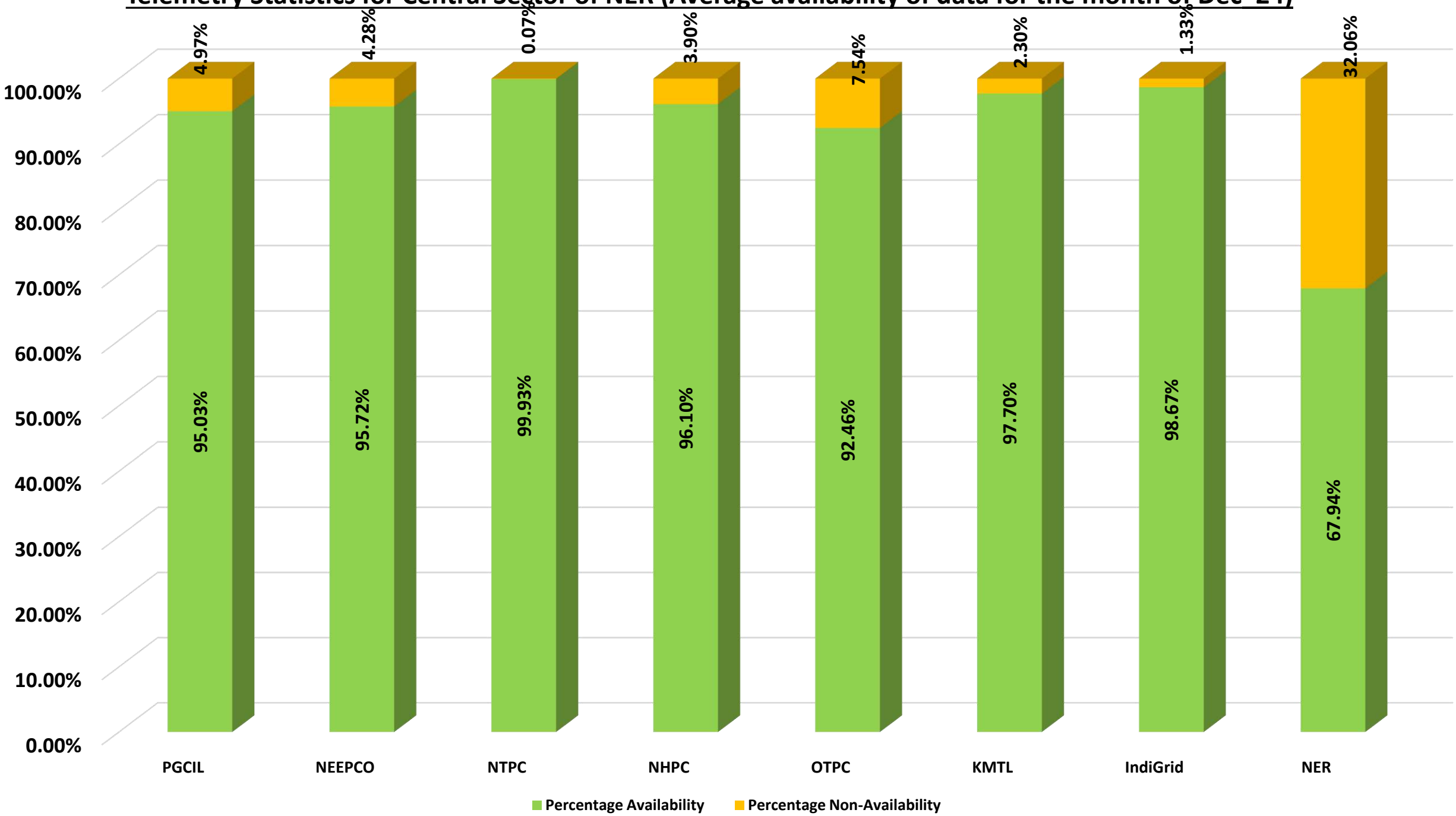
Sl. No.	Utility	Average Total Percentage	Average Analog Percentage	Average Digital Availability	Average RTU Availability
1	PGCIL	95.03	94.66	95.21	91.34
2	NEEPCO	95.72	94.42	96.5	99.76
3	NTPC	99.93	99.93	99.93	99.93
4	NHPC	96.1	99.78	94.1	99.78
5	OTPC	92.46	91.85	92.75	95.46
6	KMTL	97.7	97.89	97.62	99.95
7	Indi-Grid	98.67	97.01	99.36	99.97
8	Arunachal Pradesh	45.79	49.1	43.52	57.72
9	Assam	74.2	75.4	73.32	79.58
10	Manipur	18.06	19.27	17.34	24.99
11	Meghalaya	57.03	78.99	40.49	84.73
12	Mizoram	54.3	50.56	57.4	73.8
13	Nagaland	40.97	36.55	44	35.96
14	Tripura	29.66	32.36	27.72	41.63
	NER	67.94	69.44	66.96	79.29


Comparsion of Telemetry Availabilty Statistics
(Average %age)
100.00%
90.00%
80.00%
70.00%
60.00%
50.00%
40.00%
30.00%
20.00%
10.00%
0.00%
48.23%
42.58%
45.79%
72.19%
71.98%
74.20%
42.46%
27.05%
18.06%
56.45%
56.68%
57.03%
32.19%
40.69%
54.30%
47.97%
46.18%
40.97%
33.35%
30.20%
29.66%
92.31%
95.11%
95.03%
88.38%
89.96%
95.72%
96.98%
99.49%
99.93%
95.89%
95.77%
96.10%
96.37%
97.80%
92.46%
96.57%
98.33%
97.70%
97.97%
94.01%
98.67%
68.91%
67.58%
67.94%
Arunachal
Assam
Manipur
Meghalaya
Mizoram
Nagaland
Tripura
PGCIL
NEEPCO
NTPC
NHPC
OTPC
KMTL
IndiGrid
NER
OCTOBER-24
NOVEMBER-24
DECEMBER-24

Telemetry Statistics for NER States(Average availability of data for the month of Dec '24)



Telemetry Statistics for Central Sector of NER (Average availability of data for the month of Dec '24)



Annexure B 2.4

Methodology of Day-ahead Demand Forecast

Assam

Forecasting for Assam is done by the commercial team (APDCL). The steps for day ahead block-wise forecasts are:

The day-ahead forecasting process begins with gathering time block-wise availability data for the upcoming day. Detailed power availability reports are taken from:

1. Day ahead NERLDC WBES schedule
2. Assam Power Generation Corporation Limited (APGCL) provide the projected availability of power for the next day from the State Sector generating stations.
3. Independent Power Producers (IPPs) provide data on regarding their projected generation.

These reports provide an overview of the available power from Long-Term Agreements and Short-Term agreements and sets the foundation for demand-supply matching for the next day.

Each of the previous days scheduled versus actual power drawl for each time block are compared to assess the deviations and patterns. Such deviations and patterns are then incorporated with the day ahead generation availability to arrive to a forecast for the whole state.

In addition to the above forecast, experience based factors are incorporated during special occasions for increasing/ decreasing the forecast:

1. Weather forecasts available in public domain
2. Forced generator outages, maintenance shutdowns, or system constraints that could affect supply availability.
3. Significant events like holidays, festivals, or elections, which tend to influence typical consumption behavior, are carefully considered in our forecasts. We maintain a comprehensive dataset on load pattern shifts observed during these events, allowing us to incorporate historical consumption trends and adjustments specific to each type of event.

Meghalaya

For day ahead forecasting previous 2-3 days' block-wise demand is averaged. For weekends and as per the weather reports in public domain, the averaged data is then increased/decreased on experience basis with a suitable factor.

Mizoram

For day ahead forecast during week days, previous day actual SCADA data is taken to know the demand trend along with the previous week's similar day block wise data to compare. In case of weekends and Sundays, previous weeks corresponding days' demand is taken as the forecast.

Manipur

For day ahead forecast, previous 2-3 days' block-wise actual SCADA data is used. In case of any outages/ disturbances a different day is chosen for forecast. As per weather reports in public domain, a day with the similar weather conditions is chosen for the forecasts. If required, the values are changed on experience basis to meet the current trends.

Tripura

For day ahead forecasting previous 3 days' block-wise demand is averaged. For weekends and per the weather reports in public domain, the averaged data is then increased/decreased on experience basis with a suitable factor.

Nagaland

For day ahead forecasting, last 6 days' block-wise demand as well as average is compared with the demand of previous day and the best fit is given as forecast for the next day. For weekends and as per the weather reports in public domain, the forecast data is then increased/decreased on experience basis with a suitable factor.

Arunachal Pradesh

The day ahead forecast is given by looking the trends of the last 7 days block wise actual SCADA data. This trend is also compared with previous 5 years SEM data. For weekends and as per the weather reports in public domain, the forecast data is then increased/decreased on experience basis with a suitable factor.

Methodology of Week-ahead Demand Forecast

Assam

For week-ahead forecasts, the past weeks historical data are examined to check the consumption patterns observed over the past weeks. Patterns related to similar days of the week are particularly compared, as consumption behavior tends to follow weekly cycles.

For the upcoming week, weather data, especially forecasts of extreme temperatures or rainfall is incorporated to adjust the baseline demand predictions. The weather forecast is available from the public domain.

Any known events, such as public holidays, festivals, or special regional occasions, are factored into the forecast, as they may lead to deviations in usual demand patterns.

Meghalaya

The previous week data is taken as the base data, however the same is adjusted based on experience, outages and weather forecast available at the public domain.

Mizoram

The past week data is studied to find the demand trend for the upcoming week.

Manipur

The previous week data is taken as the base data for the forecast. However, on the basis of experience, changes during the winter peak, summer peak is calculated by a suitable factor.

Tripura

The forecast for the next week is calculated by taking the change of demand from the previous 2 to 3 weeks and incorporating the factor in the previous week demand.

Nagaland

The last 6 days' block-wise demand as well as average is compared with the demand of previous day and the best fit is given as forecast for the next week. For weekends and as per the weather reports in public domain, the forecast data is then increased/decreased on experience basis with a suitable factor.

Arunachal Pradesh

The last 7 days' actual demand data is studied to find the demand trend for the upcoming week.

Methodology of Month-ahead Demand Forecast

Assam

For month-ahead forecasts, demand patterns for the same month in previous years are reviewed to identify recurring consumption trends.

Monthly weather trends like anticipated high temperatures in summer or cooler months in winter are incorporated into the demand estimate, as these factors strongly influence the demand for an extended period.

Any pre-planned major events, known holidays, are considered. Additionally, maintenance schedules of major plants or transmission lines are factored in, as these may impact power availability and thus affect supply-demand balancing.

Meghalaya

Actual Demand of the same month in previous year is taken as base data and adjusted with the change in the current month actual demand to that of previous year current month.

Mizoram

The past month demand data as well as monthly peak demand met data is used to find out the probable demand met during peak hours for the upcoming month.

Manipur

Manipur yet to send month ahead forecast

Tripura

Month ahead demand forecast is calculated by looking at the previous year demand for the month and applying a suitable % age increase as per the yearly increase in demand percentage.

Nagaland

Based on the Load analysis for the preceding 2 Years Load forecasting is done. Weather forecasting is also taken into account which is available in the public demand. Shutdown or outages of the lines are also taken into account.

Arunachal Pradesh

Month ahead demand forecast is calculated by looking at the previous 5 years average demand for the month and applying a suitable % age increase as per the yearly increase percentage.

Annexure 2

Request for Updating datasheet of NER Restoration Procedure 2025 reg.

Annexure B 2.6

Keshab Borah (केशब बोराह)

Fri 1/3/2025 1:21 PM

Inbox

To:nertscpcc <nerts_cpcc@powergrid.co.in>; nerts rtamc <nerts_rtamc@powergrid.co.in>; sldcaseb <sldcaseb@gmail.com>; SLDC ASSAM <sldcassam@aegcl.co.in>; Mizoram SLDC Control Room <mzsldc@gmail.com>; SLDC Tripura <tsecl_sldc@rediffmail.com>; sldc.ngl <sldc.ngl@gmail.com>; ntpcbgtpp250 <ntpcbgtpp250@gmail.com>; OTPC Palatana CR <shiftincharge.otpc@gmail.com>; Operation Team OTPC <operationteam@otpcindia.in>; Power House Ranganadi HE Plant, NEEPCO Ltd. <rhep.powerhouse@gmail.com>; AGBPP <ccragbp@rediffmail.com>; doyang powerhouse <dhep_ph@rediffmail.com>; doyang powerhouse <dhep_ph@rediffmail.com>; Kangkan Paul <KANGKANPAUL@NTPC.CO.IN>; khandong <khandong_cr@rediffmail.com>; Kopili POWER HOUSE <kopiliph@gmail.com>; PARE POWER STATION <parepowerstation@rediffmail.com>; Mizoram SLDC Control Room <mzsldc@gmail.com>; apsldc.sd <apsldc.sd@gmail.com>; Narendra Kumar Gupta <nk.gupta@otpcindia.in>; Joypal Roy <joypal_roy@rediffmail.com>; Domo Kamduk <kamduk56049@gmail.com>; Geyi Yinyo <nicegeyi@gmail.com>; phuntsosange@gmail.com <phuntsosange@gmail.com>; emgkahep@rediffmail.com <emgkahep@rediffmail.com>; ccr agbp <ccrbokuloni@gmail.com>; NHPC Limited <phem-loktak@nhpc.nic.in>; pho-loktak <pho-loktak@nhpc.nic.in>; Loktak Power Station Operation <loktakphop@gmail.com>; loktakphem@gmail.com <loktakphem@gmail.com>; Kameng PHCC <kameng.phcc@neepco.co.in>; shillong <sldc.shg@gmail.com>; sldcmanipur1 <sldcmanipur@yahoo.in>; DEEP SARKAR (दीप सरकार) <deepsarkar@powergrid.in>; Soubhik Choudhury <soubhik.choudhury@otpcindia.in>; kopili power house <kopiliph200mw@gmail.com>; sldcmanipur1 <sldcmanipur@yahoo.in>; SLDC Tripura <tsecl_sldc@rediffmail.com>; sldc.ngl <sldc.ngl@gmail.com>; SLDC Division <eesldcitaap@gmail.com>; rudraraju@powergrid.in <rudraraju@powergrid.in>; ANIL DEBBARMA <anildebbarma123@gmail.com>; dgmoperation sldc <dgmoperation.sldc@aegcl.co.in>; nillutpal boruah <nillutpal.boruah@aegcl.co.in>; BARSHA KASHYAP <barsha.kashyap@aegcl.co.in>; neepco.edonm@gmail.com <neepco.edonm@gmail.com>; neepcocontrolroom@yahoo.com <neepcocontrolroom@yahoo.com>; Reed Ayrto <redrit03@gmail.com>;

Cc:Amaresh Mallick (अमरेश मल्लिक) <amareshmallick@grid-india.in>; Biswajit Sahu (बिस्वाजित साहू) <biswajit@grid-india.in>; NERPC Shillong <nerpc@ymail.com>; Babul Roy (बाबुल रॉय) <broy@grid-india.in>; Chitrankshi Ghangrekar (चित्रांक्षी गंगरेकर) <chitrankshi@grid-india.in>; Bimal Swargiary (बिमल स्वर्गीयारी) <bimal.swargiary@grid-india.in>; SYSTEM OPERATION NERLDC <SO1_NERLDC@grid-india.in>; SO2 NERLDC <so2.nerldc@grid-india.in>; Hanna Debbarma (हन्ना देबबर्मा) <hanna@grid-india.in>; Subhash Kumar (सुभाष कुमार) <subhash.tran@grid-india.in>; Sunil Singha (सुनील सिंह) <sunil.singha8@grid-india.in>;

9 attachments (522 KB)

ISGS NER.xlsx; NAGALAND.xlsx; MIZORAM.xlsx; TRIPURA.xlsx; MANIPUR.xlsx; AP.xlsx; POWERGRID.xlsx; MEGHALAYA.xlsx; ASSAM.xlsx;

महोदय/महोदया,

In compliance with IEGC 2023: Clause 34 (1), Based on the template issued by NLDC, SLDC of each State and the RLDC of each region shall prepare restoration procedures for the grid for their respective control areas, which shall be updated every year by the concerned SLDC and RLDC taking into account changes in the configuration of their respective power systems.

Clause 34 (2), Each RLDC, in consultation with the NLDC, CTU, and the concerned STUs, SLDCs, users and RPC, shall prepare detailed procedures for restoration of the regional grid under partial and total blackouts which shall be reviewed and updated annually by the concerned RLDC.

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.

In view of the above, **all concerned NER utilities are kindly requested to update their respective datasheets and submit the updated files by 08-01-2025** for preparation of the **NER Black Start Procedure 2025.**

Your cooperation is greatly appreciated.

भबदीय / Regards,
केशब बोराह/Keshab Borah

एस.ओ.-1 बिभाग /System Operation-I Department
उ.पु.क्षे.भा.प्रे.कें. /North Eastern Regional Load Despatch Center
ग्रिड कंट्रोलर ऑफ इंडिया/ Grid Controller of India Limited

Follow Grid-India on:

Annexure 3

Annexure B 2.9

भारत सरकार/Government of India
विद्युत मंत्रालय/Ministry of Power
केंद्रिय विद्युत प्राधिकरण/Central Electricity Authority
राष्ट्रीय विद्युत समिति प्रभाग /National Power Committee Division
1st Floor, Wing-5, West Block-II, RK Puram, New Delhi-66

No. CEA-GO-15-14/1/2021-NPC Division/ 3149 Date: 20.12.2024

To,

(As per distribution list)

विषय: 14.11.2024 को नागपुर मे आयोजित एनपीसी की 15 वीं बैठक के कार्यवृत्त के संबंध मे।

Subject: Minutes of the 15th Meeting of NPC held on 14.11.2024 at Nagpur-reg.

कृपया 14.11.2024 को नागपुर, महाराष्ट्र में आयोजित एनपीसी की 15वीं बैठक का कार्यवृत्त आपकी जानकारी और आवश्यक कार्रवाई के लिए संलग्न है। यह सीईए वेबसाइट पर भी उपलब्ध है।

The Minutes of the 15th meeting of NPC held on 14.11.2024 at Nagpur, Maharashtra is enclosed herewith for your kind information and necessary action, please. The same is also available on CEA website.

Encl: As above

भवदीय/Yours Faithfully
20/12/2024
(ऋषिका शरण/Rishika Sharan)
मुख्य अभियंता एवं सदस्य सचिव, एनपीसी
Chief Engineer & Member Secretary, NPC

Distribution List (Members of NPC):

1. Smt. Nandita Gorlosa, Hon'ble Power Minister, Govt. of Assam & Chairperson NERPC, Block D, Ground Floor Janata Bhawan, Dispur, Assam-781006 [Email: nanditagorlosa77@gmail.com]
2. Shri. Hemant Jain, Member(Go&D),CEA, Room No. 601 (North), 6th Floor, Sewa Bhawan, Sector-1, R.K. Puram, New Delhi-110066 [Email: member.god@cea.nic.in/ hemjain.cea@nic.in]
3. Shri. Bibhu Bhuyan, MD, APGCL & Chairperson TCC (NERPC), APGCL, 3rd Floor, Bijulee Bhawan, Guwahati-01 [Email: bibhu.bhuyan@apgcl.org]
4. Shri. T T Lepcha, Principal Chief Engineer-cum-Secretary & Chairperson, ERPC, Power Department, Govt of Sikkim. [Email secypower.sikkim@gmail.com]
5. Smt. Sonam Rinchen Bhutia, Principal Chief Engineer & Chairperson, TCC (ERPC), Power Department, Govt of Sikkim. [Email-sorinchen@rediffmail.com]
6. Shri. Gaurav Gupta, Chairperson, SRPC &Managing Director, KPCL, & ACS, Energy Department, GoK, 240, 2nd Floor, Vikasa, Soudha, Bengaluru,560001 [Email: prs.enrgy@gmail.com] and [Email: acs@karnataka.gov.in]
7. Shri. R Jayakumar, Chairperson TCC(SRPC) & Director (Transmission), KPTCL, 1st Floor, Kaveri Bhavan, Kempegowda Rd, Nehru Nagar, Gandhi Nagar, Bengaluru, Karnataka 560009 [Email: dt@kptcl.com]
8. Shri. Rajiv Sood, Managing Director, Himachal Pradesh Power Transmission Corporation Limited & Chairperson NRPC, Himfed Bhawan, New ISBT Road, Panjari (Below Old MLA Quarters), Shimla-171005, Himachal Pradesh [Email: md.tcl@hpmail.in]
9. Shri. Manoj Upreti, Director (Operation), Himachal Pradesh State Electricity Borad Limited & Chairperson, TCC(NRPC), Vidyut Bhawan, HPSEBL, Shimla-171004, Himachal Pradesh [Email: manojupretisolan@gmail.com,] and [Email: directoro@hpseb.in]
10. Shri. P. Dayanand Chairman CSPTCL & Chairman, WRPC, Office of Chairman, Vidyut Seva Bhavan, Danganiya, Raipur 492013 (C.G.) [Email: chairmancspc@gmail.com]
11. Shri. R.K. Shukla, Managing Director, CSPTCL, Chairperson TCC ((WRPC) 2nd Floor, Vidyut Seva Bhavan, P.O. Sunder Nagar, Danganiya, Raipur: 492013 (CG). [Email-mdtransco@cspc.co.in]
12. Shri. N.S. Mondal, Member Secretary, ERPC,14,Golf Club Road, ERPC Building, Tollygunje,Kolkata-700033. [Email: mserpc-power@nic.in]
13. Shri. V.K.Singh, Member Secretary, NRPC, 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016.[Email: ms-nrpc@nic.in]
14. Shri. Asit Singh, Member Secretary, SRPC, No.29, Race Course Cross Road, Bengaluru-560009. [Email: mssrpc-ka@nic.in]

15. Shri. Deepak Kumar, Member Secretary, WRPC, Plot No- F-3, MIDC Area, Marol, Opp. SEEPZ, Central Road, Andheri (East), Mumbai-400093.[email: mswrpc@nic.in]
16. Shri. K B Jagtap, Member Secretary, NERPC, NERPC Complex, Dong Parmaw, Lapalang, Shillong-793006. [Email: ms-nerpc@gov.in]
17. Shri. S. R. Narashiman, CMD, GRID-INDIA, B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016.
18. Shri. P. C. Garg, COO, CTU, Saudamini, Plot No.2, Sector-29, Gurugram-122001

Special Invitees:

1. CMD, PowerGrid, Saudamini, Plot No.2, Sector-29, Gurugram-122001.
2. Chief Engineer, GM Division, Sewa Bhawan, CEA, New Delhi.

Copy for kind information to:-

1. SA to Chairperson, CEA, New Delhi
2. SA to Member (Go&D),CEA, New Delhi

******

Minutes of 15th Meeting of National Power Committee (NPC) chaired by Chairperson, NPC held on 14.11.2024 at Nagpur (Maharashtra)

1. Introduction:

a) The 15th meeting of National Power Committee (NPC) was held on 14.11.2024 at Nagpur (Maharashtra). The meeting was hosted by WRPC. The list of participants is at **Annexure-A**.

b) **Member Secretary, WRPC** extended a warm and heartfelt welcome to Shri Ghanshyam Prasad, Chairperson of CEA/NPC, all NPC members, and attendees of the 15th NPC meeting. He acknowledged the significant role of NPC as the apex body for implementing policies formulated by MoP, CERC, and CEA, ensuring their intended execution. While NPC plays a key role in policy formulation, its regular meetings have enabled a holistic view of power sector issues, leading to well-informed conclusive and uniform implementation across India.

He added that recently NPC took initiative to devise SOPs for various common functions of RPCs. These finalized SOPs covering communication outage planning, communication audits, third-party protection audits, and grid disturbance analysis have been instrumental in shaping RPC operations and served as a foundation for uniformity at PAN India level.

Further, he emphasized that there is a need to expand RPC membership to include more RE/key players. Recent inclusion of Adani Green and Inox Green in Western Region, were steps in the right direction, but representation remains inadequate given the growing RE capacity. He suggested that the State DISCOMs, currently included on a rotational basis, should be offered permanent membership to ensure continuity, especially since meetings are now often conducted online. State power holding companies should also be included to reflect their growing responsibilities.

He also praised the recent Golden Jubilee celebration of CEA on 15th October, 2024, describing it as an outstanding event that brought together key players in the power sector for brainstorming sessions. He expressed hope for similar events in the future.

c) **Chairperson, NPC in his opening remarks emphasized** that ongoing efforts over the past few years to enhance the role and purpose of the NPC has shown significant progress. He emphasized that while RPCs meetings address regional issues, the growing scale of the national grid, especially with the growing integration of renewable energy, calls for a broader and more holistic approach at national level. He stressed the importance of ensuring that whatever is adopted for the national grid, the same be uniformly implemented across all states and regions. He added that while much progress has been made in achieving goals in the past, there is still considerable work ahead.

He expressed hope for meaningful discussions leading to constructive and actionable decisions, along with a clear roadmap for the future during the meeting. He then requested MS, NPC, to proceed with the agenda of the meeting.

d) **Member Secretary, NPC** also welcomed Shri Ghanshyam Prasad, Chairperson, CEA & NPC, Shri Hemant Jain, Member (GO&D), CEA, Shri S R Narshiman, CMD Grid India and distinguished Chairperson of RPCs and TCC, Member Secretaries of RPCs, special invitees and participants to the 15th meeting of National Power Committee (NPC).

Before taking up the agenda items, she informed that in the last NPC meeting many important and new tasks were entrusted to NPC, like Task force for the AUFLS scheme and its implementation, developing uniform accounting software for all RPCs, preparing a uniform protection protocol and its coordination, establishing a standard operating procedure for VOIP connectivity, and creating a roadmap for the transition to 5-minute scheduling & accounting. In order to accomplish the various assigned tasks, committees and sub-committees were formed at NPC Division level and the status of work will now be presented to the NPC Committee for further directions/ratifications/deliberations. Further, she informed that uniform protection protocol was very urgently required and same has already been adopted by all the RPCs.

Regarding islanding schemes initiated in 2020, she informed that the DPR for the Jabalpur islanding scheme has been sanctioned for PSDF funding, while other islanding scheme, such as Jamnagar, Kutch, Nagpur, Raipur and Guwahati, are under scrutiny by the PSDF team. The Raipur, Jamnagar and Kutch schemes are expected to be cleared shortly for PSDF funding**.**

She further informed that key agenda points to be addressed in the meeting include amendments to the functions and roles of the NPC, expenditure booking for installing firewalls at ISTS Substations, SOP for implementation methodology for VOIP, roadmap of 5 min scheduling, dispatching metering and accounting etc. These agenda points aims to create a robust framework for efficient grid operation and secure, transparent power system management. She added that it is her privilege for having the meeting conducted under the able guidance of Chairperson, CEA & NPC and hoped for fruitful deliberations. She also thanked MS, WRPC and his team for arranging the meeting with their warm hospitality at Nagpur.

With these remarks, the agenda items were taken up one by one for deliberations.

2. Confirmation of Minutes of 14th Meeting of NPC:

a) The Minutes of 14th Meeting of NPC held on 03.02.2024 at Bangalore was circulated vide letter No. CEA-GO-15-14/1/2021-NPC division/83-104 dated 27.02.2024. No comments had been received from the members.

b) The Committee confirmed the minutes of 14th NPC meeting.

3. <u>Amendment in functions of National Power Committee (NPC) and its Conduct of Business Rules</u> (NPC Secretariat Agenda):

a) **MS, NPC** briefed the agenda to the Committee by informing the proposed amendments in Conduct of Business Rules (CBR) of NPC (**attached at <u>Annexure-I</u>**). She informed that after approval of the draft CBR by the NPC forum, the same would be put up to Ministry of Power for further approval.

b) **CMD, Grid-India** highlighted that the original NPC formation order stated that decisions taken by the NPC would be considered as concurred by the respective RPCs. In the proposed amendments, Grid-India and CTUIL have also been included, which is acceptable.

Further, he emphasized that the RPC resolution explicitly specifies that, as RLDC being one member of the Committee, the decisions of the Committee arrived at by consensus regarding operation of the regional grid and scheduling and dispatch of electricity would be followed by the RLDC subject to directions from the Central Commission, if any. Similarly, he suggested that NPC decisions should generally follow this principle, although occasional discrepancies may arise due to specific MoP Rules or Regulations.

c) **Chairperson, CEA & NPC** highlighted that neither NPC nor RPC have the authority to take decisions contrary to the Rules and Regulations established by the CEA, CERC, or the Ministry of Power. Further, he stressed that decisions at the RPC or NPC level must strictly adhere to established Rules and Regulations, with no scope for violations. Suggestions, for improving Regulations or addressing gaps in implementation, should only serve as recommendations and not as enforceable decisions, if they conflict with existing Regulations/laws.

d) **MS, SRPC** expressed that chances of interpretation are there only where the Rules and Regulations are not clearly defined and RPCs are making decisions through consensus. He suggested that decisions at both the RPC and NPC levels must adhere to existing Rules and Regulations, ensuring no violations. Further, he added that considering the views of the RPCs, the NPC may take appropriate decisions/recommendations.

e) **Chairperson, CEA & NPC** clarified that interpreting Rules and Regulations is the responsibility of the legal entity that framed them. He further stated that in cases of interpretation issues, clarification should always be sought from the concerned competent authority.

f) After detailed deliberations, Committee agreed to the amendments in the proposed draft Order and the Conduct of Business Rules of NPC for submission to the Ministry of Power, Government of India, for further consideration and approval.

g) **Decisions of the Committee:**

i) Following amendment in functions of National Power Committee (NPC) and its Conduct of Business Rules were agreed by Committee:

a) Preparation and issuance of National Energy Account (NEA) for interregional and inter-national energy transactions by NPC Secretariat.

b) Decision taken in the NPC shall be considered as concurred by respective RPCs, GRID-India and CTUIL for implementation.

c) NPC may constitute its Sub-Committees, Sub-group, Task Forces, Ad-hoc Committees and Standing Committees, as deemed necessary for efficient functioning. It may also set up, if required, Groups/ Committees of eminent experts to advise it on issues of specific nature. The level of the representation to the Sub-Committees etc. would depend on the nature of the issue concerned. NPC shall make separate order/rule for above task through a resolution passed in NPC meeting/approval of Chairperson, CEA and subsequent ratification through NPC Meeting.

d) The meetings of NPC would be hosted by RPC on roster basis. However, NPC may decide to create a fund in future for establishment expenses of its Secretariat and conducting NPC meetings and Sub-committees/sub-group meetings or workshop, conferences or seminars etc. NPC shall make separate order/rule for above task through a resolution passed in NPC meeting.

e) Chief Engineer (GM Division, CEA) shall be a member of NPC.

ii) The Committee approved the draft Order and its Conduct of Business Rules for submission to the Ministry of Power, Government of India, for further consideration and approval. Additionally, the Committee authorized the Member Secretary (MS), NPC, to communicate with the Ministry of Power in this matter.

(Action: NPC Secretariat)

4. Uniform Protection Protocol(WRPC Agenda) :

a) **MS, NPC** briefed the agenda to the Committee. She informed that in line with the deliberations of 14th NPC meeting, Protection subgroup of NPC was given a task for preparing Uniform Protection Protocol and Uniform Protection Setting Procedure. Accordingly, the Protection subgroup has prepared this Uniform Protection Protocol. The main features in the Uniform Protection Protocol covers

general philosophy such as design, criteria, fault clearance, time, speed, selectivity, sensitivity, reliability, security. It also covers protection schemes for thermal generating units, hydro generating stations, renewable energy generation, renewable hybrid generating stations, Battery Energy Storage Systems (BESS), protection scheme for Sub-station and transmission lines, HVDC terminals, philosophy of transmission line protection, and transmission line loadability etc.

Regarding Uniform Protection Setting Procedure, she informed that in the document one chapter (6) has been included under heading "Procedure for Protection Settings & Coordination" which suggests that an internal mechanism to ensure effective coordination among all grid-connected entities to achieve the required coordinated protection settings in consultation with stakeholders in their respective regions can be developed by each RPCs. Further, she also mentioned that in the pre-meeting held on 11.11.2024 with RPCs , it has been informed that the Uniform Protection Protocol (**attached at Annexure-II)** has already been adopted by all the RPCs.

b) **Chairperson, CEA & NPC** appreciated the effort done by Protection sub-group of NPC while preparing and finalizing the Uniform Protection Protocol for users of the National Grid. Further, he suggested for creating a **Standing Committee on Protection at National level** for discussion and resolving the protection related issues of Inter-regional and international entity and develop best practices by integrating insights and lessons learned from inter-regional and inter-national protection-related issues.

c) **MS, NRPC** suggested that an officer from the NPC Secretariat may participate in RPC's Protection Committee meetings, which is scheduled on a monthly basis for gaining knowledge on protection related issues. **Chairperson, NPC advised** NPC Secretariat to send officers to the Protection Sub-committee meetings of RPCs for better learning on protection aspect.

d) **Decisions of the Committee:**

i) Uniform Protection Protocol finalized by the Protection Subgroup of NPC were approved by the Committee.

ii) A National Protection Standing Committee may be constituted under chairmanship of Member Secretary, NPC with the representation from PSETD division, CEA, RPCs/NPC, RLDCs, CTUIL, and Grid-India. The Committee will address the inter-regional protection issues having national grid ramifications and inter-national protection related issues and develop best practices by integrating insights and lessons learned from regional, inter-regional, and inter-national protection-related matters.

(Action: NPC Secretariat)

5. <u>Five (5) minute Interface Energy Meters along with AMR system for PAN India</u> (for all Five regions):

a) **MS, NPC** briefed the agenda to the Committee. She informed that the Technical Specifications (TS) of the new 5-minute Interface Energy Meters (IEMs) with Automatic Meter Reading (AMR) and Meter Data Processing (MDP) for the Interstate Transmission System (ISTS) was finalized by Joint Committee. Further, in the 14th NPC meeting, it was decided that a roadmap and activities to be done for transition from 15 minute to 5 minute regime based on the previous studies/ reports in present context may be prepared by CTU. The timeline was to be prepared with the activities to be in sync and coordination for smoother implementation of the project. Further, in the 14th NPC meeting, it was also decided that the agenda for 5-minute Interface Energy Meters with AMR for PAN India needs deliberations in all RPCs. This agenda has since been approved by all the five (5) RPCs.

She further informed that after deliberation with RPCs and NPC in various meetings, CTUIL submitted a draft roadmap and implementation timeframe for 5-minute based metering, scheduling, dispatch, and settlement to the NPC Secretariat. As per the draft roadmap, the total transition time will be approx. 3.5 years considering the preparation of DPR by CTU/POWERGRID, Procurement and implementation of meters and related software, formulation & amendment of CEA & CERC Regulations and Enablement of Hardware/Software by RPCs/RLDCs/ISGS.

b) **Chairperson, CEA & NPC** suggested that in respect of regulatory aspects, initial deliberations are required at the Grid-India, CTU levels and with the participation of representatives from CERC. He further emphasized the importance of ensuring compatibility of already installed meter with the new systems and advised Grid-India to provide feedback on this matter to ensure alignment. Additionally, the quantity of IEM meters, AMR, MDP, and other related items may be identified and finalized at the RPC level.

c) **Chairperson, CEA & NPC** directed that for mode of implementation of Five (5) minute Interface Energy Meters along with AMR system on PAN India basis, an agenda be put up by CTU in NCT for approval within the next six months. CTU is advised to make the necessary efforts accordingly.

He further advised the procurement of new meters must be aligned with the new Technical Specification as approved in earlier 13th NPC meeting. The NPC Secretariat will issue a letter to RPCs in this regard and subsequently, RPCs will communicate this to the respective States/UTs.

He stated that the implementation of Five (5) Minute Interface Energy Meters along with an AMR system for PAN India (across all five regions) is targeted for completion by 3**1st December, 2027**. All necessary preparations and alignment must be ensured for this timeline. **CMD, Grid-India also endorsed the view.**

d) **Member (GO&D), CEA** informed that this agenda has been approved at all RPC levels, and no amendments are required to the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006, including subsequent amendments.

e) **Representative of CTUIL** informed that the DPR for implementation of Five (5) minute Interface Energy Meters along with AMR system for PAN India is under preparation by POWERGRID and same will be submitted to CTU shortly for further processing.

f) **MS, ERPC** emphasized that the existing compatible meters should not be replaced and preliminary assessment should be done while preparing the DPR. Further, he highlighted that the newly supplied meters in the Eastern Region, procured and installed within the last 1-2 years with provisions for 5-minute configuration, should be retained in the system. Additionally, as the regional AMR system in the Eastern Region is already operational, it is not required at present to consider this in the Pan India Project for ER.

g) **Member (GO&D), CEA** suggested that a joint meeting may be held between CEA, RPCs, CTU and Grid-India for further coordination.

h) **MS, SRPC** recommended that primary requirement is the implementation of AMR, which should be prioritized and delinked from implementation of 5-Minute scheduling. He further stated that as per the approved TS, provisions for one-minute instantaneous data at SLDC end should also be included in revised **Roadmap and DPR** for transition from 15 minutes to 5 minutes SEM. **The Committee agreed with the proposal for inclusion of 1-minute instantaneous data availability at SLDC in the Roadmap and DPR.**

i) **Director (MO), Grid-India**, emphasized that the responsibility for the Meter Data Processing (MDP) function should be assigned to NLDC/RLDC in line with the provisions outlined in new Technical Specifications (TS) and relevant CERC Regulations. He further clarified that the CTU's role is confined to managing the meters, implementing the Automated Meter Reading (AMR) system, and ensuring the availability of meter data at the MDP. **The Committee agreed with the views of Grid-India.**

j) **MS, NERPC** requested that PSDF grant may be considered for this project. CTUIL was advised to take up the matter with the PSDF Committee for necessary action.

k) Based on the above deliberation, **the Committee felt** that Five (5) minute IEM along with AMR system, MDP and related software/hardware for PAN India (for all Five regions) must be implemented by **31st December, 2027** and all necessary preparations and alignments must be ensured for this timeline. **The Committee also suggested** that the roadmap needs to be revised by CTU and submit again after considering the inputs from Grid-India, RPCs and NPC Secretariat and the

DPR for implementation of Five (5) minute Interface Energy Meters along with AMR system for PAN India be prepared within the next six months.

l) **Decisions of the Committee:**

i) Five (5) minute Interface Energy Meters along with AMR system, MDP and related software/hardware for PAN India (for all Five regions) shall be implemented by 31st December, 2027. All necessary preparations and alignment including the Regulations of CERC are to be ensured for this timeline. NPC Secretariat will intimate this date to all stakeholders and concerned agencies for preparedness.

(Action: CTU/PowerGrid/Grid-India/RPCs/NPC)

ii) CTU will review, analyze, and identify the regulatory aspect. For addressing these regulatory aspects, initial discussions are required at the level of CTU with Grid-India and participation of a representative of CERC.

(Action: CTU)

iii) An agenda on mode of implementation of Five (5) minute Interface Energy Meters along with AMR system for PAN India may put up by CTU in NCT for approval within the next six months.

(Action: CTU)

iv) CTU may prepare and the submit the revised roadmap and activities to be done for transition from 15 min to 5 min regime after considering the inputs from Grid-India, RPCs and NPC by January, 2025. All necessary preparations and alignment must be ensured for this timeline. The draft roadmap is enclosed at Annexure-III.

(Action: CTU)

v) The inclusion of 1-minute instantaneous SEM data availability at the SLDC may be ensured in the Roadmap and DPR for seamless monitoring and enhanced operational efficiency. However, the state specific requirement for inclusion of 1-minute instantaneous SEM data availability at the SLDC may also be assessed.

(Action: CTU/POWERGRID)

vi) Quantity of IEM meters, AMR, MDP and other related items are to be identified and finalized at RPC level.

(Action: All RPC)

vii) NPC Secretariat will issue a letter to RPCs for procurement of new meters as per the approved new TS and further, RPCs will communicate this requirement to the respective States/UTs.

(Action: NPC Secretariat and all RPC)

6. <u>Report on Automatic Under Frequency Load Shedding (AUFLS) and df/dt scheme</u>:

a) **MS, NPC briefed** the agenda to the Committee. She informed that the report of Task Force on Automatic Under Frequency Load Shedding (AUFLS) and df/dt scheme was approved in the 14th NPC meeting and it was decided that same needs to be taken up for implementation by RPCs. However, it was proposed that a meeting may be convened by NPC Secretariat with stakeholders to address the views of Director SLDC (Odisha) and suggestions of GRID-India, and if any further changes are suggested it shall be brought to next meeting of NPC.

Accordingly, NPC Secretariat had convened a meeting on 06.03.2024. After detailed deliberations, it was decided that the starting frequency/first stage of AUFLS may be considered and implemented at 49.4 Hz as per the Task Force Report. After implementation, if any comments is received, the same may be reviewed. Regarding suggestion of GRID-INDIA to exclude the Distribution connected RE (DRE) rich areas as loads for shedding under AUFLS, it was decided that the DRE rich areas for load shedding under AUFLS may be decided by monitoring of average load/generation of feeders by SLDC.

She further informed that in the pre-meeting among MS, RPCs and MS, NPC held on 11.11.2024, MS, RPCs expressed the opinion that the implementation of the AUFLS and df/dt schemes would be completed by March 2025.

b) **CMD, Grid-India** informed that increasing number of bulk consumers are getting connected at the ISTS level, such as data centers and electrolyzers. Currently, entities such as Sterlite, Balco, and Arcelor-Mittal are already connected in the system. Moving forward, it is important to identify such consumers, as they are not part of any distribution or state utility. These consumers should also designate non-essential loads and be required to provide load relief when necessary.

c) **Chairperson, NPC** suggested that bulk consumers connected at the ISTS and STU levels should implement the UFR scheme, and this should be ensured during the grant of connectivity by CTU and STU. He further advised RPCs to regularly monitor the UFR scheme implementation by bulk consumers connected at ISTS level.

d) **CMD, Grid India** informed that as per Central Electricity Regulatory Commission (Indian Electricity Grid Code) Regulations, 2023, Pumped storage hydro plants operating in pumping mode or ESS operating in charging mode shall be automatically disconnected before the first stage of UFR.

e) **MS, SRPC,** suggested that major lift irrigation loads may be disconnected from the grid for load relief, and all states should be instructed accordingly.

f) **Chairperson, NPC** suggested that BESS (in charging mode) may disconnect first at 49.6 Hz, while pumped hydro (in pumping mode) may disconnect at 49.5 Hz. He also advised that RPCs may instruct states to disconnect lift irrigation loads for load relief. He also directed NPC Secretariat to issue a letter to RPCs for quantum of load shedding including UFR implementation for bulk power consumer /BESS/pumped hydro in and RPCs to further communicate this requirement to the respective States.

g) <u>Decisions of the Committee</u>:

i) The following quantum of load relief settings of AUFLS scheme for year 2024-25 were approved by the Committee:

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%	3802	3214	3425	1383	174	11998
2	Stage 2	49.2 Hz	6.00%	4562	3857	4109	1659	208	14395
3	Stage 3	49.0 Hz	7.00%	5322	4500	4794	1936	243	16795
4	Stage 4	48.8 Hz	7.00%	5322	4500	4794	1936	243	16795
	Total (in MW):			**19008**	**16071**	**17122**	**6914**	**868**	**59983**

ii) The AUFLS scheme must ensure Pumped storage hydro plants operating in pumping mode or ESS operating in charging mode shall be automatically disconnected before the first stage of UFR.

(Action: All RPCs)

iii) Bulk consumers connected to ISTS and STU networks must implement the UFR scheme. Compliance should be ensured during the grant of connectivity by CTU and STU.

(Action: CTU and All RPCs)

iv) The implementation of the AUFLS and df/dt schemes must be completed by March 2025. RPCs are required to regularly monitor the implementation of the UFR scheme as a whole including the bulk consumers connected at the ISTS level. RPCs may communicate above decisions to the respective States for implementation.

(Action: All RPCs)

7. SOP for Voice over Internet Protocol (VOIP) connectivity to utilities from RLDC Exchange (NRPC Agenda):

a) **MS, NPC** briefed the agenda to the Committee. Further, she informed that in line with the 14th NPC meeting decision, the Committee under the chairmanship of MS, NRPC with representations from all RPCs, PCD Division, CEA, NPC, RLDCs/Grid India, CTU, POWERGRID and concerned private entities has deliberated and prepared the Standard Operating Procedure (SOP) for VOIP connectivity (**attached at Annexure-IV)** and same was circulated to all RPCs. In the pre-meeting held on 11.11.2024, among the MS, RPCs, and MS, NPC, the Report was accepted by all RPCs.

b) The Committee agreed on the Standard Operating Procedure (SOP) for Voice over Internet Protocol (VOIP) connectivity to utilities from the RLDC Exchange.

c) **Decision of the Committee:**

i) The SOP for Voice over Internet Protocol (VOIP) connectivity to utilities from RLDC Exchange were approved by the Committee.

8. Unified Accounting Software (UAS) for RPCs (NRPC Agenda):

a) **MS, NPC** briefed the agenda to the Committee. She informed that as per decision taken in the review meeting of RPCs held on 07.08.2024 under the chairmanship of Chairperson, CEA/NPC , the work of UAS was assigned to NRPC and the function of preparing DPR, NIT and other documents assigned to Committee under MS, NRPC. Accordingly, reconstitution of the Committee for implementation of the Unified Accounting Software (UAS) for RPCs has been issued by NPC secretariat on 11.09.2024.

b) **MS, NRPC** informed that the Committee has deliberated extensively and worked hard for preparing the draft DPR. However, there are some disagreement among RPCs on two points. i.e

i) On- premise Data Center (DC) with Disaster Recovery (DR) or Cloud Hosting
ii) Centralized vs De-centralized DC and DR

On query of Chairperson, CEA & NPC regarding hosting servers on-premise versus on the cloud, **Director (MO), Grid-India**, explained that an on-premise server facility offers advantages in terms of cybersecurity, isolation, and control, making it particularly useful for handling sensitive data. Additionally, the scheduling

application, which operates 24x7, benefits from being hosted on premise. He mentioned that the cloud infrastructure, which provides high availability, if needed, operates on a subscription model. Since the accounting application does not demand extensive infrastructure, an on-premise server is preferable, as it ensures everything remains under direct control.

c) **Chairperson, CEA & NPC** suggested that Grid India's inputs may be considered for implementation. He further suggested the formation of an implementation Committee, comprising representative from RPCs and NPC, under the chairmanship of MS, NRPC. Additionally, he recommended conducting a mock trial before the UAS goes live.

d) **MS, NRPC** suggested the location of on-premise server with Data Center at NRPC and Disaster Recovery at SRPC, ensuring compliance with seismic zone requirements.

e) **MS, SRPC** proposed extending the AMC period for UAS from the existing 7 years to 10 years in the DPR.

f) **The Committee** agreed to establish an on-premise server with a data center at NRPC and a disaster recovery site at SRPC for UAS, with an AMC period of up to 10 years. The Committee also advised NRPC to submit the DPR accordingly for PSDF funding at the earliest.

g) **<u>Decisions of the Committee</u>:**

i) On-premise server system, along with the Data Center, will be located at NRPC, Delhi, with Disaster Recovery at SRPC, Bangalore.

ii) The DPR may be submitted to the PSDF Secretariat, NLDC, for PSDF funding at the earliest.

(Action: NRPC)

iii) NRPC may seek quotations from the vendor at the earliest. AMC period for UAS has to be considered for 10 Years.

(Action: NRPC)

iv) An Implementation Committee may be formed under the Chairmanship of MS, NRPC with representative from RPCs/NPC as members.

(Action: NPC Secretariat)

9. <u>Unified Real Time Dynamic State Measurement (URTDSM) Project Phase-II</u> (PowerGrid Agenda)

a) **MS, NPC** briefed the agenda to the Committee. She informed that in the 14th NPC meeting it was decided that POWERGRID may incorporate the following suggestion in the scope of DPR to optimize the cost of the project:

i. Optimization of the number of Phasor Measurement Units (PMUs) for Phase II based on the importance of PMU location for grid operation, consulting with users like RLDCs and SLDCs.
ii. Excluding new substations from the scope for URTDSM phase-II: As per CEA Construction Regulations, 2022, PMUs must be installed in all new substations. This Regulation came into force on the date of their publication (23.12.2022) in the Official Gazette, and therefore, new substations (post 23.12.2022) may be excluded from URTDSM Phase-II scope.
iii. Exclusion of components of URTDSM phase –I (which will complete their useful life by 2026) from the scope of URTDSM phase-II.
iv. Development of Software Analytics by use of new technologies such as Artificial Intelligence (AI), Machine Learning (ML), and big data analytics in consultation with the RLDCs/RPCs.
v. Reduction of the storage duration of data under URTDSM phase II in consultation with GRID-India.

b) Further, she informed that a meeting was held under the Chairmanship of Member (PS), CEA, on 20.06.2024 to clarify issues regarding the installation of Phasor Measurement Units (PMUs) on a PAN India basis. The meeting aimed to resolve as to which documents should be referred for the implementation of PMUs and to suggest ways to harmonize the requirements into a single guideline. Currently, the available documents are the "Interface Requirements" under the Central Electricity Regulatory Commission (Communication System for Inter-State Transmission of Electricity) Regulations, 2017, Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, and the Subcommittee report on the implementation of PMUs. In the meeting, following were decided:
   i. A Committee under the Chairmanship of Member (Power System), CEA with members from Grid India, CTUIL, Electric Power Transmission Association (EPTA), Power Grid would be constituted to examine the various PMU guidelines currently in force viz., CERC interface guidelines, CEA Construction Standards 2022 and Subcommittee report and will suggest the ways to harmonize the requirements into one single guideline.
   ii. A single, unified version of PMU placement guidelines is to be notified for compliance in all upcoming projects.
   iii. For the Transmission schemes for which bidding was completed before December, 2022 i.e. the date of notification of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, PMU installation may be considered as per placement philosophy of Sub-committee report and as per the decision taken in the 14th NPC meeting.
   iv. For the Transmission Scheme for which bidding was completed after December, 2022 and before January 2024 i.e. date of notification of CERC Interface Guidelines, PMUs shall be installed as per RfP document.

v. For the transmission Scheme for which bid is to be completed after January, 2024, PMUs shall be installed as per CERC Interface Guidelines till a single, unified version of PMU placement guidelines is notified.

c) **Representative of POWERGRID** informed that the proposal for implementation of URTDSM phase II project in RTM mode was taken to all RPCs. The RPCs had the following observations:
   i) 73rd NRPC (21.05.2024) – Members have agreed in-principle (technically). RTM funding proposal to be deliberated.
   ii) 52nd SRPC (03.08.2024), 50th COM SR Meeting (23.09.2024) & Special Meeting with SRPC on 05.11.2024 – In-principle agreed, further deliberation for funding proposal required. Control center is alright. Uniform guidelines awaited for PMU.
   iii) 582nd WRPC OCC Meeting (16.08.2024) & WR SCADA Work Group Meeting on 30.11.2024 – In principle agreed. Control center is alright. PMU to be optimized.
   iv) 219th OCC Meeting of ERPC (24.09.2024) –OCC technically agreed to the proposal of URTDSM Phase-II implementation, but Members opined to explore the possibility of funding this project from PSDF.
   v) 26th NERPC Meeting (05.07.2024) and Special meeting with NERPC (28.10.2024) - The forum opined that the proposal is to be further discussed in Sub-Committee meeting(s) for detailed deliberation/clarification and is therefore referred to the OCC/NETeST meeting of NERPC. Request for funding this project from PSDF.

   Further he informed that the uniform PMU placement philosophy is under finalization, but the quantity of PMUs can be reduced by placing them on critical elements. PMUs on transformers and reactors in existing stations can be deferred. Some RPCs requested for the optimization of PMUs and asked for a detailed quantity and cost breakup. PSDF funding was requested by ERPC and NERPC.

d) **MS, ERPC** informed that the agenda has not been deliberated in the ERPC, but it has been discussed only in the OCC meetings.

e) **Representative of POWERGRID** informed that the cost can be further optimized, particularly for smaller states in NER, by using remote consoles instead of full-fledged control centres. Currently, 34 control centres and approximately 4,000 PMUs have been considered. POWERGRID also highlighted that the replacement of control centres should be prioritized, as the existing control centres are under Annual Maintenance Contracts (AMC) until January 2027, and most of the equipment and systems have become technically obsolete, with no support from the OEMs.

f) **Chairperson, CEA/NPC** suggested that, given the high cost of the project, seven control centers for Grid India and the PMUs for the Central sector can be prioritized for initial implementation. POWERGRID may explore the access to URTDSM data and remote consoles (two units) instead of full control centers. Procurement for

new PMUs under the state sector can be addressed separately after the finalization of the uniform PMU placement philosophy.

g) **Chairperson, CEA/NPC** asked POWERGRID to proceed with the implementation of PMUs only for the Central sector and inquired if GRID India could implement the control centers portion. **CMD, Grid India** informed that collaboration with POWERGRID may be required for the control center hardware and project implementation.

h) **Chairperson, CEA/NPC** advised POWERGRID to submit a revised proposal in consultation with Grid India only for the existing network after segregating the PMUs under ISTS and STUs system. The revised proposal may be put up to the NCT for further consideration.

i) <u>Decisions of the Committee</u>:

i) **PowerGrid is to submit the revised proposal in consultation with Grid India, only for the existing network after segregating the PMUs and control centers under ISTS and STUs system. The proposal may also be revised to optimized number of control centers and PMUs at ISTS & STUs system separately. The revised proposal for ISTS portion may be put up to the NCT for further consideration**.

(Action: PowerGrid)

10. <u>Introduction of MPLS Technology in ISTS Communication</u> (Agenda from CTU)

a) **MS, NPC** briefed the agenda to the Committee. She informed that the Joint Committee members have completed the field visit to conduct testing at RRVPNL and TANTRANSCO substations to witness MPLS interoperability. Further she informed that Report on Introduction of MPLS technology in ISTS communication is under preparation by Joint Committee.

b) **Representative of CTUIL** informed that the draft report of the JC for introduction of MPLS in ISTS Communication has been circulated to all the members of JC on 21.10.2024 by CTU and comments/suggestions were asked from all the members by 15.11.2024. CTU have received the comments from Grid-India (NRLDC) and NPC Secretariat only on the report. Further he informed that CTU shall convene a meeting with all members to finalize the reports after taking inputs from all members. He also highlighted that some states has already gone ahead in MPLS technology like Tamilnadu and Rajasthan.

c) **MS, SRPC suggested that** MPLS technology in ISTS communication may be adopted in hybrid and phase manner.

d) **Chairperson, CEA/NPC** advised CTU to prepare a demand trajectory for MPLS equipment required during the migration from SDH to MPLS over the next 7–10 years. He further emphasized that to address the "Make in India" (MII) constraints

and to encourage greater OEM participation, the initial MII percentage should be reduced, with a gradual increase up to 50% over the years. CEA shall take up this matter with the Ministry of Power (MoP) to optimize the MII percentage for MPLS equipment

He further suggested that ISTS nodes should also be included in the Terms of Reference (ToR). A comprehensive report, including the technical specifications (TS) of MPLS technology in ISTS communication, may be submitted to the Committee for approval.

e) Decisions of the Committee:

i) A comprehensive report, including the technical specifications (TS) of MPLS technology in ISTS communication and demand trajectory for MPLS equipment required during the migration from SDH to MPLS over the next 7–10 years may be submitted by CTU by January, 2025.

(Action: CTU)

ii) The matter may be taken up by CEA with the Ministry of Power (MoP) to optimize the MII percentage for MPLS equipment.

(Action: ET&I Division, CEA)

11. Mismatch between RTU-SCADA real time data and IEM data (WRPC agenda)

a) **MS, NPC** briefed the agenda to the Committee. She informed that it was decided in the 14th NPC meeting held on 03.02.2024 that a Sub-committee may be constituted under chairmanship of MS, WRPC with representation from PowerGrid, RPCs, RLDCs, CTUIL, NPC and states to look into the issue SCADA vs SEM mismatch, reason thereof and also study the pilot project being done by MP. She further informed that three meetings of the Sub-committee were held on 24.05.2024, 02.07.2024, and 08.08.2024. The Sub-committee has submitted the report on 07.11.2024.

b) **MS, WRPC** informed that the sub-committee had deliberated extensively, and the following recommendations have been made:

i. The difference between the SCADA and SEM data is causing appreciable financial implications for the beneficiaries in form of DSM charges. Therefore, integration of SEMs with SCADA must be done to ensure better management of drawl from the regional grid by a beneficiary. However, states may take a call on this as per their own assessment.

ii. The only way to minimize the mismatch is to fetch the data from the same source (i.e. from SEM).

iii. The pilot project carried out by MPPTCL is comparatively better than GETCO as it involves lesser cost and lesser fiddling with existing SEM configuration and therefore, it should be followed in other parts of the country.

iv. The proposed implementation is not in violation of any regulatory provisions.

v. The expenditure of the projects (estimated as about 2 crores for a state) should be borne by the beneficiaries as its associated benefit is comparatively more.
vi. The data fetched from SEM to SCADA may be used only for making operational decisions and may not to utilized for raising commercial disputes.
vii. It is technically feasible to provide real time data (MW/instantaneous) data to SLDC from the RTU/SAS-based substations. However, the meters not supporting MODBUS feature need to be replaced.
viii. In SAS-based system, installing a new mini RTU is the most appropriate solution.
ix. In the existing AMR system, the best way to share real time SEM data is by augmenting the system and running a software application on a backup data server for sharing data through Intranet.
x. The new AMR system, once it comes, will have the provisions of displaying data to RLDCs as well as SLDCs.

c) **Member (GO&D), CEA** suggested that Study Report may be circulated to the stakeholders for implementation at the state level and SCADA point accuracy shall be ensured by STUs/ entities in coordination with SLDCs/ RLDCs. The states may adopt the proposed methodology as per their preference.

d) **Chairperson, CEA/NPC** suggested that location of SEM data and SCADA data should be the same to further reduce errors. He recommended that the necessary changes be incorporated into the final report. Further, he suggested that RPCs should deliberate on the reported discrepancy between SCADA and SEM data, and work towards resolving them. RLDC should identify each SCADA point with discrepancies, and RPCs may address these issues in a separate special meeting.

e) **Decisions of the Committee:**

i) The Report on the mismatch between RTU-SCADA real-time data and IEM data may be modified to include the condition that the locations of the SCADA data and IEM data must be the same, and the report may be circulated to all stakeholders for implementation at the state level as per their preferences.

(Action: WRPC)

ii) Detailed deliberation is required at the RPC level to address reported discrepancies between SCADA and SEM data, with the aim of minimizing errors and ensuring data accuracy.

(Action: All RPCs)

12. Agenda of operational issues of DISCOMs at RPC level

a) **MS, NPC** briefed the agenda to the Committee. She informed that in the 14th NPC meeting, it was decided that DP&T Division, CEA in coordination with the NPC may take lead to discuss the operational issues of the DISCOMs at appropriate forum and Region-wise meeting may be held. RPCs may facilitate these meetings at regional level.

Further she informed that in the 26th TCC and NERPC meeting held on 4-5 July, 2024 at Guwahati, the following agenda points of NE states were discussed in details:

i. Request for Proposals for Down Stream Distribution Network connectivity of 33 kV Sub-stations implemented/being implemented under NERPSIP and Comprehensive Scheme in NE States for funding under RDSS.
ii. Request for Proposals for high Impact distribution sector infrastructure projects to be funded under PM-DevINE scheme of Ministry of DONER.
iii. Request for furnishing the data for preparing Distribution Perspective Plan 2035 by CEA - Discom & High Growth Cities/Town.
iv. Status of Integration of feeders with National Feeder Monitoring System (NFMS)

b) **Member (GO&D), CEA** emphasized that the focus should be confined to technical issues such as planning, reduction of AT&C losses, and the Government of India's RDSS scheme for Discoms.

c) **Chairperson, CEA/NPC suggested** that this agenda be continued in the NPC forum for further discussions. The operational aspects of DISCOMs may be addressed at the RPC level. He also emphasized that monitoring of the installation of 30 GW of capacity under the PM Surya Ghar Yojana scheme at Discom level may be discussed under this agenda item.

d) **<u>Decisions of the Committee</u>:**

i) Only the operational aspects of DISCOMs may be discussed at the RPC level.

(Action: All RPCs)

ii) Monitoring of the installation of 30 GW of capacity under the PM Surya Ghar Yojana scheme at Discom level may be discussed under this agenda item.

(Action: All RPCs)

13. <u>Establishment of State-of- the-Art National Unified Network Management System (NUNMS) in main & backup configuration integrating all the regional UNMSs</u> (Agenda by CTU)

a) **MS, NPC** briefed the agenda to the Committee. She informed that in the 14th NPC meeting, it was decided that the agenda for implementation of National-UNMS needs deliberations at RPC level for taking the views of RPCs. CTU may take up

agenda for implementation of National-UNMS in the upcoming meeting of RPCs. The cost booking under National Component may be included in proposal.

She further informed that in this regards the status provided by RPCs was as follows:

i. **SRPC:** In 50th Meeting of SRPC held on 16.03.2024, SRPC approved for establishment of National -UNMS and sharing of cost. Recommended that CTUIL to seek PSDF funding for the same.

ii. **NRPC:** The scheme for establishment of National-UNMS was approved by NRPC in its 72nd meeting held on 30.03.2024.

iii. **WRPC:** The proposal of National-UNMS was approved in the 49th WRPC meeting held on 13.04.2024.

iv. **ERPC:** In 52nd ERPC meeting, ERPC accorded in-principle approval to the National UNMS project. However, in the 219th OCC meeting, OCC opined that once the regional UNMS project gets successfully implemented in WR and SR, the proposal shall be re-examined in ERPC forum.

v. **NERPC:** The matter was deliberated in 53rd Commercial Committee Meeting of NERPC scheduled on October 18, 2024 at Itanagar Arunachal Pradesh. The matter was further taken to ensuing NERPC meeting scheduled on 08th November 2024 at Guwahati for taking the views of NERPC. The decision/views of NERPC will be communicated accordingly.

b) **Representative of CTU** informed that the implementation of UNMS scheme has been approved in all the RPC forums. However, ER has expressed concerns regarding the timely implementation of the regional schemes in WR and SR, before National UNMS.

She further informed that POWERGRID will provide the updated write-up and Cost estimate for National UNMS project to CTU. The functionality of the Outage Management Portal for National and Regional ISTS Communication Networks, will be aligned with the revised Standard Operating Procedure (SOP) of the NPC Subgroup for Communication System Outage Planning and shall be included in the project scope.

c) **Chairperson, CEA/NPC** emphasized that the National UNMS project award and implementation should be closely coordinated with the commissioning of Regional UNMS to ensure seamless integration of all five regional schemes with the National UNMS. The proposal may be submitted by the CTU to the NCT for approval.

d) **<u>Decisions of the Committee</u>:**

i) Implementation of National UNMS project was agreed by the Committee.

ii) **POWERGRID will provide the updated write-up and Cost estimate for National UNMS project to CTU.**

(Action: POWERGRID)

iii) **The functionality of the Outage Management Portal for National and Regional ISTS Communication Networks, will be aligned with the revised Standard Operating Procedure (SOP) of the NPC Subgroup for Communication System Outage Planning and shall be included in the project scope. The proposal for Implementation of regional and National UNMS may be submitted by the CTU to the NCT for approval.**

(Action: CTU)

14. <u>Modification related to the reporting of GD-1 due to outage of 132 kV radial system with negligible load or generation loss (in case of NER)</u>: (Agenda by NERPC)

a) **MS, NPC** briefed the agenda to the Committee. She informed that as per Regulations 11(2) of CEA (Grid Standard) Regulations, 2010 GD-I means ***"When less than ten percent of the antecedent generation or load in a regional grid is lost"***

She further informed that presently, NER is reporting grid events for 132 kV and above system whereas other regions are reporting grid events for 220 kV and above system. In case of North Eastern region, 132 kV power system consist of many radial feeders. Further the load loss due to tripping of such feeders are almost negligible as compared to the regional antecedent generation or load which resulted into the reporting of higher numbers of Grid Events per month as compared to other regions.

She also informed that during April'24 to September'24, 46% of the Grid Events reported with Load/Generation loss upto 10 MW and 32% of the Grid Events reported which was radially fed area through single feeder only (Loss upto 10 MW)

b) **MS, NERPC** informed that the geographic location, vulnerability to natural calamities, and extensive forest areas in the NER states contribute to the high occurrence of grid incidents in radial feeders.

c) **CMD Grid-India** suggested that Grid incidents should be closely monitored and reporting should also be done for further reduction and improvement.

d) **Chairperson, NPC** suggested that the outage of the 132 kV system in the NER should not be excluded from the GD-1 category; otherwise, reliability and performance of NER systems may not improve. He further emphasized the need to identify the root causes of Grid events and take measures to minimize their occurrence.

e) **Decisions of the Committee:**

i) **The Committee did not agree to the NERPC proposal, citing concerns about its potential impact on the reliability and performance of the NER system. The Committee advised NERPC to identify the root cause of the Grid event failure and take measures to minimize their occurrence.**

(Action: NERPC)

15. Firewall installation for existing ISTS sub-stations (RTM & TBCB) (Agenda of CTU)

a) **MS, NPC** briefed the agenda to the Committee. She informed that presently, firewalls are not installed at existing substations of POWERGRID and some of the other Private TSPs substations to ensure perimeter security. Further she informed that the issue need to be deliberated regarding POWERGRID and private TSPs, concerning the booking of expenditure on the installation of firewalls and compliance with other requirements under the CEA Cyber Security Guidelines for the Power Sector, 2021, as well as the upcoming CEA Cyber Security Regulations. This includes consideration of additional capitalization for RTM substations and treatment as "Change in Law" under the TSA for TBCB substations, in line with the CERC Order in Petition No. 94/MP/2021 and cost of firewall installation and cybersecurity may be managed under the TSP's O&M expenses.

b) **CTU** informed that to ensure cyber security compliance as per CEA guidelines, firewall devices are being specified in Substations. These are must to ensure security of the substations telemetry system and Control center system.

c) **POWERGRID** informed that they are procuring two firewalls for each of their 273 ISTS substations, including those implemented under RTM or TBCB. The cost of firewalls is about Rs.30 lakhs per substation and there are some central systems in place for their management and maintenance. The total project cost is around Rs. 110 crores, which includes maintenance for 7 years and project updates. Since this is an IT system, the project has a lifecycle of 7 years. Further, POWERGRID requested for approval of the project implementation under RTM mode.

d) **Chairperson, CEA/NPC** inquired whether the project could be included under the O&M expenditure head. POWERGRID stated that since this is a new requirement, it is preferred to treat it as a separate project.

e) **RPCs** suggested that the number of firewalls included in the proposal should also be reviewed to ensure alignment with actual requirements.

f) **Chairperson, NPC,** advised that the proposal regarding the recovery of costs for firewall installation at existing ISTS substations (RTM & TBCB) may be examined by the Power System Wing, CEA. It may be discussed with Cyber Security Division, CEA, F&CA Division, CEA, PSPA-I Division, CEA, RPCs, CTU and POWERGRID. Following the cost examination, the proposal may be submitted at the next NPC meeting for further consideration.

Decisions of the Committee:

i) **The proposal of recovery of costs for firewall installation at existing ISTS substations (RTM & TBCB) may be examined by the Power System Wing of CEA in consultation with Cyber Security Division, CEA, F&CA Division, CEA, PSPA-I Division, CEA, RPCs, CTU and POWERGRID at the earliest.**

(Action: PS wing, CEA)

ii) **After the cost examination, the proposal may be submitted at the next NPC meeting.**

(Action: CTU)

16. Implementation methodology for VOIP Communication system for Grid-Operation for all Five Regions NR, NER, SR, WR, ER as PAN India (Agenda of CTU)

a) **MS, NPC** briefed the agenda to the Committee. She informed that the VoIP-based Hotline Communication system, implemented in 2016 to ensure fast and reliable communication for grid operators after the 2012 grid disturbances, is facing obsolescence. OEM support will end by July 2025, leaving POWERGRID unable to maintain the system beyond this date.

Representative of CTU informed that they are engaged with various VoIP suppliers, utilities, and regional committees to ensure that uniform system specifications are adopted across all regions. Tentative cost estimates have been derived from budgetary quotes obtained from three OEMs. The proposal has been in-principle approved in all RPCs, with a request for CTU to furnish detailed cost breakdowns. The costs have been categorized into:

- **Regional Central Sector** – Shared by regional DICs under the Regional Component (CERC regulations).
- **National Central Sector** – Shared by all regional DICs under the National Component.
- **State Sector** – Costs, including AMC expenses, will be borne by the respective states.

MS, NPC informed that during the pre-meeting held on 11.11.2024, it was suggested that further cost optimization is required before finalization.

b) **Committee** observed that the cost of the proposed VOIP communication system for grid operation across all five regions (NR, NER, SR, WR, ER) on a

PAN-India basis is significantly high and emphasized the need for cost optimization.

c) **MS, SRPC,** suggested that the number of firewalls included in the proposal should also be reviewed to ensure alignment with firewall agenda.

d) **Chairperson, CEA/NPC** advised that after cost optimization and segregating the costs between central and state entities, the revised proposal may be put up to the NCT for further consideration.

e) **Decisions of the Committee:**

i) After reviewing the proposal with cost optimization and segregating the costs between central and state entities, the revised proposal for central entities may be put up to the NCT for further consideration.

(Action: CTU)

17. Best practices/procedures being followed by RPC

a) **MS, NPC** briefed the agenda to the Committee. She informed that in the 14th NPC meeting it was decided that the Standard Operating Procedures (SOPs) finalized by the respective subgroups may be revised based on any suggestions from subgroup members. Accordingly, Standard Operating Procedures (SOPs) are revised after due deliberations in the respective subgroup meetings and the same was circulated to RPCs vide letter dated 08.07.2024 **(Annexure-V)** for implementation/adoption:

i. Third Party Protection System Audit.
ii. Grid Disturbances/Grid Incidents/Tripping's.
iii. Communication Audit for Substations.
iv. Communication System Outage Planning.

Further, MS, NPC informed that based on the detailed deliberation in the subgroup meetings these SOPs were revised. These SOPs were adopted by all RPCs.

b) **Committee** agreed to the proposed amendment to the SOPs finalized in the respective subgroup of NPC as above.

c) Decision of the Committee:

i. The revised SOP for Third Party Protection System Audit, Grid Disturbances/Grid Incidents/Tripping's, Communication Audit for Substations and Communication System Outage Planning were approved by the Committee.

18. List of external agencies for conducting Third Party Protection Audit

a) **MS, NPC** briefed the agenda to the Committee. She informed that in the 14th NPC meeting it was decide that the list of external agencies for conducting Third Party Protection Audit may be prepared by the Protection sub-group of NPC for

reference. Accordingly, NPC Secretariat based on the inputs received from RPCs and subsequent deliberations in the Protection sub-group meeting of NPC, prepared a consolidated draft list of external agencies for conducting Third Party Protection Audits.

b) **CMD, Grid-India** suggested that the list of agencies eligible for conducting third party protection audits should be expanded to include additional qualified entities to enhance participation and expertise.

c) MS, ERPC informed that Qualifying Criteria for selection of prospective Bidders for Third Party Protection Audit is under preparation for Eastern Region.

d) **Chairperson, CEA/NPC** expressed concerns regarding the authenticity of external agencies conducting third party protection audits. He emphasized that the credibility of these agencies must be verified thoroughly through both quantitative and qualitative assessment criteria.

He further proposed the development of comprehensive guidelines detailing the assessment criteria and the process for selecting external agencies. Input from Grid-India should also be sought to ensure robustness in the selection process.

Chairperson, CEA/NPC recommended the preparation of Standard Qualifying criteria for selection of third-party protection audit agencies to standardize the engagement process across all RPCs. Additionally, Terms of Reference (ToR) should be prepared, along with defined timelines for the execution of third-party protection audits.

e) <u>Decisions of the Committee</u>:

i) Developing Qualifying Criteria for selection of prospective Bidders for Third Party Protection Audit to ensure authenticity and reliability.

(Action: ERPC)

19. <u>Updated Status of the following Agenda items</u>

a) <u>Constitution of Protection System Analysis Group</u> (PSAG):

MS, NPC briefed the agenda to the Committee. She informed that it was decided in the 14th NPC meeting that Protection System Analysis Group (PSAG) may be constituted at RPC level consisting of the members from RPC, NPC, NLDC, RLDC, PowerGrid, a Protection Expert from the region along with the entity under whose jurisdiction GD/GI occurred to analyse Grid Disturbances/Grid Incidents occurred at major/critical substations or at substations that affected critical/essential/strategic loads. The PSAG may exist always to analyze such GD/GI in a region.

Further she informed that SRPC and NERPC have already constituted the PSAG. Formation of PSAG is under process at ERPC. However, WRPC &

NRPC informed that they are taking up the matter in the Protection Sub-committee Meetings. WRPC & NRPC were requested to form a PSAG as per earlier decision.

b) **Preparation of an annual calendar for conducting the protection system audits:**

MS, NPC informed that all the RPCs have prepared the annual calendar for 2024-25 for conducting protection system audit.

c) Review of Status of Islanding schemes

MS, NPC informed that RPCs may handhold the states for timely implementation of the islanding scheme and the timeline may be given by RPC to each state for DPR preparation and implementation of Islanding Scheme.

Further, she requested RPCs that the existing islanding schemes may be reviewed, and a comprehensive plan may be prepared by the RPCs to ensure operational resilience.

d) Mapping of Feeders under AUFLS schemes on SCADA system

Regarding Mapping of Feeders under AUFLS schemes on SCADA system, MS, NPC requested to expedite the work by WRPC, NRPC and NERPC to conduct meetings with their DISCOMs to find solutions for feeder mapping and expedite the same in their regions.

e) **Chairperson, NPC** suggested that all these tasks should be effectively managed and executed by the respective RPCs.

f) Decisions of the Committee:

i) Protection System Analysis Group (PSAG) shall be constituted by all RPCs to enhance the reliability and performance of the grid.

(Action: ERPC/NRPC/WRPC)

ii) Considering the critical loads, the existing islanding schemes may be reviewed, and a comprehensive plan may be prepared by the RPCs to ensure operational resilience. The new Islanding schemes may be send to NLDC for PSDF funding.

(Action: All RPC)

iii) The mapping of feeders under AUFLS schemes on SCADA system will be monitored and regularly updated.

(Action: RPCs/NPC Secretariat)

20. Grid Security issues during major generation loss (Agenda by NRPC):

a) **MS, NPC** briefed the agenda to the Committee. She informed that RE penetration is increasing in the country and its uncertainty is affecting the secure grid operation. On several occasions, RE generation loss in the range of 3000 to 6000 MW have occurred in Northern Region. With existing regulatory provisions, generation can be rescheduled from N+7/N+8 time block, meaning that drawl schedule of the states will also get revise from N+7/N+8 time block. Thus states are eligible to draw power as per their drawl schedule against a generation schedule where actual injection is zero.

   She further informed that real time load generation balance remains affected for next 90 minutes as during peak demand season, there is limited option for ancillary dispatches. To ensure secure grid operation, in case of major generation loss, revision of schedule to be applicable either in the same time block or from next time block may be considered.

b) **MS, NRPC** explained that sudden cloud cover in specific regions of renewable energy (RE) rich states is causing significant generation losses. These losses disrupt the real-time load generation balance and have a cascading effect lasting up to 90 minutes, particularly during peak demand periods

c) **Member (GO&D), CEA** emphasized that that this agenda item seeks to highlight the issue for the Committee's attention and deliberation to find viable solutions, as it has become a pressing concern across all regions.

d) **MS, SRPC** suggested that revising the schedule of beneficiary from the next time block may result in higher DSM penalties compared to the existing practice of schedule revisions in the 7th or 8th time block, as states are drawing power based on their current schedules. Furthermore, he added that this approach might be beneficial in some cases, it would result in increased penalties in most cases.

e) **Chairperson, CEA/NPC** emphasized two major issues: forecasting errors and limited availability of ancillary services. He suggested that these issues could be improved by partnering with IMD to enhance forecasting accuracy. Further, he informed that IMD has set a target of providing 3-hourly forecast data by March 2025 and plans to reduce this interval to 1-hourly forecasts progressively.

   He further suggested that to enhance ancillary service capacity, RPCs should regularly monitor the unused capacity and work towards integrating it into the system.

f) **CMD, Grid-India** stated that while there is a 5–6 GW potential capacity for ancillary services, only 1 GW is currently operational in the AGC framework. The thermal capacity is unable to accommodate sudden RE generation losses due to cloud cover, as thermal plants face ramping issues.

g) Decisions of the Committee:

i) To address sudden RE generation losses, the main focus should be on improving forecasting accuracy.

(Action: All RPC)

ii) Analyze and monitor idle unused capacity and integrate it into the system for ancillary services to enhance grid stability and reliability.

(Action: Grid-India / All RPC)

21. Hosting of NPC meeting:

a) **MS, NPC** informed that as per the roster finalized in the 5th NPC meeting, the next NPC meeting would be hosted by NERPC. The Committee agreed to the proposal.

b) Decisions of the Committee:

i) The 16th NPC meeting will be hosted by NERPC. The date and venue will be finalized in consultation with NERPC.

(Action: NERPC)

22. Methodology for certification process of Intra-state line carrying interstate power:

a) **MD, HPPTCL** submitted that as per the CERC (Terms and Conditions of Tariff) Regulations, 2024, CEA has mandate to frame a methodology for certification process of intra-state lines carrying interstate power. He further requested Chairperson, NPC to bring out the methodology in this regard at the earliest for benefit of states.

b) **Member (GO&D), CEA** informed that the guidelines for the certification process of intra-state lines carrying interstate power is currently under approval. It will be issued shortly after receiving approval from Authority.

23. Sharing of Communication Fiber link:

a) **Member (GO&D), CEA** informed that the issue of sharing communication fiber links has been pending for a long time. He further informed that beneficiaries frequently raise this matter in various RPC forums, emphasizing the need for a standardized methodology to facilitate the sharing of communication fiber links for commercial settlements. In this regard, a Committee under Member (PS), CEA, already exists for this purpose and urged for expediting the finalization of the methodology.

b) In response to a query from the Chairperson, CEA/NPC, regarding the current sharing methodology, it was clarified that sharing is presently carried out on a bilateral basis.

c) **Chairperson, CEA/NPC** directed MS, NPC, to follow up with Member (PS), CEA, to expedite the development and implementation of the methodology for sharing communication fiber links.

The meeting concluded with a Vote of Thanks to the Chairperson, all NPC members, and participants for their valuable contributions and active participation.

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Annexure –A

List of Participants in the 15th Meeting of National Power Committee held on 14.11.2024 at Nagpur (Maharashtra).

Central Electricity Authority (CEA)

1. Sh.Ghanshyam Prasad, Chairperson……. (In Chair)
2. Sh. Hemant Jain, Member (GO&D)
3. Smt. Rishika sharan, Member Secretary, NPC
4. Sh.Satyendra Kr. Dotan, Director, NPC
5. Sh.Ravi Shankar Singh, Dy. Director, NPC
6. Sh. Shishir Kumar Pradhan, Dy. Director, NPC

Eastern Regional Power Committee (ERPC)

1. Sh. Sonam Rinchen Bhutia, Chairperson TCC
2. Sh.N.S. Mondal, Member Secretary
3. Sh. S. Kejriwal, Superintending Engineer
4. Sh.P. P. Jena, Executive Engineer

Western Regional Power Committee (WRPC)

1. Sh. R. K. Shukla, Chairperson TCC
2. Sh. Deepak kumar, Member Secretary
3. Sh. D.N.Gawali, Superintending Engineer
4. Sh. P. D. Lone, Superintending Engineer
5. Sh. B V Sandeep, Deputy Director
6. Sh. Vidyasagar Paladugu, Deputy Director
7. Sh. Sunny Parmar, Assistant Director

Southern Regional Power Committee (SRPC)

1. Sh. R. Jayakumar, Chairperson TCC
2. Sh. Asit Singh, Member Secretary
3. Sh. N.R.L.K. Prasad, Superintending Engineer

North Regional Power Committee (NRPC)

1. Sh. Rajeev Sood, Chairperson NRPC
2. Sh.V. K. Singh, Member Secretary
3. Sh. Praveen Jangra, Executive Engineer

North Eastern Regional Power Committee (NERPC)

1. Sh. Bibhu Bhuyan, Chairperson TCC
2. Sh. K. B. Jagtap, Member secretary
3. Sh. Vikash Shankar, Asstt. Executive Engineer

Grid-India

1. Sh. S. R. Narsimhan, CMD
2. Sh. S.C. Saxena, Director (M.O.)
3. Smt. S. Usha, Head, NLDC

4. Sh. Vivek Pandey, Senior General Manager,NLDC
5. Smt. Pushpa S., Chief General Manager, WRLDC
6. Sh. S. K. Chandrakar, General Manager, WRLDC
7. Sh. T. R. Mohapatra, Senior Deputy General Manager, WRLDC

Central Transmission Utility of India Limited (CTUIL)

1. Sh. H. S. Kaushal, Senior General Manager
2. Smt. Nutan Mishra, Senior General Manager

PowerGrid

1. Sh. Arun Kumar Singh, Senior General Manager

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Annexure-I 15th NPC
DRAFT

No. A-60016/24/2012-Adm-I
Government of India
Ministry of Power

New Delhi, Dated:

O R D E R

Subject: Establishment of National Power Committee (NPC).

Keeping in view the ever growing complexity of Power System, synchronous mode of operation of the entire grid of the country and to evolve a common approach to issues related to reliability and security of the grid, it has been decided with the approval of the Competent Authority to establish National Power Committee (NPC). The composition of the Committee shall be as under:

1. Chairperson, CEA	Chairperson of NPC
2. Member (GO&D), CEA	Member
3. Chairperson of each of NRPC, WRPC, SRPC and ERPC	Member
4. Representative of Chairperson, NERPC	Member
5. TCC Chairperson of each RPC (NRPC, WRPC, SRPC, ERPC, NERPC)	Member
6. Member Secretary of each of NRPC, WRPC, SRPC, ERPC & NERPC	Member
7. CMD, GRID-India	Member
8. CEO, CTUIL	Member
9. Chief Engineer (GM Div, CEA)	Member
10. Chief Engineer (NPC Div, CEA)	Member Secretary

2. NPC shall carry out following functions for integrated operation of the power system of the country:

(i) To resolve issue among RPCs,

(ii) Discuss and resolve issues referred to NPC requiring consultation among one or more RPCs, concerning inter-alia inter-regional implication or any other issue affecting more than one region or all regions,

(iii) Preparation and issuance of National Energy Account (NEA) for inter-regional and inter-national energy transactions by NPC Secretariat.

P.T.O

3. Decision taken in the NPC shall be considered as concurred by respective RPCs, GRID-India and CTUIL for implementation.
4. The Committee may constitute its Sub-Committees, Sub-group, Task Forces, Ad-hoc Committees and Standing Committees, as deemed necessary for efficient functioning. It may also set up, if required, Groups/ Committees of eminent experts to advise it on issues of specific nature.
5. The Conduct of the Business Rule (CBR) for NPC providing for establishment of the secretariat of NPC, procedure for conduct of meetings of NPC, funding etc. is at **Annexure.**

( )
Deputy Secretary to Govt. of India
Tel No.

To:

1. Chairperson, CEA
2. Member (GO&D), CEA
3. Chairperson of NRPC/WRPC/SRPC/ERPC/NERPC
4. TCC Chairperson of NRPC/WRPC/SRPC/ERPC/NERPC
5. Member Secretary of NRPC/WRPC/SRPC/ERPC/NERPC
6. Chief Engineer (GM Div, CEA)
7. Member Secretary, NPC
8. CMD, GRID-INDIA
9. CEO, CTUIL

Copy to:

1. PS to Hon'ble Minister of Power
2. PS to Hon'ble Minister of State for Power
3. PPS to Secretary (Power)/ PPS to AS (SN)
4. All Joint Secretaries/Chief Engineers, Ministry of Power
5. All Directors/ Deputy Secretaries, Ministry of Power

( )
Deputy Secretary to Govt. of India
Tel No.

Annexure-I 15th NPC
DRAFT

Annex to Order No. No. A-60016/24/2012-Adm-I dated ----------

National Power Committee

Conduct of Business Rules

CHAPTER I

GENERAL

1. Short title and commencement:

These rules shall come into force from the date of its formation i.e. …….2024 and shall remain in force unless otherwise modified.

2. Definitions:

2.1 In these Rules unless the context otherwise requires: -

(a) 'Agenda' means the list of business proposed to be transacted at a meeting of the Committee.
(b) 'Committee' means the National Power Committee
(c) 'Meeting' means a meeting of the Committee convened by Member Secretary after consultation with Chairperson, NPC.
(d) 'Member' means the member of the NPC
(e) 'Rule' means National Power Committee (Conduct of Business) Rules, 2024.

3. Composition of NPC:

1. Chairperson, CEA – Chairperson, NPC
2. Member (GO&D), CEA
3. Chairperson, NRPC
4. Chairperson, WRPC
5. Chairperson, SRPC
6. Chairperson, ERPC
7. Representative of Chairperson, NERPC
8. Chairperson, TCC of NRPC
9. Chairperson, TCC of WRPC
10. Chairperson, TCC of SRPC
11. Chairperson, TCC of ERPC
12. Chairperson, TCC of NERPC
13. Member Secretary, NRPC
14. Member Secretary, WRPC
15. Member Secretary, SRPC
16. Member Secretary, ERPC
17. Member Secretary, NERPC
18. CMD, GRID-INDIA
19. CEO, CTUIL
20. Chief Engineer (GM Div, CEA)
21. Chief Engineer, NPC Div., CEA – Member Secretary, NPC

4. Functions of NPC

NPC shall carry out following functions for integrated operation of the power system of the country:

(i) To resolve issue among RPCs

(ii) Discuss and resolve issues referred to NPC requiring consultation among one or more RPCs, concerning inter-alia inter-regional implication or any other issue affecting more than one region or all regions.

(iii) Preparation and issuance of National Energy Account (NEA) for inter-regional and inter-national energy transactions by NPC Secretariat.

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Decision taken in the NPC shall be considered as concurred by respective RPCs, GRID-India and CTUIL for implementation.

5. Secretariat of NPC

Secretariat of NPC will be provided by CEA and Chief Engineer (NPC Division), CEA will be Member Secretary. Secretariat shall perform the following duties namely:

a) Keep custody of records of proceedings of the Committee meetings.

b) Prepare agenda for the Committee meetings.

c) Prepare minutes of Committee meetings.

d) Take follow-up action on the decision taken in the Committee meetings.

e) Collect from constituent members or other offices or any other party as may be directed by Committee, such information as may be considered useful for the efficient discharge of functions of the Committee and place the information before the Committee.

f) Preparation and issuance of National Energy Account (NEA) for inter-regional and inter-national energy transactions.

g) The duties and responsibility envisaged under Orders/ Regulations of MoP, CEA, CERC, NPC Resolutions, GoI Resolutions from time to time shall be carried out by the NPC Secretariat.

CHAPTER II
PROCEDURE FOR CONDUCTING NPC MEETINGS

6. Place and date of NPC Meeting

The place and date of the meeting shall be decided by Chairperson, NPC.

7. Notice for the Committee Meetings and Agenda

7.1 Notice for the Committee meetings shall be issued by Member Secretary, NPC at least 25 days in advance in consultation with Chairperson, NPC. In case of emergency meetings required to be conducted to carry out urgent business, notice of one week is to be given.

7.2 The Agenda points for the meeting shall be sent to the Member Secretary by the members at least 20 days in advance of the meeting. The Member Secretary, NPC shall finalize the agenda and circulate the same to all its members at least 10 days in advance before the meeting.

7.3 Agenda for Committee meeting shall generally be put up after discussions in RPC.

7.4 Member Secretary, NPC may also put any agenda involving urgent matters/policy issue directly in consultation with Chairperson, NPC.

7.5 Member Secretary, NPC may convene a meeting at short notice on any urgent matter in consultation with Chairperson of the NPC.

8. Effect of Non-receipt of Notice of Meeting by a Member

The non-receipt of notice by any member of NPC shall not invalidate the proceeding of the meeting or any decision taken in the meeting.

9. Cancellation / Re-scheduling of Meeting

If a meeting is required to be cancelled or rescheduled the same shall be intimated to the members at the earliest by telephone / fax/ email.

10. Periodicity of Meetings

The Committee members shall meet at least once in six months. However, the Committee may meet any time to discuss any issue as and when required in consultation with Chairperson, NPC.

11. Quorum of NPC Meeting

11.1 The quorum of the meeting shall be 50% of its members.

11.2 NPC would take decisions based on majority/ general consensus of the strength present.

11.3 Members of NPC and NPC Secretariat shall participate in Committee Meetings. The Special invitees by the Committee may also attend the meeting.

12. Presiding Authority

12.1 The Chairperson, NPC shall preside over the meeting of NPC and conduct the meeting. The Member Secretary, NPC shall assist the Chairperson of NPC in conducting the meeting. If the Chairperson is unable to be present at the meeting for any reason, Member (GO&D) would preside over the meeting.

12.2 In the absence of Member Secretary, NPC, Director (NPC), CEA shall function as Member Secretary to assist Chairperson, NPC.

13. Recording of the Minutes

The minutes of the meeting shall be finalized and circulated to all its members by the Member Secretary, NPC normally within 15 working days from the date of the Committee Meeting.

14. Confirmation of the Minutes

Minutes of the NPC meeting shall be placed in the next meeting for confirmation. However, in case of urgency the minutes may be confirmed by circulation.

15. Funding of NPC meeting and NPC Secretariat establishment expenses:

~~Requirement of funds for~~ ~~hosting~~ The meetings of NPC would be hosted by RPC on roaster basis. However, NPC may decide to create a fund for NPC in future for establishment expenses of its Secretariat and conducting NPC meetings and Sub-committees/sub-group meetings or workshop, conferences or seminars etc. NPC shall make separate order/rule for above task through a resolution passed in NPC meeting.

16. **Sub-Committees/Sub-Group etc:**

NPC may constitute its Sub-Committees, Sub-group, Task Forces, Ad-hoc Committees and Standing Committees, as deemed necessary for efficient functioning. It may also set up, if required, Groups/ Committees of eminent experts to advise it on issues of specific nature. The level of the representatives to the Sub-Committees etc. would depend on the nature of the issue concerned. NPC shall make separate order/rule for above task through a resolution passed in NPC meeting/Approval of Chairperson, NPC and subsequent ratification through NPC Meeting.

17. Hosting the NPC meeting:

17.1 Meeting will be hosted by member organization (RPCs) as per the roster finalized by NPC. The host member organization (RPCs) shall incur its expenditure.

17.2 NPC shall determine the terms and procedure for maintaining the roster.

CHAPTER III
MISCELLANEOUS

19. Savings of inherent Power of the NPC

19.1 Nothing in these Rules shall bar the NPC from adopting a procedure that is at variance with provisions of these Rules, if the NPC in view of the special circumstances of a matter or class of matters deem it necessary or expedient to deal with such a matter or class of matters.

19.2 Nothing in these Rules shall expressly or by implication, bar the NPC to deal with any matter or exercise any power for which no Rules have been framed and NPC may deal with such matters, and functions in a manner it thinks fit.

( )
Deputy Secretary to Govt. of India
Tel No.

Annexure-II 15th NPC

भारत सरकार/Government of India
विद्युत मंत्रालय/Ministry of Power
केंद्रीय विद्युत प्राधिकरण/Central Electricity Authority
राष्ट्रीय विद्युत समिति प्रभाग/National Power Committee Division

सं./MTGS/SG/NPC/CEA/2024/ २११ दिनांक: 10.07.2024

सेवा में/To

(As per distribution list)

विषय: Uniform Protection Protocol for the user of the grid - reg.

Madam/Sir,

As per decision taken in 14th NPC meeting held on 03.02.2024, the Uniform Protection Protocol has been prepared after detailed deliberation in protection sub group of NPC and the same is attached herewith for your kind information and necessary action, please. The same will also be ratified in the next NPC meeting.

Encl: As above

10.07.24

(सत्येंद्र कु. दोतान / Satyendra Kr. Dotan)
Director
Tel: 011-26732045
Email: cenpccea@gmail.com

Distribution List

1. SE/EE from RPCs of concerned subgroup of NPC (Protection)
2. DGM (SO), NLDC/DGM (NERLDC)/DGM (WRLDC)/Mgr.(ERLDC)

Copy to

1. Member Secretary, NPC, CEA
2. Member secretary, NRPC
3. Member secretary, WRPC
4. Member secretary, SRPC
5. Member secretary, ERPC
6. Member secretary, NERPC

UNIFORM PROTECTION PROTOCOL

NATIONAL POWER COMMITTEE

CENTRAL ELECTRICITY AUTHORITY

Prepared in Compliance to

Clause 12(2) and Clause 13 of Central Electricity Regulatory Commission Indian Electricity Grid Code Regulations, 2023

July 2024

Chapters

UNIFORM PROTECTION PROTOCOL

1. Background

National Power Committee in its 14th meeting held at Bangalore under the chairmanship of Chairperson, CEA has decided that the protection subgroup of NPC may finalise a Uniform Protection Protocol and Uniform Protection Setting Procedure for all regions in consultation with RLDCs/GRID-India.

1.1. The Uniform Protection Protocol has been prepared in accordance with Clauses 12(2) & 13 of the Indian Electricity Grid Code, 2023 (IEGC 2023) notified by the Central Electricity Regulatory Commission.

1.1.1. **The clause 12(2) of the IEGC 2023:**

"There shall be a uniform protection protocol for the users of the grid:

a) for proper co-ordination of protection system in order to protect the equipment/system from abnormal operating conditions, isolate the faulty equipment and avoid unintended operation of protection system;

b) to have a repository of protection system, settings and events at regional level;

c) specifying timelines for submission of data;

d) to ensure healthiness of recording equipment including triggering criteria and time synchronization; and

e) to provide for periodic audit of protection system."

1.1.2. The clause 13 of the IEGC 2023:

"13. Protection protocol

(1) *All users connected to the integrated grid shall provide and maintain effective protection system having reliability, selectivity, speed and sensitivity to isolate faulty section and protect element(s) as per the CEA Technical Standards for Construction, the CEA Technical Standards for Connectivity, the CEA (Grid Standards) Regulations, 2010, the CEA Technical Standards for Communication and any other applicable CEA Standards specified from time to time.*

(2) *Back-up protection system shall be provided to protect an element in the event of failure of the primary protection system.*

(3) *RPC shall develop the protection protocol and revise the same, after review from time to time, in consultation with the stakeholders in the concerned region, and in doing so shall be guided by the principle that minimum electrical protection functions for equipment connected with the grid shall be provided as per the CEA Technical Standards for Construction, the CEA Technical*

Standards for Connectivity, the CEA Technical Standards for Communication, the CEA (Grid Standards) Regulations, 2010, the CEA (Measures relating to Safety and Electric Supply) Regulations, 2010, and any other CEA standards specified from time to time.

(4) *The protection protocol in a particular system may vary depending upon operational experience. Changes in protection protocol, as and when required, shall be carried out after deliberation and approval of the concerned RPC.*

(5) *Violation of the protection protocol of the region shall be brought to the notice of concerned RPC by the concerned RLDC or SLDC, as the case may be."*

1.2. The Uniform Protection Protocol of stipulates General Protection Philosophy of Protection System, Protection Schemes for Generators & various Transmission Elements in Power System, Protection Settings & their Coordination among entities, Disturbance Monitoring, Analysis and Reporting, Time Synchronization of Protection Systems, Protection Audit Plan, Performance of Protection Systems & Compliance Monitoring.

2. Applicability

The Uniform Protection Protocol shall be applicable to all Regional entities, State/Central/Private Generating Companies/ Generating Stations, SLDCs, RLDCs, CTU, STUs, Transmission Licensees and RPCs, connected at 220 kV (132 kV for NER) and above.

3. Definitions

Words and expressions used in this Uniform Protection Protocol are defined in the Act or any other regulations specified by the Central Commission or Central Electricity Authority shall, unless the context otherwise requires, have the meanings assigned to them under the Act or other regulations specified by the Central Commission, as the case may be.

4. General Philosophy of Protection System

4.1. Protection philosophy shall be in accordance with below mentioned objectives, design criteria and other details. However, protection design in a particular system may vary depending upon judgment and operational experience in the broad contours of the protection philosophy. Consideration must also be given to the type of equipment to be protected as well as the importance of this equipment to the system. Further, protection must not be defeated by the failure of a single component.

4.1.1. **Objectives**:

The basic objectives of any protection schemes should be to:

(i) Protect equipments from abnormal operating conditions.

(ii) Automatically isolate the faulty element.

(iii) Avoid unintended or misoperation of protection system.

(iv) Mitigate the effect of short circuit and other abnormal conditions in minimum possible time and area.

(v) Indicate the location and type of fault and

(vi) Provide effective tools to analyze the fault and decide remedial measures.

4.1.2. **Design Criteria:**

To accomplish the above objectives, the four design criteria for protection that should be considered are:

(i) fault clearance time/speed;
(ii) selectivity;
(iii) sensitivity and
(iv) reliability (dependability and security)

4.1.2.1. **Fault clearance time/speed**: It is defined as the time required to interrupt all sources supplying a faulted piece of equipment. In order to minimize the effect on customers and maintain system stability, Fault clearance time shall be as per CEA Grid Standard Regulations 2010, as amended to date.

4.1.2.2. **Selectivity:** Selectivity is the ability of the protective relaying to trip the minimum circuits or equipment to isolate the fault **.**To ensure Selectivity, coordination shall be ensured with the adjacent protection schemes including breaker failure, transformer downstream relays, generator protection and station auxiliary protection.

4.1.2.3. **Sensitivity**: Sensitivity demands that the relays be capable of sensing minimum fault conditions without imposing limitations on circuit or equipment capabilities. To ensure Sensitivity, the settings must be investigated to determine that they will perform correctly for the minimum fault current envisaged in the system, yet remain stable during transients and power swings from which the system can recover.

4.1.2.4. **Reliability**: Reliability is a measure of protective relaying systems certainly to trip when required (dependability) and not to trip falsely (Security). To ensure Reliability, two independent auxiliary direct current supplies shall be provided for Main-I and Main-II relays. The Main-I and Main-II relays should be from two different makes or operating with different algorithm. The CB´s shall have two independent trip coils and two independent trip circuits. Each protection device should trip at least one of them by independent auxiliary DC- supplies.

4.1.2.5. **Security**: To ensure Security, the protection shouldn't limit the maximum transmission capacity of the element. Distance protection in particular could cause spurious tripping due to specific grid conditions, in case of high load operation. Therefore, any special topologies must be known and considered for protection parameterization. For parallel Over Head Lines it is necessary to consider the rapid increase of load current in the healthy line when the faulty line trips and the protection operation must allow such conditions The

load encroachment detection function of the relays must be used, when the highest distance zone resistance reach conflicts with the maximum transmitted load on the protected element.

4.2. All generating units shall have standard protection system to protect the units not only from faults within the units and within the Station but also from faults in sub-stations and transmission lines.

4.3. The generator, generator transformer, unit auxiliary transformer shall be provided with protection systems connected to two independent channels or groups, such that one channel or group shall always be available for any type of fault in the generator and these transformers;

4.4. Protection relays shall be configured in such a way that analog, digital and milli ampere input points shall not pick up due to stray voltages. All protection relays should enough spare input and output contacts for taking care of future expansions.

4.5. Protective relays shall be used to detect electrical faults, to activate the alarms and disconnect or shut down the faulted apparatus to provide for safety of personnel, equipment and system within shortest possible time.

4.6. Electrical faults shall be detected by the protective relays arranged in overlapping zones of protection.

4.7. The protection relays for the generators, motors, transformers and the transmission lines shall generally be of numerical type.

4.8. All relays used shall be suitable for operation with CTs secondary rated for one ampere or five amperes as per relevant Indian Standards or International Electrotechnical Commission or Institute of Electrical and Electronics Engineers standards.

4.9. Relevant Indian Standards or International Electrotechnical Commission or Institute of Electrical and Electronics Engineers standards shall be applied for protection of generators, transformers and motors.

5. Protection Schemes

The electrical protection functions for equipment connected with the grid shall be provided as per the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2022 amended to date, the CEA (Technical Standards for connectivity to the Grid) Regulations 2007 amended to date, the CEA (Technical Standards for Communication System in Power System Operation) Regulations 2020 amended to date, the CEA (Grid Standards) Regulations 2010 amended to date, the CEA (Measures relating to Safety and Electric Supply) Regulations 2023 amended to date, and any other CEA standards specified from time to time.

5.1. **Protection Scheme for Thermal Generating Units**

The electrical protection functions for generator, generator transformer, unit auxiliary transformer and station transformer of **coal or lignite based thermal generating stations, gas turbine based thermal generating stations, internal combustion (IC) engine based**

thermal generating stations shall be provided in accordance with but not limited to the list given in **SCHEDULE-I** of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2022 amended to date.

5.2. **Protection Scheme for Hydro Generating Units**

5.2.1. For the generating units with a rating of more than one hundred megawatt (100 MW), protection system shall be configured into two independent sets of protection (Group A and B) acting on two independent sets of trip coil fed from independent DC supplies, using separate sets of instrument transformers, and segregated cables of current transformers and voltage transformers.

5.2.2. The protection functions for Generator, Excitation Transformer, Generator, Transformer, Unit Auxiliary Transformer, and Station Auxiliary Transformer shall be provided in accordance with but not limited to the list given in SCHEDULE-IV of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2022 amended to date except for variable speed units which will have specialized protection functions.

5.3. **Protection Scheme for REGs/RHGS/BESS**

Protection Schemes for Renewable Energy (RE) Power Plants of Solar power generation, Wind power generation, Battery Energy Storage System (BESS) and Hybrid of these connected with grid at voltage level above 650 volts shall be in accordance with the Central Electricity Authority (Technical Standards for Construction of Renewable Energy Power Plants) Regulations, 2024 from the date as & when these regulations are notified).). As per Central Electricity Authority (technical Standards for Connectivity of the Distributed Generation Resources) amendment Regulations, 2019 regulation 11A-**Standards for charging station, prosumer, or a person connected or seeking connectivity to the electricity system**;-

(1) The applicant shall provide a reliable protection system to detect various faults and abnormal conditions and provide an appropriate means to isolate the faulty equipment or system automatically.
(2) The applicant shall ensure that fault of his equipment or system does not affect the grid adversely.
(3) The protective relays deployed for inverter protections in RE plants shall possess protections from AC/DC over current, over and under frequency and shall comply features like LVRT/HVRT **(as per CEA Technical Standards for Connectivity).**
(4) The protective relays deployed in RE plants shall be immune from conditions like phase jumps and sharp change in frequency during fault scenarios.
(5) The inverters and BESS in RE plants shall responds to abnormal conditions arises due to system faults within its operating margin in holistic manner.
(6) Protection settings of inverters/WTG shall be coordinated in such a way that it accounts for the voltage rise/drop between inverter/WTG terminal & Point of interconnection (POI). Overvoltage /under voltage trip settings should be configured accordingly.

(7) The protection settings of elements in collector system viz. transformers, cables etc. shall such that it allows RE plants to ensure the compliance of CEA standards at POI.
(8) Sub-cycle transients or measurement inaccuracy shall be factored while configuring the protection settings.

5.4. **Substations & Transmission Line**

5.4.1. All major protection relays for the Voltage levels 66 kV and above shall be of numerical type and communication protocol shall be as per IEC-61850.

5.4.2. Grouping of Protection systems for the voltage level 66 kV and above:

i. The protection circuits and relays shall be electrically and physically segregated into two groups each being independent and capable of providing uninterrupted protection even in the event of one of the protection group fails or taken out for maintenance.

ii. Interconnection between these two groups shall not generally be attempted. However, such interconnection shall be kept to the bare minimum, if found absolutely necessary.

5.4.3. The protections required in respect of transmission lines, transformers, reactors and bus bar protection and local breaker backup protection (breaker failure protection) but not limited to shall be in accordance with **SCHEDULE-V** of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2022 amended to date.

5.5. **HVDC Terminals/ Stations**

5.5.1. **Classical HVDC Terminals/ Stations**

i) HVDC system protection shall consist of two parts:

(A) AC side protection:

AC side protection function shall cover the zone for converter transformer, AC filters, shunt capacitors, shunt reactors, and bus bars. These protections shall generally follow the same philosophy as in a typical substation i.e. detection of fault by relay and tripping of circuit breaker.

(B) DC side protection:

DC side protection shall cover the zones consisting of the valve hall, DC switchyard including smoothing reactor and DC filters, DC line, DMR line / electrode line and ground electrode. The protection equipment shall be designed to be fail safe and shall ensure high security to avoid maloperation/ unwanted shutdown due to protection equipment failures. ii) Following a DC Line fault, the HVDC System shall have the facility to restart, one or more times, the faulted pole at a variable pre-selected DC voltage level(s), not below 80% of the nominal voltage rating. The DC transmission system shall be capable of recovery in a controlled and stable

manner without commutation failures during recovery following ac and dc system faults. The post fault power order shall be equal to the pre-fault power order unless AC/ DC systems dictate otherwise.

ii) Protection system required in respect of Classical HVDC Terminals/ Stations but not limited to shall be in accordance with 13 (b) of Part A of SCHEDULE-VI of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2022 amended to date.

iii) HVDC Stations shall have ensure the open line test (OLT) before charging of lines after DC faults.

iv) All HVDC stations should prioritize the protections with back up for DC line faults, Differential protections for DC yard equipment including converter valves, Filter protections, External block protections for problems like smoke detections, valve cooling etc. AC side protections and protection block for various controller maloperation issues.

5.5.2. **Voltage Source Converter (VSC) based HVDC Terminals/Stations**

i) The protection equipment shall be designed to be fail-safe and shall ensure high security to avoid mal-operation/ unwanted shutdown due to protection equipment failures.

ii) Protection system required in respect of Voltage Source Converter (VSC) based HVDC Terminals/ Stations but not limited to shall be in accordance with 8 (b) of Part B of **SCHEDULE-VI** of CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2022 amended to date.

5.5.3 STATCOM: All STATCOM shall be having sensitive and fast acting protection system for coupling transformer, MSC, MSR, MV bus, VSC branches and valve hall.

i) The utility should redundancy for the protections like capacitor unbalance, Neutral displacement, cooling and temperature dependent protections all the time.

5.6. **Philosophy of Transmission Line Protection**

5.6.1. Transmission circuit construction can be considered in three main categories viz.: Overhead construction, Underground cable construction and Composite (overhead plus underground) construction. The requirements of overhead line and cable protection systems vary greatly, due to the exposure of transmission circuits to a wide variety of environmental hazards and are subjected to the wide variations in the format, usage and construction methodologies of transmission circuits. The type of protection signaling (tele- protection) or data communication systems required to work with the protection systems will also influence protection scheme requirements.

5.6.2. Transmission circuit Main protection is required to provide primary protection for the line and clear all type of faults on it within shortest possible time with reliability, selectivity and sensitivity. Transmission circuit back-up protection shall cater for failure of any main protection system to clear any fault that it is expected to clear. A protection function that offers back-up for most faults may also provide main protection for some fault conditions. Combinations of main and back-up protection systems should be used to address the main and application specific requirements for transmission circuits.

5.6.3. **Design Criterions:** While designing the scheme for protection of transmission lines following criteria shall be considered:

i) The systems applied must be capable of detecting all types of faults, including maximum expected arc resistance that may occur at any location on the protected line.

ii) The protection should be set not to trip under system transient conditions, which are not short circuits. Conversely where the short circuit current is low due to local grid conditions (weak network) or due to high resistance of the arc, this must be taken into consideration to trip the relay by using the most appropriate criterion, without jeopardizing the unwanted tripping during heavy load conditions.

iii) The design and settings of the transmission line protection systems must be such that, with high probability, operation will not occur for faults external to the line or under non-fault conditions.

iv) The over current protection for the transmission lines 220 kV and above voltage levels shall generally be in disabled condition.

5.6.4. **Reliability Criterions:**

i) **For transmission line having voltages at 220kV and above:** High speed Duplicated Main Protection (Main-I and Main-II) shall be provided. Main-I protection shall be carrier aided non-switched distance protection. Main-II protection shall be carrier aided non-switched distance protection, or phase segregated line differential protection. For very short line (less than 10 km), cable or combination of overhead line and cable, line differential protection with distance protection as backup (built-in Main relay or standalone) shall be provided mandatorily as Main-I and Main-II.
In addition to above, following shall also be provided:

a) Auto reclose relay (Standalone or as built-in function of Main-I & Main-II relay) suitable for 1 ph or 3 ph (with deadline charging and synchro- check facility) reclosure.

b) Inverse Definite Minimum Time (IDMT) directional E/F relay (Standalone or as built-in function of Main-I & Main-II relay).

c) Inverse Definite Minimum Time (IDMT) Directional over current for 220 kV lines if Main-II is not provided.

Main Protection shall have following features:

a) The Main-I and Main-II protection shall be numerical relays of different makes or employ different fault detection algorithm.

b) Each distance relay shall protect four/five independent zones (three/four forward zones and one reverse zone). It shall be provided with carrier aided tripping through PLCC or OPGW/FOTE communication.

c) The relays should have sufficient speed so that they will provide the clearing times as defined in the CEA Grid Standards Regulations amended time to time.

d) The Main-I and Main-II relays shall be powered by two separate DC sources.

e) Both, Main-I and Main-II shall send initiation signal to Breaker Failure Relay / LBB Protection system.

f) Internal Directional Earth Fault function shall be set to trip the line in case of high resistance earth faults.

g) The Broken Conductor detection shall be used for alarm purpose only.

h) The internal overvoltage function shall be used to protect the line against over voltages. Two stage over voltage protection for the transmission lines (Stage-I as Voltage and Time graded & Stage-II @ 140% of Nominal Voltage with time delay 100ms) shall be implemented for the transmission lines of voltage levels 400kV and above. The OVR grading, Voltage and Time graded, for the Stage-I over voltage protection shall be as recommended by RPC/RLDC. The lines emanating from same substation shall be provided with pickup as well as time grading to avoid concurrent trippings. The overvoltage relay shall have better than 98% drop-off to pick-up ratio (the ratio of the limiting values of the characteristic quantity at which the relay resets and operates). For over voltage detection, though Ph-N voltage is preferable to Ph-to-Ph voltage, to achieve required discrimination for OVR grading on account of limitation imposed by voltage resolution of the relay, Ph-to-Ph voltage to be used for Over Voltage detection.

ii) **For transmission lines having voltages at 132kV/110kV:** There should be at least one carrier aided non-switched four/five zone distance protection scheme. Carrier aided zone protection may be optional for the radial feeders and feeders having intermittent loads In addition to this, another non switched/switched distance scheme or Inverse definite Minimum time(IDMT) directional over current and earth fault relays should be provided as back up. Main protection should be suitable for single or three phase tripping. Additionally, auto-reclose relay suitable for 1 ph or 3 ph (with dead line charging and synchro-check facility) reclosure shall be provided. In case of both line protections being Distance Protections, IDMT type Directional E/F relay (standalone or as built-in function of Main-I & Main-II relay) shall also be provided additionally.

5.6.5. Following types of protection scheme to be adopted to deal with faults on the lines:

i) **Distance Protection Scheme:** The scheme shall be based on the measuring the impedance parameters of the lines with basic requirements as below:

a) Each distance relay shall protect four/five independent zones (three/four forward zones and one reverse zone). It shall be provided with carrier aided tripping through PLCC or OPGW/FOTE) communication.

b) Each Distance Relay:

i. Shall include power swing detection feature for selectively blocking, as required.

ii. Shall include suitable fuse-failure protection to monitor all types of fuse failure and block the protection.

iii. Shall include load encroachment prevention feature like Load blinder.

iv. Shall include Out of Step trip function.

v. Distance relay as Main protection should always be complemented by Directional ground protection to provide protection for high resistive line faults.

vi. Shall be capable to protect the series compensated lines from voltage inversion, Week end infeed and current inversion phenomenon. Special measures must be taken to guard against these phenomenon.

ii) **Line Differential Protection**: The scheme shall be based on the comparing the electrical quantities between input and output of the protected system. Provided that:

a) Due to the fact that short lines (less than 10kM) and/or cables do not have enough electrical length, the current differential relay should always be used.

b) For Cables, at least a differential line protection shall be used in order to guarantee fast fault clearing while maintaining security. The reason being that there are many sources of errors associated to other protection principles, especially for ground faults in cables.

c) The differential protection shall have following requirements:

i. Line differential as Main-I with inbuilt backup Distance Protection shall be installed for all the lines irrespective of length (subject to technical limitations).

ii. Zone-I protection feature shall get automatically enabled in case of communication failure observed by the differential relay.

iii. The differential relays provided in 220 kV and above system must operate in less than 30 ms. RPC/RLDC may decide on differential protection on voltage level below 220 kV.

iv. The current differential protection should a reliable type (preferably digital). The protection should be of the segregate phase type, i.e. it should be able to detect the phase in fault and therefore for the case of single line-ground (SLG) faults to trip only the phase in fault (also to establish single phase A/R). The synchronization of the measured values is done via a communication system. The communication system for differential line protection should be based on fibre optic and any equipment should comply with the IEC 60834.

5.6.6. **Auto Reclosing**:

The single phase high speed auto-reclosure (HSAR) at 220 kV level and above (except for the composite feeders: overhead plus underground) shall be implemented, including on lines emanating from generating stations. If 3-phase auto reclosure is adopted in the application of the same on lines emanating from generating stations should be studied and decision taken on case to case basis. For 132 kV system, three phase auto-reclosure (TPAR) is optional. As per CEA construction standards for construction of electrical plants and lines regulation) 2022, 3 Phase A/R is optional for 132 KV system.

i) **AR Function Requirements:**

It shall have the following attributes:

a) Have single phase or three phase reclosing facilities.

b) Incorporate a facility of selecting single phase/three phase/single and three phase auto-reclose and non-auto reclosure modes.

c) Have facilities for selecting check synchronizing or dead line charging features.

d) Be of high speed single shot type

e) Suitable relays for SC and DLC should be included in the overall auto reclose scheme if three phase reclosing is provided.

f) Should allow sequential reclosing of breakers in one and half breaker or double breaker arrangement.

It may have the following attributes as well:

(1) Have a continuously variable single phase dead time.

(2) Have continuously variable three phase dead time for three phase reclosing.

(3) Have continuously variable reclaim time.

ii) **Scheme Special Requirements:**

a) Modern numerical relays (IEDs) have AR function as built-in feature. However, standalone AR relay or AR function of Bay control unit (BCU) for 220kV and above voltage lines may be used. For 132kV/110kV lines, AR functions built-in Main distance relay IED can be used.

b) Fast simultaneous tripping of the breakers at both ends of a faulty line is essential for successful auto-reclosing. Therefore, availability of protection signaling equipment is a pre-requisite.

c) Starting and Blocking of Auto-reclose Relays:

Some protections start auto-reclosing and others block. Protections which start A/R are Main-I and Main-II line protections. Protections which block A/R are:

i. Breaker Fail Relay
ii. Line Reactor Protections
iii. O/V Protection
iv. Received Direct Transfer trip signals
v. Busbar Protection
vi. Zone 2/3 of Distance Protection
vii. Carrier Fail Conditions
viii. Circuit Breaker Problems.
ix. Phase to Phase Distance Trip
x. AR selection switch in OFF / Non-auto position
xi. Logic AR OFF in SAS
xii. Phase Distance Start (when Auto reclosure is in progress)

When a reclosing relay receives start and block A/R impulse simultaneously, block signal dominates. Similarly, if it receives 'start' for 1-phase fault immediately followed by multi- phase fault the later one dominates over the previous one.

xiii. Fault on reclaim time
xiv. Fault on line charging
xv. Pole discrepancy

iii) **Requirement for Multi breaker Arrangement:**

Following schemes shall be adhered to multi-breaker arrangements of one and half breaker or double breaker arrangement:

a) In a multi-Circuit Breaker (C.B.) arrangement one C.B. can be taken out of operation and the line still be kept in service. After a line fault only those C.Bs which were closed before the fault shall be reclosed.

b) In multi-C.B. arrangement it is desirable to have a priority arrangement so as to avoid closing of both the breakers in case of a permanent fault.

c) A natural priority is that the C.B. near the busbar is reclosed first. In case of faults on two lines on both sides of a tie C.B. the tie C.B. is reclosed after the outer C.Bs. The outer C.Bs. do not need a prioritizing with respect to each other.

iv) **Setting Criteria:**

Auto reclosing requires a dead time which exceeds the de-ionizing time. The circuit voltage is the factor having the predominating influence on the de-ionizing time. Single phase dead time of 1.0 sec. is recommended for 765 kV, 400 kV, 220 kV and 132 kV system. As per CEA construction standards for construction of electrical plants and lines regulation) 2022, 3 Phase A/R is optional for 132 KV system. Therefore, 132kV system may be included based on RPC/RLDC input. For the lines emanating from generating stations single-phase dead time upto 1.5 sec may be adopted.

a) According to IEC 62271-101, a breaker must be capable of withstanding the following operating cycle with full rated breaking current:

O - 0.3 s - CO - 3 min - CO

O- stands for Open

CO- stands for Close-Open

The rated operating cycle of the circuit breaker consisting of an opening, a holding time of 0.3 seconds, a CO cycle, a 3-minute wait, and another CO cycle.

The recommended operating cycle at 765 kV, 400 kV, 220 kV and 132 kV is as per the IEC standard. As per CEA construction standards for construction of electrical plants and lines regulation) 2022, 3 Phase A/R is optional for 132 KV system. Therefore, 132kV system may be included based on RPC/RLDC input. Therefore, reclaim time of 25 Sec. is recommended.

5.6.7. **Power Swing Blocking and Out of Step (OOS) Function**

Large interconnected systems are more susceptible to Power Swings in comparison to the erstwhile smaller standalone systems. Inter-area Power

Swings can be set up even due to some event in far flung locations in the system. During the tenure of such swings, outage of any system element may aggravate the situation and can lead to instability (loss of synchronism). It is hence extremely important that unwanted tripping of transmission elements need to be prevented, under these conditions. Distance protection relays demand special consideration under such a situation, being susceptible to undesirable misoperation during Power swings which may be recoverable or irrecoverable power swings. Following steps may be adopted to achieve above objective:

i) **Block all Zones except Zone-I**

This application applies a blocking signal to the higher impedance zones of distance relay and allows Zone 1 to trip if the swing enters its operating characteristic. Breaker application is also a consideration when tripping during a power swing. A subset of this application is to block the Zone 2 and higher impedance zones for a preset time (Unblock time delay) and allow a trip if the detection relays do not reset.

In this application, if the swing enters Zone 1, a trip is issued, assuming that the swing impedance entering the Zone-1 characteristic is indicative of loss of synchronism. However, a major disadvantage associated with this philosophy is that indiscriminate line tripping can take place, even for recoverable power swings and risk of damage to breaker.

ii) **Block All Zones and Trip with Out of Step (OOS) Function**

This application applies a blocking signal to all distance relay zones and order tripping if the power swing is unstable using the OOS function (function built in modern distance relays or as a standalone relay). This application is the recommended approach since a controlled separation of the power system can be achieved at preselected network locations. Tripping after the swing is well past the 180-degree position is the recommended option from CB operation point of view.

Normally relay is having Power Swing Un-block timer which unblocks on very slow power swing condition (when impedance locus stays within a zone for a long duration). Typically, the Power swing un-blocking time setting is 2sec.

However, on detection of a line fault, the relay has to be de-blocked.

Placement of OOS trip Systems

Out of step tripping protection (Standalone relay or built-in function of Main relay) shall be provided on all the selected lines. The locations where it is desired to split the system on out of step condition shall be decided based on system studies.

The selection of network locations for placement of OOS systems can best be obtained through transient stability studies covering many possible

operating conditions. Based on these system studies, either of the option above may be adopted after the approval of PCSC of RPC.

While applying Power Swing Blocking (PSB) in the distance protection relay a few other important aspects also need to be considered:

- PSB function should not block if negative sequence or zero sequence currents are present. Once blocked, the PSB should unblock if negative sequence or zero sequence currents are detected. Power Swing is a balanced three phase phenomenon and unbalance can only occur in the case of an asymmetrical fault.
- It will be desirable that during tenure of PSB, the distance protection is capable of detecting a fault and tripping. If such a feature is not available in the relay, PSB should be unblocked after a time delay, corresponding to the half cycle period of the slowest expected Swing Frequency (usually 2s corresponding to the slowest swing frequency of 0.25Hz is considered as default), to avoid the protection remaining perpetually blocked.

5.7. **Transmission Relay Loadability**

Transmission Relay Loadability means the loading permitted in the transmission line by the relay including a security margin. The relay Loadability is to be arrived in such a way as far as possible not to interfere with system operator actions, while allowing for short-term overloads, with sufficient margin to allow for inaccuracies in the relays and instrument transformers. Transmission relay do not prematurely trip the transmission elements out-of-service and allow the system operators from taking controlled actions consciously to alleviate the overload.

5.7.1. Protective relay settings shall

i) Not limit transmission Loadability;

ii) Not interfere with system operators' ability to take remedial action to protect system reliability and;

iii) Be set to reliably detect all fault conditions and protect the electrical network from the faults.

5.7.2. The protective functions which could trip with or without time delay, on load current i.e. load responsive phase protection systems including but not limited to:

i) Phase distance.

ii) Out-of-step tripping.

iii) Switch-on-to-fault.

iv) Overcurrent relays.

v) Communications aided protection schemes including but not limited to:

- Permissive overreach transfer trip (POTT).
- Permissive under-reach transfer trip (PUTT).
- Directional comparison blocking (DCB).
- Directional comparison unblocking (DCUB).

vi) Phase overcurrent supervisory elements (i.e., phase fault detectors) associated with current based, communication-assisted schemes (i.e., pilot wire, phase comparison, and line current differential) where the scheme is capable of tripping for loss of communications.

5.7.3. Each Transmission Licensee and Generating Company, shall use any one of the following criteria for any specific circuit terminal to prevent its phase protective relay settings from limiting transmission system loadability while maintaining reliable protection of the Grid for all fault conditions. Relay loadability at 0.85 per unit voltage and a power factor angle of 30 degrees shall be evaluated.

i) For Distance protection relays of transmission lines, the Zone-3 shall prevent load encroachment, considering the following criteria:

a) Maximum load current (I_{max}) may be considered as 1.5 times the thermal rating of the line or 1.5 times the associated bay equipment current rating (the Minimum of the bay equipment individual rating) whichever is lower.

(The rating considered is approximately 15 minutes rating of the Transmission facility).

b) For setting angle for load blinder, a value of 30 degree may be adequate in most cases.

c) The Distance protection relays shall have provision for load blinder characteristic or load encroachment detection. ii) For Directional Overcurrent relays, wherever used in a transmission line (132/110 kV level), the following shall be adopted:

a) An overload alarm shall be set at 110% of the thermal rating of the line with sufficient delay. This alarm shall allow the operator to take corrective action.

b) The Directional Overcurrent relay shall allow the line to carry 1.2 times of the thermal rating of the associated line or bay equipment (whichever is lower) at least 10 minutes.

iii) For transformer protection relays the following shall be adopted:

- Set the definite time transformer overload relay atleast 105% of the transformer ratings with sufficient delay. It shall be wired for alarm purpose only to allow the operator to take corrective action. No tripping shall be issued from this relay.

- The back-up overcurrent relays shall use IDMT characteristics and be suitably coordinated with the upstream transmission network.
- Install supervision for the transformer using either a top oil or simulated winding hot spot temperature element. The alarm and trip settings for these relays shall be set by individual entities based on the manufacturer's recommendation.

Thermal ratings as specified in the prevailing CEA's Manual on Transmission Planning Criterion shall be used for above requirement.

6. *Protection Settings & Coordination*

The purpose is to ensure system protection is coordinated among the grid connected entities. The Protection systems coordination comprises the following:

i) *Each Transmission Licensee, Load Dispatch Centre (LDC) and Generating Company shall keep themselves familiarized with the purpose and limitations of Protection System schemes applied in its area of control.*

ii) *Each Transmission licensee shall coordinate its Protection System schemes with concerned transmission system, sub-transmission system and generators.*

iii) *Each Generating Company shall coordinate its Protection System schemes with concerned transmission system and station auxiliaries.*

iv) *Each Transmission Licensee and Generation Company shall be responsible for settings calculations for protection of elements under its ownership. It shall be the responsibility of the respective asset owner to obtain the inputs (adjacent line settings, infeed values etc.) from STU/Generating Company/ Transmission Licensee necessary for calculation of the settings.*

v) *STU/Generating Company/Transmission Licensee shall provide the infeed values/latest network model to the requesting entity, within 15 days of receipt of such a request from the entity.*

vi) *Each Generating Company and Transmission Licensee, for voltage levels 400kV and above and interstate lines, shall submit the protection settings as per the format prescribed, along with the calculation sheets, co-ordination study reports and input data, in advance, to RPC/RLDC for every new element to be commissioned. The mentioned information shall be submitted to the RPC/RLDC two months in advance for all the elements proposed to be commissioned. RPC shall furnish the approved settings within forty days from the date of submission of the settings by the entity.*

vii) *If required Protection Setting Sub Group (PSSG) may be constituted under PCSC in the RPCs with the expert members from all States & UTs, Major Transmission Licensee in the Region, Major Generating Company in the Region, Grid-India/RLDC & RPC Secretariat for analysing/reviewing the proposed protection settings of the new elements as well as changes in the existing protection settings, as arrived by the*

proposer as per the Chapter 6 of Uniform Protection Protocol. The PSSG recommended protection settings shall be ratified by PCSC of respective RPC.

Or

Any procedure that is finalized and approved by the Protection Sub-Committee of respective RPC.

viii) *The PCSC shall review the settings to ensure that they are properly coordinated with adjacent system and comply with the existing guidelines. The onus to prove the correctness of the calculated settings shall lie with the respective Transmission licensee/Generation Company. In case, the PCSC feels that the adjacent transmission system settings need to be changed, in view of the new element, it shall inform the concerned entity for revision of the existing settings.*

ix) *The PCSC of RPC shall review and approve the settings based on the inputs /report submitted by the entities.*

x) *The approved settings shall be implemented by the entity and proper record of the implemented settings shall be kept. The modern numerical relays have several settings for various features available in the relay. It shall be ensured that only the approved features and settings are enabled in the relay. No additional protection/setting shall be enabled without the prior approval of RPC.*

xi) *Each Transmission licensee and Generating Company shall co-ordinate the protection of its station auxiliaries to ensure that the auxiliaries are not interrupted during transient voltage decay.*

xii) *Any change in the existing protection settings, for voltage levels 400kV and above & interstate lines, shall be carried out only after prior approval from the RPC. The owner entity shall inform all the adjacent entities about the change being carried out.*

xiii) *In case of failure of a protective relay or equipment failure, the Generating Company and Transmission Licensee shall inform appropriate LDC/RLDC/RPC. The Generating Company and Transmission Licensee shall take corrective action as soon as possible.*

xiv) *Each Transmission Licensee shall coordinate Protection Systems on major transmission lines and interconnections with neighbouring Generating Company, Transmission Licensee and appropriate LDC.*

xv) *RPC in consultation with the RLDC & Regional entities shall undertake review of the protection settings, assess the requirement of revisions in protection settings and revise protection settings, from time to time and at least once in a year. The necessary studies in this regard shall be carried out by the RPC & RLDC. The modifications/changes, if any, in protection settings shall be advised to the respective users and STUs.*

xvi) *RPC shall maintain a centralized database and update the same on periodic basis in respect of their respective region containing details of relay settings for grid elements connected to 220 kV and above. RLDC also shall maintain such database. Respective Transmission licensee/Generating Company/Entities are responsible for ensuring to make available the implemented protection settings in the centralized database within fifteen days from the date of commissioning.*

xvii) *If System Protection Schemes(SPS) is recommended to be implemented by the appropriate forum/Sub-Committee of RPC on account of operational & system constraints, the same shall be implemented by the concerned Transmission licensee/Generating Company/Entities within the specified timelines.*

xviii) *IBR settings like phase jump, df/dt settings, over currents settings, over/under frequency, over/under voltage, LVRT/HVRT etc. for Solar, Wind & Battery Energy Storage System (BESS) etc. to be reviewed in protection subcommittee meetings.*

Note: - It was agreed in the meeting held on 28.06.2024 with members of protection Sub group of NPC that there is no need for preparation of separate uniform protection setting procedure. RPCs may develop an internal mechanism to ensure effective coordination among all grid-connected entities to achieve the required procedure. However, RPCs may refer the above Chapter 6 for the purpose of development of such internal mechanisms to review of the protection settings in consultation with the stakeholders of the respective region.

7. Disturbance Monitoring, Analysis and Reporting

The Purpose is to ensure that adequate disturbance data is available to facilitate Grid event analysis. The analysis of power system disturbances is an important function that monitors the performance of protection system, which can provide information related to correct behavior of the system, adoption of safe operating limits, isolation of incipient faults.

7.1. **The Disturbance Monitoring Requirements include the following:**

i) Each Transmission Licensee and Generating Company shall provide Sequence of Event (SOE) recording capability by installing Sequence of Event recorders or as part of another device, such as a Supervisory Control and Data Acquisition (SCADA) Remote Terminal Unit (RTU), Phasor Measurement Unit (PMU), a generator plants Digital (or Distributed) Control System (DCS) or part of Fault recording equipment.

This capability shall be provided at all substations and at locations to record all the events in accordance with CEA Grid Standard Regulations, 2010 amended to date. The following shall also be monitored at each location:

a) Transmission and Generator circuit breaker positions

b) Protective Relay tripping for all Protection Groups that operate to trip circuit breakers identified in (a) above.

c) Tele protection keying and receive

ii) In either case, a separate work station PC shall be identified to function as the event logger front end. The event logger work-station PC should be connected to UPS (Uninterrupted Power Supply).

The event logger signals shall include but not limited to

- All Circuit Breaker and isolator switching Operations
- Auxiliary supply (AC, DC and DG) supervision alarms
- Auxiliary supply switching signals
- Fire-fighting system operation alarms
- Operation signals (Alarm/Trip from all the protection relays.)
- Communication Channel Supervision Signals.
- Intertrip signals receipt and send.
- Global Positioning System (GPS) Clock healthiness.
- Control Switching Device healthiness (if applicable).
- RTU/Gateway PC healthiness
- PMU Healthiness
- All Circuit Breaker Supervision Signals.
- Trip Circuit Supervision Signals.

iii) Each Transmission Licensee/Generating Company/Users shall provide Disturbance recording capability for the following Elements at facilities:

- All transmission lines (Each line shall be provided with facility for distance to fault locator)
- Autotransformers or phase-shifters connected to busses.
- Shunt capacitors, shunt reactors.
- Individual generator line interconnections.
- Dynamic VAR Devices.
- HVDC terminals.
- Bus Bars
- Inverter and PPC
- Generators
- Statcom

iv) The Disturbance recording feature shall be enabled and configured in all the numerical relays installed. Disturbance recording system shall have minimum

recording time of 3 seconds (0.5 seconds for pre-fault and 2.5 seconds for post fault).

v) Each Generating Company shall provide Disturbance recording capability for Generating Plants in accordance with Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations 2022 amended to date, the CEA (Technical Standards for connectivity to the Grid) Regulations 2007 amended to date.

vi) Each Transmission Licensee and Generating Company shall record for Faults, sufficient electrical quantities for each monitored Element to determine the following:

- Three phase-to-neutral voltages. (Common bus-side/line side voltages may be used for lines.)
- Three phase currents and neutral currents.
- Polarizing currents and voltages, if used (As applicable).
- Frequency (As applicable).
- Real and reactive power (As applicable).
- V sync(Synchronizing voltage) (For TPAR)
- Mutual compensation current(In case of parallel line)

The Minimum parameters to be monitored in the Fault record shall be specified by the PCSC of RPCs.

vii) Each Transmission Licensee and Generating Company shall provide Disturbance recording with the following capabilities:

- The Disturbance recorders shall have time synchronization and a standard format for recording analogue and digital signals (DR labels to be standardized as per the Report of FOLD Working Group - 3 on DR Parameter Standardization). The data files shall be capable of being viewed, read, and analyzed with a generic COMTRADE analysis tool as per the latest revision of IEEE Standard C37.111.
- Each Fault record duration and the trigger timing shall be settable and set for a minimum 3 second duration including 0.5 seconds for pre-fault and 2.5 seconds for post fault
- Each Fault recorder shall have sampling frequency of 1 kHz or better.
- Each Fault recorder shall be set to trigger for at least the following:

  Internal protection trip signals, external trigger input and additional triggers may be assigned as necessary.

viii) Each Transmission Licensee and Generating Company shall keep the recording instruments (disturbance recorder and event logger) in proper working condition

and shall establish a maintenance and testing program for Disturbance Recorder (DR) that includes

- Maintenance and testing intervals and their basis.
- Summary of maintenance and testing procedures.
- Monthly verification of communication channels used for accessing records remotely (if the entity relies on remote access and the channel is not monitored to a control centre staffed around the clock, 24 hours a day, 7 days a week (24/7)).
- Monthly verification of time synchronization (if the loss of time synchronization is not monitored to a 24/7 control centre).
- Monthly verification of active analog quantities.
- A requirement to return failed units to service within 90 days. If a Disturbance Recorder (DR) will be out of service for greater than 90 days, the Transmission Licensee and Generating Company shall keep a record of efforts aimed at restoring the DR to service.

ix) The time synchronization of the disturbance recorders shall be corroborated with the PMU data or SCADA event loggers by RLDCs. RLDCs shall list out for Disturbance recorders which are non- compliant for discussion in PCSC meetings of RPCs.

x) Each Transmission Licensee and Generating Company shall submit the data files to the RLDCs conforming to the following format requirements:

- The data files shall be submitted in COMTRADE and PDF format.
- File shall have contained the name of the Relay, name of the Bay, station name, date, time resolved to milliseconds, event point name, status.

The DR archives shall be retained for a period of three years.

xi) A separate work-station PC, powered through UPS (Uninterrupted Power Supply) shall be identified with access to all the relays for extraction of DR. Auto Download facility shall be established for automatic extraction of the DR files to a location on the work- station PC.

xii) **Time Synchronization Equipment**

a) Time Synchronizing Equipment complete with antenna, all cables and processing equipment shall be provided to receive synchronizing pulse through Global Positioning System or Indian Regional Navigation Satellite System Navic compatible for synchronization of event logger, disturbance recorder, Phasor Measurement Units, and Supervisory Control and Data Acquisition System or Substation Automation System.

b) Each substation shall have time synch equipment to synchronize all the numerical relays installed. Before any extension work, the capability of the

existing Time-sync equipment shall be reviewed to ensure the synchronization of upcoming numerical relays.

c) The status of healthiness of the time-sync device shall be wired as "Alarm" to SCADA and as an "Event" to Event Logger.

d) The time synch status of all the installed numerical relays and event logger shall be monitored monthly and recorded. The Monthly records for relays not in time-sync shall be reported to RLDCs and RPCs. This record shall be archived for a period of three years by each concerned agency.

e) Remedial action shall be taken by the concerned substation/ Protection department immediately to make the relays in time synchronization with reference to external time source.

f) All the new Grid elements/Bay extension shall have accurate and precise Time synchronization equipment.

7.2. **Disturbance Analysis and Reporting**

The Disturbance Analysis and Reporting shall be carried out in line with Central Electricity Authority (Grid Standards) Regulations, 2010, IEGC Grid Code Regulations 2023 and as per the revised SOP to address the Grid Disturbances (GDs)/Grid Incidents (GIs)/any other Protection Tripping's approved in the Protection sub group of NPC which is being adopted in all region. (at **Annexure-I**)

8. Protection Audit Plan

The Protection Audit of the substations connected with ISTS system shall be carried out in line with the Central Electricity Authority (Grid Standards) Regulations, 2010,IEGC Grid Code Regulations 2023 and as per the approved SOP for Protection System Audit of the sub group of RPCs/NPC which is being adopted in all region. (at **Annexure-II**)

9. System Protection Schemes (SPS)

If System Protection Schemes(SPS) is recommended to be implemented by the appropriate forum/Sub-Committee of RPCs on account of operational & system constraints, the same shall be implemented by the concerned Transmission licensee/Generating Company/Entities within the specified timelines. The provisions related to SPS as mentioned in CEA regulations and CERC (IEGC) 2023 regulations and their amendments from time to time shall be followed.

10. Performance Monitoring of the Protection Systems

10.1. Users/Entities shall submit the following protection performance indices of previous month to RPCs and RLDCs on monthly basis for 220 kV (132 kV in case of NER) and above by 15th of the subsequent month and the same shall be reviewed in the ensuing PCSC meeting of RPCs.

a) The Dependability Index defined as

$$D = \frac{N_C}{(N_C + N_F)}$$

Where, N_C is the number of correct operations at internal power system faults and N_F is the number of failures to operate at internal power system faults.

b) The Security Index defined as

$$S = \frac{N_C}{(N_C + N_U)}$$

Where, N_C is the number of correct operations at internal power system faults and is the number of unwanted operations.

c) The Reliability Index defined as

$$R = \frac{N_C}{(N_C + N_I)}$$

Where, N_C is the number of correct operations at internal power system faults and N_I is the number of incorrect operations and is the sum of N_F and N_U

10.2. Users/Entities shall furnish the reasons for performance indices less than unity of individual element wise protection system to the RPC and action plan for corrective measures. The action plan will be followed up regularly in the PCSC Meetings.

11. Compliance Monitoring

11.1. The Uniform Protection Protocol shall be reviewed as and when required, in consultation with the stakeholders by Protection Sub Group of NPC after discussion in respective RPC.

11.2. Violation of the Uniform Protection Protocol shall be brought to the notice of RPCs by the RLDCs or concerned SLDC, as the case may be.

11.3. In case any User/Entity fails to comply with the Uniform Protection Protocol or fails to undertake remedial action identified by the PCSC of RPCs within the specified timelines, the RPCs would approach the Commission with all relevant details for suitable directions.

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2.

Revised Final Standard Operating Procedure (SOP) to address the Grid Disturbances (GDs)/Grid Incidents (GIs)/any other Protection Trippings

1. Immediately following an event (grid disturbance/incidence as defined in the CEA (Grid Standards) Regulations 2010 and subsequent amendment in the system, the concerned user/entity or SLDC shall inform to the RLDC through voice message.
2. Written flash report shall be submitted to RLDC and SLDC by the concerned user/entity within the time line specified in **Table 8** below, as per the IEGC, 2023.
3. In compliance of IEGC, 2023, All the Users, STU/SLDC are required to furnish the following information in respect of Grid Occurrences(GD/GI) within the time line specified in **Table 8** below, to RLDC/ RPC:
   (i) First Information Report (FIR)
   (ii) Event Logger (EL) output
   (iii) Disturbance Recorder (DR) output
   (iv) Trip event analysis report-TR (with pre and post fault system conditions)
   (v) Data Acquisition System (DAS)
4. RLDC shall report the event (grid disturbance or grid incidence) to CEA, RPC and all regional entities within twenty-four (24) hours of receipt of the flash report.
5. After a complete analysis of the event, the user/entity 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.
6. Based on the above detailed report submitted to RLDC by the entities, RLDC shall Categorize Grid Occurrences into grid incidents (GIs) and grid disturbance (GDs) based on criteria as per the CEA (Grid Standards) Regulations 2010 and subsequent amendment. RLDC shall also submit the Auto Reclosure (A/R) failure events, PLCC related events, any other protection related events to RPCs on monthly basis.
7. RLDCs and NLDC (for events involving more than one region) shall prepare a draft report of each grid disturbance or grid incidence including simulation results and analysis along with associated PMU plots of appropriate resolution, which shall be discussed and finalized at the Protection sub-committee/sub-group of RPC as per the timeline specified in **Table-8** below.

TABLE 8 : REPORT SUBMISSION TIMELINE

Sr. No.	Grid Event^ (Classification)	Flash report submission deadline (users/ SLDC)	Disturbance record and station event log submission deadline (users/ SLDC)	Detailed report and data submission deadline (users/ SLDC)	Draft report submission deadline (RLDC/ NLDC)	Discussion in protection committee meeting and final report submission deadline (RPC)
1	GI-1/GI-2	8 hours	24 hours	+7 days	+7 days	+60 days
2	Near miss event	8 hours	24 hours	+7 days	+7 days	+60 days
3	GD-1	8 hours	24 hours	+7 days	+7 days	+60 days
4	GD-2/GD-3	8 hours	24 hours	+7 days	+21 days	+60 days
5	GD-4/GD-5	8 hours	24 hours	+7 days	+30 days	+60 days

^*The classification of Grid Disturbance (GD)/Grid Incident (GI) shall be as per the CEA Grid Standards.*

(**The above table is as per the IEGC 2023**)

8. RPCs shall circulate all the GDs, GIs, near miss events, A/R events, PLCC mal-operation events, any other protection related event etc. along with the Agenda for Protection Co-Ordination Sub-Committee (PCSC) of RPCs. PCSC meetings are to be held in every month.
9. The implementation of the recommendations of the final report shall be monitored by the protection sub-committee of the RPC. Tripping portals deployed for reporting of the GDs & GIs on RLDCs portal, shall also have compliances reporting of PCSC recommendations on this portal. NLDC shall disseminate the lessons learnt from each event to all the RPCs for necessary action in the respective regions.
10. Constituents/entities shall furnish the following details to RPCs/RLDCs in respect of all the grid occurrences for analysis:

    a) Detailed analysis of the events
    b) SLD or equivalent pictorial representation clearly showing:
        i. Location of fault with distance
        ii. Fault details with type & relay indications
        iii. CT/PT/CVT rating details with location
        iv. Bus-bar arrangement/ Configuration of feeders and other information related to the ratings of the information required for analysis of the disturbance.
        v. CB positions (OPEN/ CLOSE) before and after fault
        vi. Isolator & Earth-switch positions (OPEN/CLOSE)
        vii. Voltage, frequency & power flows with direction at the time of fault
    c) Output of Event logger & Disturbance recorder
    d) Remedial Action(s) taken
    e) Relay setting details

HVDC Station Disturbance : Any additional data such as HVDC transient fault

record, switchyard equipment and any other relevant station data required for carrying out analysis of an event by RPC, NLDC, RLDC and SLDC shall be furnished by the users including RLDC and SLDC, as the case may be, within forty- eight (48) hours of the request. All users shall also furnish high-resolution analog data from various instruments including power electronic devices like HVDC, FACTS, renewable generation (inverter level or WTG level) on the request of RPCs, NLDC, RLDCs or SLDCs.

Generating Station Disturbance: Generating Station shall furnish high-resolution analog data from various instruments including AVR response, PSS response required for analysis of disturbance.

11. The respective entities (for which the Grid occurrence is placed in the PCSC agenda) shall present the Grid Occurrence which shall cover all related aspects such as:

    a) Antecedent conditions,
    b) Bus-configuration,
    c) Reasons of GD/ GI occurrence,
    d) Relevant Diagrams showing location of the fault,
    e) Bus bar arrangement/configuration of feeders and other connected equipment with proper CB positions (OPEN/ CLOSE) at the time of occurrence of the fault,
    f) Type of protections operated,
    g) Substantiation of the protections operated by relevant DRs & ELs,
    h) Reasons for protection systems mal-operation/non-operation,
    i) Remedial measures taken/ proposed, etc.

12. In respect of failure or Non-operation of A/R events, PLCC mal-operation events, any other protection related event as given in the PCSC agenda the concerned entities, shall furnish the reasons along with remedial action taken to RPCs/RLDCs. The same would be analyzed by the PCSC.
13. In the PCSC meetings, all the GDs, GIs, near miss events, A/R non-operation/mal-operation, PLCC mal-operations, other protection related trippings/events as circulated in the agenda shall be analyzed in detail by the PCSC forum and conclude the suitable recommendations to avoid the recurrence of such incidents in the future.
14. The action plan by the entities shall be furnished to RPC for implementation of the PCSC recommendations along with the timelines.
15. The implementation of the PCSC recommendations shall be followed up in the monthly PCSC meetings of RPC.
16. When grid disturbances or grid incidents occurred at major/critical substations and at substations that affected critical/essential/strategic loads, a Protection System Analysis Group (PSAG) shall be constituted consisting of the members from RPC, NLDC, RLDC, PGCIL, a Protection Expert from the region along with the Entity under whose jurisdiction GD/GI occurred to analyze the GD/GI in detail by visiting the respective substation/substations physically and conducting the meetings. PSAG would finalize the remedial actions and recommendations after deliberations and detailed analysis. The progress of implementation of the PSAG shall be followed up in the monthly PCSC Meetings.
17. If grid disturbance or grid incident is due to operational issue or transmission constraint/inadequacy, Grid-India shall share feedback to CTU or respective STU.

18. In case any user/entity fails to undertake remedial action identified by the RPC within the specified timelines as decided by PCSC of RPC, the concerned RPC may approach the Commission with all relevant details for suitable directions.
19. A date depository of the event as maintained by the RLDC shall be accessible to every entity and the entity shall upload all the relevant documents on the RLDC portal of trippings.

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Revised Standard Operating procedure for Third Party Protection System Audit

A protection system audit is a review and evaluation of the protection systems of a substation with an objective to verify whether required protection systems have been put in place at station by the concerned utility, and to recommend suitable measures to provide for the same.

Ministry of Power, had constituted a Committee under the Chairmanship of Chairperson CEA to examine the grid disturbances on the 30th and the 31st July 2012. One of important recommendation of the committee was conducting of extensive audit of protection system. List of sub-stations where protection audit is to be undertaken on priority basis was prepared and audited across the country. This was the beginning of protection audit across the country and large number of important 400 and 220kV substations were audited.

Keeping in view the importance of Protection System Audit, Standard Operating Procedure has been prepared for the reference purpose. It will provides a step-by-step guide for RPCs to follow during the audit process.

1. All users shall conduct third party protection audit of each sub-station at 220 kV and above (132 kV and above in NER) once in five years or earlier as advised by the respective RPC.
2. After analysis of any event, each RPC shall identify a list of substations / and generating stations where third-party protection audit is required to be carried out and accordingly advise the respective users to complete third party audit within three months.
3. Third Party Protection Audit shall be carried out by the third party designated agencies in line with the IEGC Regulations 2023 or by the audit teams constituted by RPCs with the members from other states (at least two) who opt for the RPC coordinated third party protection audit.
4. The third-party protection audit report shall contain information sought in the format as per IEGC 2023 and its further amendments.
5. Annual audit plan for the next financial year shall be submitted by the users to their respective RPC by 31st October. The users shall adhere to the annual audit plan and report compliance of the same to their respective RPC.

6. **Criteria for choosing substations for third party protection audit:**

The following criteria are generally applied during choosing a substation for protection audit.

i. Substations/ Generating (SS/ GS) stations with frequent grid incidences or frequent maloperations or any grid occurrence in any substation which affected supply to large number of substations and caused significant load loss. In this case, third-party protection audit may be carried out within three months or as decided in the Protection sub-Committee Meeting of the RPC.

ii. Important 400kV and 765kV substations (SS) / Generating stations (GS) including newly commissioned SS/ GS. In this case, third-party protection audit may be carried out at a frequency decided in the Protection sub-Committee Meetings of respective RPCs.

7. Protection audit Procedure:

i. After identification of stations for protection audit, the same is communicated to the owner utility seeking nomination of one nodal officer for each Station.
ii. The nodal officer shall provide the details of substation for preparation of protection audit format (in line with IEGC and subsequent amendments).
iii. Meanwhile nominations shall be sought from all utilities to form regional teams for audit. Regional teams comprising of engineers from various utilities /utility (other than the team of host State) of the region shall be formed based on the no. of SS to be audited. (Each team may consists of 3 or 4 engineers from utilities other than the host utility and at the maximum a team will be able to audit 3 to 4 stations in 7-9 days or so)
iv. Once the team details and list of stations to be audited is finalised the details of nodal officers, team members , list of stations to be audited by each team is shared to all for further coordination regarding planning and conduction of audit.
v. Based on the inputs received from nodal officer regarding the list of elements in the substation to be audited, protection audit formats shall be prepared by RPC (in line with IEGC) and circulated to nodal officer. The nodal officer along-with the substation engineers shall fill the audit format and furnish the same along-with various attachments sought as part of the audit format within a week or so. List of attachments shall be given in the covering page of audit format.
vi. In case, other entity's bays /equipment are existing in the substation to be audited, the entity shall furnish all the details of its equipment to the Audit Team/Agency and the other entity shall be available during the Protection Audit.
vii. The filled in audit format along-with the received annexures shall then forwarded to the audit team by the nodal officer and any further clarification regarding the format or attachments shall be taken up by the audit team with the nodal officer under intimation to RPC.
viii. The SS/ GS shall be audited based on the data filled in audit format checking for compliance of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007 & CEA (Measures relating to Safety and Electric Supply) Regulations, 2010, CERC regulations and amendments to the same, approved guidelines of RPC, best practices in industry, report of the Task Force on Power System Analysis Under Contingencies and as per the "Model Setting Calculations For Typical IEDs Line Protection Setting Guide Lines Protection System Audit Check List Recommendations For Protection Management Sub-Committee on Relay/Protection Under Task Force For Power System Analysis Under Contingencies" etc.
ix. After conduct of audit, the shortcomings observed in the audit shall be discussed in detail with the nodal officer and substation engineers and recommendations are finalised.
x. The filled in audit format along-with the recommendations and attachments shall be finalised and final protection audit report RPC (in line with IEGC) shall be compiled.
xi. The audit team shall check the criteria for activation/archival of DR, as decided in the respective Protection sub-Committees of RPC.

xii. Final protection audit report shall be discussed in Protection Coordination Committee and recommendations may be accepted/deleted/modified as per the scope of audit and compliance of various regulations/guidelines etc.

xiii. The recommendations of all SS audited shall be inserted into audit recommendations database and update regarding recommendations shall be sought from respective utilities.

xiv. Action plan for rectification of deficiencies detected, if any, shall be submitted to the respective RPC and RLDC and monthly progress will be submitted.

xv. The travel expense from place of duty to Substation/Generating Station to be audited shall be borne by respective Auditor (Parent Organisation). The expense for boarding, lodging any travel of the team during the audit period shall be borne by the organisation owning the Substation/Generating Station.

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Annexure-III 15th NPC

Roadmap
&
Implementation Timeframe

for

5-minutes based
Scheduling, Metering and Settlement

For Interface Energy Meters at ISTS level
For Indian Power Sector

July 2024

1. Background:

Presently, in India, generation and drawl schedules are prepared for every 15 minute time block. With increased RE penetration, smaller dispatch intervals such as a 05-minute scheduling and dispatch, will have significant advantages.

The detailed aspects of 05-minute scheduling, dispatch, metering, accounting and settlement have been deliberated by various apex level committees of Govt of India. It has been ascertained that the 05-minute scheduling and settlement will help power station to better manage their ramp and help grid during any requirement, especially the fast ramping resources. Further, 05-minute scheduling and settlement will discretize the load curve and help in better load ramp management. This may also cause economy in resource utilization. This would enable managing the intermittent and variability caused by large scale RE integration as well.

In the present scenario where, solar generation is forming a substantial percentage of installed capacity which shall eventually expected to be around 30% of the installed capacity by 2030, smaller window of 05 minute time block shall be critical for the Market design and Grid management as well. Especially solar hours are for limited period of the day and having lesser CUF. Therefore, more granular and smaller insights shall be an enabler for better resource management while also addressing the intermittency issues and reserve adequacy.

2. Steps taken towards a 5-minute metering mechanism to integrate more RE and reduce cost of reserves:

In the present scenario, IEMs at inter-state level and intra-state level deployed by CTU and STU, respectively, are for 15 minute time block. Government of India has set a non-fossil fuel-based electricity installed capacity target of 500 GW by 2030. In the last decade, 05-minute Scheduling, Metering, Accounting and Settlement at the inter-state level has been discussed and deliberated in various apex level forums & Committees of Government of India.

There has been consensus amongst the stakeholders on the need to gradually move towards a 05-minute metering, scheduling, dispatch and settlement mechanism as part of clean energy transition and reduce cost of reserves. A sub-group of the Forum of Regulators was formed in May, 2017 to examine 05-minute scheduling, metering, accounting and settlement in Indian electricity market. The sub-group report published in February, 2018 endorsed the need to move to “fast” markets with transition to 5-minute arrangements after due consideration of the timelines and preparatory actions required for such transition.

Central Commission directed for implementation of 05-minute metering pilot project vide order in petition no. 07/SM/2018 (Suo-Motu) dated 16th July, 2018 in the matter of Pilot Project on 05-Minute Scheduling, Metering, Accounting and Settlement for Thermal/Hydro, and on Hydro as Fast Response Ancillary Services (FRAS). The FRAS pilot for hydro plants was implemented from November, 2018 – June, 2019 and report was submitted by Grid-India to Central Commission in July, 2019.

Further, the pilot on 05-minute metering covering hydro stations in Northern, Eastern and North-Eastern regions as well as thermal stations with AGC installation in all five regions pan-India was implemented from July, 2020 - January, 2021 to gain experience for formulation / refinements of Technical specifications and Software Requirement Specifications for Metering Software at RLDCs and Accounting Software at RPCs for 05-minute metering. The report covering implementation aspects, challenges and suggested way forward was submitted by Grid-India to Central Commission in January, 2021.

The learnings from the pilots were discussed in RPC meetings at regional level and it was decided to replace the existing SEMs (15-min Block) with AMR compatible Interface Energy Meters (5-min time-block) along with implementation of Automated Meter Reading (AMR) and Meter Data Processing (MDP) system for efficient and faster accounting at ISTS level.

A Joint Committee (JC) at National Power Committee (NPC) level comprising of the members from each RPC, CEA, CTUIL, PGCIL & Grid-India (erstwhile POSOCO) in July, 2022 prepared the Technical Specifications (TS) of the "5/15 Minute Interface Energy Meters (IEMs) with Automatic Meter Reading (AMR) and Meter Data Processing (MDP)" for ISTS for pan-India deployment. As per the approved TS, which covers the metering system requirements broadly, all the future procurement of IEMs shall be configured for 05-minute time block.

MoP Report on "Development of Electricity Market in India"- May 2023 also highlighted various issues faced in the electricity markets at present while identifying the required interventions for implementation. The report identified key issues to be addressed in the redesign of the Indian electricity market. The issues include dominance of inflexible, long-term contracts, resource adequacy planning, reliance on self-scheduling, increasing share of renewables in the overall energy mix, electricity markets to integrate renewables and firmness in reserves for ancillary services. *(**Annexure-I** containing extracts from Report of the Group constituted by Ministry of Power, Government of India for "Development of Electricity Market in India").*

As per 14th NPC meeting held on 3rd Feb 2024 and as directed by Chairperson CEA, roadmap & timeline for Interface Energy Meters (for ISTS meters) for transition from 15 min to 5 min regime is to be prepared by CTUIL. NPC, CEA convened a meeting in 14th May2024 amongst RPCs, Grid-India, and CTUIL & Meter Manufacturers for finalization of Roadmap. The Roadmap (in

line with the MOP Market Design report and based on the inputs received from RPCs, Grid India & meter manufacturers) has been elaborated in subsequent sections covering the aspects for followings:

- Approach/ Roadmap for moving from 15 to 5 Min Scheduling, Metering and Settlement Regime
- Manufacturing Capabilities
- Recommendation and conclusion.

3. Approach/Roadmap for moving from 15 to 5 Min Scheduling, Metering and Settlement Regime:

3.1 **Technical Specifications (TS) of the new Interface Energy Meters (IEMs) with Automatic Meter Reading (AMR) and Meter Data Processing (MDP) for Interstate Transmission System (ISTS)** was prepared by a Joint Committee comprising of members from each RPCs, CEA, CTU, PGCIL and POSOCO (now GRID INDIA). The same was approved in the 12th NPC meeting held on 17.10.2022.

3.2 CTU/ POWERGRID may prepare a DPR/ Proposal **along with cost estimates** for **new Interface Energy Meters (IEMs) with Automatic Meter Reading (AMR) and explore the possible funding for this proposal.**

3.3 CERC (if required) , may frame a new regulations to facilitate 5 min meter data schedule, dispatch, metering, accounting and settlement. CERC also to amend the all the related regulations such as, Tariff, Open Access, DSM, Ancillary services, IEGC etc. to facilitate 5 min meter data schedule, dispatch, metering, accounting and settlement.

3.4 CEA may amend its metering regulation to facilitate 5 min meter data recording, if required.

3.5 **Tasks related to Infrastructure Readiness at ISTS level:**

i. Metering Infrastructure enablement for 05 Minute Meter Data Recording:

a) The procurement and implementation of meters and related software shall be done by CTU through POWERGRID at inter-state level.

ii. Infrastructure enablement for 05 minute Forecasting, Scheduling, Dispatch, Metering, Accounting & Settlement:

a) RLDC to formulate procedure & product development and finalize its format and related software/hardware configuration & augmentation regarding forecasting, scheduling, dispatch, accounting.
b) RPC to augment Regional Accounting Software for 5 min Accounting & Settlement.
c) Implementation of necessary HW/SW upgrade for forecasting, schedule & dispatch for 5 min. ISGS/CTU Generators (Thermal, Hydro, Gas, Solar, Wind, BESS, etc), Exchanges/ OA customers/ Traders/ Intermediaries.

3.6 Until the total replacement of all old meters with new IEMs and completion of necessary changes required in relevant Software and Hardware, both 15-minute and 5-minute data may be maintained in parallel.

3.7 CERC to align all its regulation as per designated cut-off date for fully transition to 5 minutes metering, accounting and settlement from 15 minutes at inter-state transmission system (ISTS) level.

3.8 **<u>At intra-state level</u>**:

State SLDCs/STUs and State regulatory commission shall adopt similar approaches for smooth and uniform transition to 5 minutes metering, accounting and settlement from 15 minutes.

3.9 **<u>Timeline :</u>**

Following approach will ensure the smooth transition of 5-minute metering and implementing related regulatory changes and other associated activities required, thereby facilitating a more efficient overall implementation process.

Sr No.	**Activity**	**Tentative Timeline#**	**Remark, if any**
1	**Technical Specifications (TS) of the new Interface Energy Meters (IEMs) with Automatic Meter Reading (AMR) and Meter Data Processing (MDP) for Interstate Transmission System (ISTS)**	Already Completed by NPC/CEA	

2.	**Preparation of DPR by CTU/Power grid and its approval**	6 months	
3	Procurement and implementation of meters and related software shall be done by CTU through POWERGRID at inter-state level.	24 months	Both the activities may run in parallel
4	The formulation and amendment of the existing regulations of CERC and CEA (if required) as outlined in points 3.3 and 3.4.	18 months	
5	CERC to align all its regulation as per designated cut-off date		
6.	Enablement of HW/SW/Procedures etc for 05 minute Forecasting, Scheduling, Dispatch, Metering, Accounting & Settlement by RLDC/RPCs mentioned at 3.5 (ii) (a) & (b)	18 months	Both the activities may run in parallel During this time both 15-minute and 5-minute meters and data will run parallel and accordingly action to be taken by RLDC/RPCs/Generators etc
7	Implementation of necessary HW/SW by. ISGS/CTU Generators (Thermal, Hydro, Gas, Solar, Wind, BESS, etc), Exchanges/ OA customers/ Traders/ Intermediaries.	18 months	
8	Total Transition Time	**Approx 3.5 years**	

 # These are tentative timeline given. As mentioned at item no 6.1 , the task force constituted for the purpose may revise the same as per their assessment.

4. Project Implementation Details for Metering Infrastructure & Related Software and Hardware:

Table-1

Sr No	Items	Meter Qty/	Remarks
1	**Meters (IEMs), AMR, MDP & RAS**	11000 (approx.)	1. Meter and AMR procured and implemented by CTU through POWERGRID. 2. Relevant Software/Hardware Update at NLDC/RLDCs by GRID INDIA. 3. Regional Accounting Software(RAS) by RPCs.
2	**Meters (IEMs), AMR and MDP**	**Around 32,000 #** **(16,000 meters are being funded through PSDF for 19 states and** **Approx. 16,000 meters for rest of the states/ entities as given in SAMAST Report 2016 by FOR)**	**1.** Around 16,000 Meters are being installed by 19 states through PSDF funded SAMAST scheme and can be configured for 5 minutes metering. **# The exact Meter quantity required currently may get changed. For that SLDCs to provide the Meter quantity further required at Intra state level.** **2.** STU to Implement meter with AMR & MDP (AMI). **3.** SW/ HW are already updated in **many SLDCs** through SAMAST scheme for 5 minutes scheduling, accounting and settlement.

Note: Open Access Customers (Inter/Intra states, any others) and ISTS/ intra state users for Exchange/ OTC platforms are part of sr no 1 & 2.

5. Manufacturing Capability:

Indian Meter manufacturer's annual capability-

Sl. No.	Vendor	Manufacturing capacity
1.	M/s. Secure	Approx. 50K /annum (specific for ABT meter)
2.	M/s. Genus	Tentatively 1.2 Cr+ / annum for smart and Non smart meters- Vendor also confirmed the same manufacturing line can be used for ABT meter production

Implementing entity may distribute the project contract among available manufacturers to mitigate the risk of single vendor contract. This approach was already considered in the pilot project on Five minute metering and accounting in India.

6. Recommendation & Conclusion:

6.1 As per the Report of the Group on Development of electricity Market in India, Two Taskforces need to be formed for performing following tasks in regards to the Roadmap for movement towards 5 minute based metering, scheduling dispatch:

a. CERC led taskforce for Regulatory aspects.

b. Grid-India led taskforce for metering, scheduling, accounting, forecasting and communication related aspects.

CEA was entrusted to coordinate the activities of these two taskforces.

6.2 CERC to amend all the related regulations such as, Tariff, Open Access, DSM, Ancillary services, IEGC etc. to facilitate 5 min meter data schedule, dispatch, metering, accounting and settlement and inform the expected time required for amendment of relevant regulations to CEA.

6.3 CEA may need to amend its metering regulation to facilitate 5 min meter data recording, if required.

6.4 Pre-feasibility check for sufficient space and any other requirements for placement of IEMs in the Panels shall be carried out at all the sites for installation of IEMs by CTU/POWERGRID.

6.5 CTU through POWERGRID, after RPC/NCT approval, shall implement region wise 5 min metering scheme on PAN India basis at ISTS level as per approved **Technical Specification** of the new Interface Energy Meters (IEMs) with Automatic Meter Reading (AMR) and Meter Data Processing (MDP) for Interstate Transmission System (ISTS).

6.6 Implementing entity may take all the approvals of Shutdown from Operation Coordination Committee (OCC) meetings of respective RPCs well in advance in regards to metering infrastructure.

6.7 Necessary software/hardware changes for 5 min regime including forecasting, schedule, dispatch, metering, accounting and settlement shall be undertaken by **all the stake holders** at ISTS level.

6.8 For the sake of maintaining the uniformity across the country, State SLDCs/ STUs and State regulatory commission shall adopt similar approaches at intra-state level.

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Annex-I

Extracts from Report of the Group constituted by Ministry of Power, Government of India for "Development of Electricity Market in India").

5 minute based metering, scheduling, dispatch and settlement

Present state and need for re-design

Presently, in India, generation and drawal schedules are prepared for every 15 mins timeblock. With increased RE penetration, smaller dispatch intervals such as a 5-min scheduling and dispatch will have significant advantages as highlighted below:

i. Management of ramping requirements in a 5-minute schedule is easier than with 15-minute schedule. This is because in case of 15-minute dispatch, there is always a possibility of over scheduling or under-scheduling resulting in larger deviations.

ii. The variation in demand curve / ramp requirements would vary substantially in a longer timeframe as against a shorter dispatch interval.

iii. Shorter dispatch intervals would allow system operator to re-dispatch resource more frequently without relying heavily on ancillary services.

iv. 5-minute system would enable improvement in forecasting of demand and reduce forecasting errors. This would lower down the reserves' requirement.

v. The accuracy of RE forecasts would be higher in case of shorter dispatch intervals.

vi. Flexible resources / energy-limited resources can provide services more efficiently for shorter timeframes.

International best practices and learnings for India: Advanced electricity markets around the world, which have witnessed increased RE, penetration, have gradually moved to shorter dispatch intervals (as shown in the table below). Shorter dispatch intervals in advanced electricity markets. To understand benefits of such a system, a study was carried out in the Western Interconnection (USA) by NREL. The objective was to evaluate the reserve requirements under several alternative dispatch intervals. The results are highlighted in the graph alongside. It was observed that smaller dispatch intervals led to lesser requirement of reserves and a cost-effective system to integrate RE.

There has been consensus in India on the need to **gradually move towards a 5-minute metering, scheduling, dispatch and settlement mechanism to integrate more RE and reduce cost of reserves.** A sub-group of the Forum of Regulators was formed to examine 5 minutes scheduling, metering, accounting and settlement in Indian electricity market. The sub-group report published in February 2018 endorsed the need for transiting to 5-minutes operation after due consideration of the timelines and preparatory actions required for such transition.

CERC through its Order dated 16th July 2018, directed the implementation of a 5-minutes metering pilot covering hydro stations in NR, ER and NER and for thermal stations with AGC installations across all 5 regions, to gain from the experience. This pilot was successfully implemented by Grid Controller of India Limited. In addition, Central Electricity Authority also notified the amendments to Installation and Operation of Meters, Regulations in December 23, 2019, which contained the provisions related to placement of meters, standards, data storage, display and other features. Moreover, National Power Committee, CEA also constituted a joint committee to finalize the technical specifications of the 5/15-minute Interface Energy Meters with Automatic Meter Reading and Meter Data Processing system for interstate transmission system. The same was notified on July 6, 2022.

Recommendations

In line with the existing consensus, the Group recommends the following roadmap for movement towards 5 minute-based metering, scheduling and dispatch:

i. Two taskforces, one on regulatory aspects to be steered by CERC and the other on metering and communication related aspects to be steered by Grid Controller of India Ltd. should be formed. The taskforces would finalize the regulatory and operational requirements for the transition. CEA could coordinate the activities of these two taskforces.

ii. A phased approach should be adopted for replacement of meters. The same can be carried out for meters at inter-state level at first followed by those at intra-state level. The complete transition to 5-min compatible meters at a country level should be targeted over the next two years.

Following are the high-level implementation requirements:

Implementation requirements for 5 minute-based metering, scheduling and dispatch:

Implementation requirements

1. Regulations need to be formulated for 5-min metering, scheduling and despatch.

2. Amendments to Regulations viz. Tariff, Open access, IEGC, DSM, Ancillary services, etc. need to be made to reflect the change from 15-min to 5-min system.

3. Power exchanges / OTC platforms would have to implement changes to bidding and clearing systems.

4. New meters capable of 5-min data recording should be installed. CTU may identify the region-wise interface meters which are needed to be replaced and those that can be reconfigured / upgraded.

5. Appropriate infrastructure and systems for meter data collection, validation and processing at RLDC has to be made available. RPCs/RLDCs/SLDCs would need to evaluate hardware / software upgrade requirements.

6. Appropriate changes in file structures for meter data exchanges to be carried out.

7. Scheduling software and energy meters in intra-state system to be upgraded.

Annexure-IV 15th NPC

भारत सरकार
Government of India
विद्युत मत्रालय
Ministry of Power
उत्तर क्षत्रीय विद्युत समिति
Northern Regional Power Committee

Date: 12.09.2024

विषय: Recommendations of Sub-Committee for finalization of SOP at National level for providing the VOIP connectivity to control/coordination centres of TSPs/ Gencos- reg.

Reference is invited to 14th NPC meeting wherein it was decided that a Sub-committee may be constituted under chairmanship of Member Secretary, NRPC for finalization of SOP at National level for providing the VOIP connectivity to control/coordination centers of TSPs/ Gencos. Accordingly, NPC Secretariat vide its letter of even no. dated 19.03.2024 (copy enclosed) constituted the sub-committee having representations from RPCs, PCD Division (CEA), RLDCs/GRID-India, CTU, POWERGRID and concerned private entities.

In this regard, it is to apprise that the Sub-Committee convened three meetings for detailed deliberations on all aspects of the VOIP Connectivity on 16th May 2024, 26th June 2024, and 8th August 2024. Based on the deliberations in the aforesaid meetings and inputs received from all committee members, the draft SOP has been finalized by the sub-committee. The enclosed draft is now submitted for further action and deliberation in the upcoming NPC meeting.

सलग्नक:यथोपरि |

Signed by Praveen Jangra
Date: 13-09-2024 12:19:34
प्रवीण जाँगड़ा
कार्यपालक अभियंता (सचार)

Chief Engineer & Member Secretary, NPC, CEA

Copy for information to sub-committee members: [Through Email]

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21. Shri. Chandra Shekhar, Station in Charge, Devi energies pvt limited.

Standard Operating Procedure (SOP) for Providing VOIP Connectivity to Control and Co-ordination Centre of TSPs and GENCOs with VOIP Exchange situated at RLDCs

National Power Committee

Central Electricity Authority

New Delhi

Draft version 3.0

1.0 Background

This Standard Operating Procedure (SOP) is designed to provide a comprehensive and standardized framework for TSPs and GENCOs to follow when applying for VoIP connectivity for their Control Centres/Coordination Centres. It outlines the necessary steps, documentation, and compliance requirements to facilitate the approval and installation of requisite infrastructure to facilitate VoIP connectivity.

Earlier, the first draft SOP was developed by CTU in response to requests from various TSPs and was subsequently approved in the 23rd TeST sub-committee meeting of NRPC held on dated 21.09.2023 and the same was referred to NPC for finalisation for all regions as TSPs in other regions may also come up with such requirements. Subsequently, in compliance of the directions given in the 14th NPC meeting held on 03.02.2024, a sub-committee was constituted under the chairmanship of Member Secretary, NRPC with representations from all RPCs, PCD Division-CEA, NPC Division-CEA, RLDCs/Grid India, CTU, POWERGRID, and concerned private TSPs to finalise SOP at national level for providing the VOIP connectivity to control centres of TSPs.

2.0 Scope

This Standard Operating Procedure (SOP) shall be applicable to Transmission System Providers (TSPs) and Generation Companies (GENCOs) for the purpose of granting Voice over Internet Protocol (VOIP) connectivity with the VOIP system (for Grid Operation purpose) located at Regional Load Dispatch Centres (RLDCs) for their Control Centres and Coordination Centres.

3.0 Objective

To facilitate seamless operational coordination among entities connected to the Regional Load Dispatch Centres (RLDCs) for the continuous, 24x7 operation of TSPs and GENCOs from their respective Control Centres and Coordination Centres for the purpose of supervision and control of grid by NLDC, RLDC and SLDC.

4.0 Effective Date and Amendments

This SOP shall become effective one month from the date of issuance. It may be amended by the National Power Committee (NPC) as and when required. For any amendment, the Central Transmission Utility (CTU) shall take up an agenda in an NPC meeting after thorough discussions in the Regional Power Committees (RPCs) based on the feedback received from users.

5.0 Provision in Regulations

Following are the provisions already made in various CERC Regulations:

(a) Regulation 28.7 of CERC (IEGC) Regulations, 2023 provides as follows-

"Every generating station, and transmission substation of 110 kV and above shall have a control room manned by qualified operating personnel round the clock.

Alternatively, the same may be operated round the clock from a remotely located control room, subject to the condition that such remote operation does not result in a delay in the execution of any switching instructions and information flow:

Provided that a transmission licensee owning a transmission line but not owning the connected substation, shall have a coordination centre functioning round the clock, manned by qualified personnel for operational coordination with the concerned load despatch centres and equipped to carry out the operations as directed by concerned load despatch centres."

(b) Regulation 6(i) of CERC (Communication System for inter-State transmission of electricity) Regulations, 2017 provides as follows-

"The nodal agency for planning, and coordination for development of communication system for inter-State transmission system user shall be the Central Transmission Utility."

(c) Regulation 7(ix) of CERC (Communication System for inter-State transmission of electricity) Regulations, 2017 provides as follows-

"The CTU shall provide access to its wideband network for grid management and asset management by all users."

6.0 Roles and Responsibilities:

6.1 CTU:

(a) CTU shall examine and review of the connectivity applications of TSPs/ GENCOs in coordination with RLDC and POWERGRID.

(b) CTU shall issue Grant of Connectivity.

(c) CTU shall be responsible for managing all proceedings related to the amendment of this SOP, as and when required.

(d) CTU shall ensure a uniform technical specification adopted for firewall at the user/ applicant end and RLDC/NLDC.

(e) CTU shall review cyber security documents submitted by applicants in line with CEA cyber security guidelines 2021 and further documents issued by CEA and other regulatory authorities in this regard.

6.2 Implementing Agency:

(a) POWERGRID shall be Implementing Agency for i.r.o. VOIP system. However, CTU may designate any other organization as Implementing Agency. Any mention of POWERGRID means in this SOP the Implementing Agency.

(b) POWERGRID shall carry out setup and configuration work along with allotment of VOIP channel to the applicant in coordination with RLDC subject to availability of license in the VOIP system.

(c) POWERGRID shall undertake maintenance of the VOIP system (including centralized firewall, if installed).

(d) POWERGRID shall ensure proper functioning of VOIP channel from ISTS station to RLDC VOIP exchange.

(e) POWERGRID shall resolve any connectivity issues from ISTS station to RLDC VOIP Exchange after grant of connection in coordination with Applicant and RLDC.

(f) POWERGRID shall prepare Site Responsibility Schedule for equipment (VOIP system and firewall in this case) installed at RLDCs in line with the CEA (Communication Standards), Regulations 2020.

"*Regulation 9(1): A site responsibility schedule for every interface point shall be prepared by the owner of the communication interface equipment at the interfacing location.*

Regulation 9(2): Site responsibility schedule shall include- bullet (a) schedule of telecommunication interface equipment, their responsibility for access, maintenance, and operation."

(g) POWERGRID shall ensure allotment of IP Series in coordination with RLDCs.

6.3 NLDC/RLDC:

(a) RLDCs shall coordinate with applicant, POWERGRID and CTU as and when required regarding any connectivity issue, installation and maintenance of VOIP system installed (including firewalls)

(b) RLDC in case of communication failure shall inform the respective user so that the user shall ensure healthiness of its communication system.

6.4 Applicant:

(a) Applicant shall apply for VoIP connectivity as per SoP along with submission of supporting document and any other relevant document required by CTU during application process.

(b) Applicant shall coordinate with the RLDC and POWERGRID for setup and configuration of VOIP connectivity.

(c) Applicant shall ensure compliance of various CERC and CEA regulations as outlined in para 8.1.2(c)

(d) Applicant shall bear expenses towards leased line communication up to ISTS node/ISGS node/RLDC including suitable Firewalls, Routers etc. at both ends of the link, if required.

(e) Applicant shall utilize the VOIP system for communication in line with CEA technical standard's Regulation 8 "Design and Planning" bullet (9).

7.0 General Architecture

The typical diagram for VOIP Connectivity to Control/Co-ordination Centers of TSPs & GENCOs with VOIP Exchange at RLDC has been shown in Annexure-I.

POWERGRID shall ensure a provision of centralized firewall in each RLDCs with sufficient ports and throughput that can be shared by TSPs/GENCOs etc. as it would be difficult and cumbersome to accommodate separate physical firewalls of each and every VOIP connection at RLDC's end.

8.0 Procedure

8.1 Application Submission:

8.1.1 **Application Form:** Application form shall be available at official website of CTUIL (https://ctuil.in) also attached at *Annexure-II.*

8.1.2 **Submission of Application Form:** Applicant shall submit duly filled aforesaid application form along with following Supporting Documents:

Supporting Documents:

a. Network Architecture and General Arrangement diagram of concerned system with clear demarcation for TSPs/ GENCOs scope.

b. Technical specifications of firewall, communication equipment installed by applicant,

c. Undertaking for compliance of

I. CEA (Technical Standards for Communication System in Power System Operations) Regulations, 2020

II. CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022

III. CERC (Communication System for inter-State transmission of electricity) Regulations, 2017

IV. CEA (Cyber Security in Power Sector) Guidelines, 2021,

V. Guidelines on Interfacing Requirements under the CERC (Communication System for inter-State transmission of electricity) Regulations, 2017.

VI. Guidelines on Availability of Communication System under the CERC (Communication System for inter-State transmission of electricity) Regulations, 2017

VII. Procedure on "Centralized supervision for quick fault detection and restoration" under the CERC (Communication System for inter-State transmission of electricity) Regulations, 2017

VIII. "Procedure on Maintenance and testing of Communication System" under the CERC (Communication System for inter-State transmission of electricity) Regulations, 2017

IX. and their amendment issued time to time

d. Undertaking by applicant that connectivity to VOIP system shall be used for Grid Operation purpose.

e. Applicant shall submit the undertaking stating that it shall bear all the expenses towards communication, cyber security compliance and any other requirements for this purpose.

8.2 Review of Application

a. **Verification of Documents:** CTU shall verify the completeness and accuracy of the submitted application and supporting documents.

b. **Preliminary Assessment:** An initial assessment of the proposed VoIP system's feasibility to be done by CTU in coordination with RLDC and POWERGRID.

c. **Detailed Technical Evaluation & Review:** Detailed review of the proposed VoIP system's technical specifications, network architecture, and cybersecurity measures would be done by CTU in coordination with RLDC and POWERGRID.

d. **Approval/Rejection**: Based on the technical evaluation, CTU shall approve/ reject the application. In case of rejection, detailed reasons shall be provided by CTU.

    a. In case of rejection, the applicant may submit the fresh application form after incorporating the corrective measures/suggestions as informed by CTU during rejection of earlier form.

8.3 **Grant of VOIP connectivity**

(i) After approval, a letter regarding grant of connectivity shall be issued by CTU to the applicant with a copy to RPC/ RLDC/ POWERGRID.

8.4 Post-Approval Procedure

(i) **Installation and Configuration:** Upon approval, the applicant through POWERGRID can proceed with the installation and configuration of the VoIP system, as per the approved specifications.

(ii) **Testing and Commissioning:** Applicant shall conduct comprehensive testing to ensure proper functionality and interoperability with RLDC/ISTS systems and submit a report to CTU with copy to RPC for information.

(iii) **Post Commissioning Activity:** POWERGRID shall ensure proper functioning after configuration of VOIP channel from ISTS station to the RLDC VOIP exchange.

Applicant shall ensure proper functioning of VOIP channel from their end to ISTS station.

(iv) **Confirmation of Connectivity**: Applicant shall confirm the connectivity of their control centre/coordination centre with VOIP system through a letter to CTU and RPC.

9.0 Compliance and Reporting

(i) Regular Audits: Adhere to periodic audits and compliance checks as per prevailing regulations for the communication system.

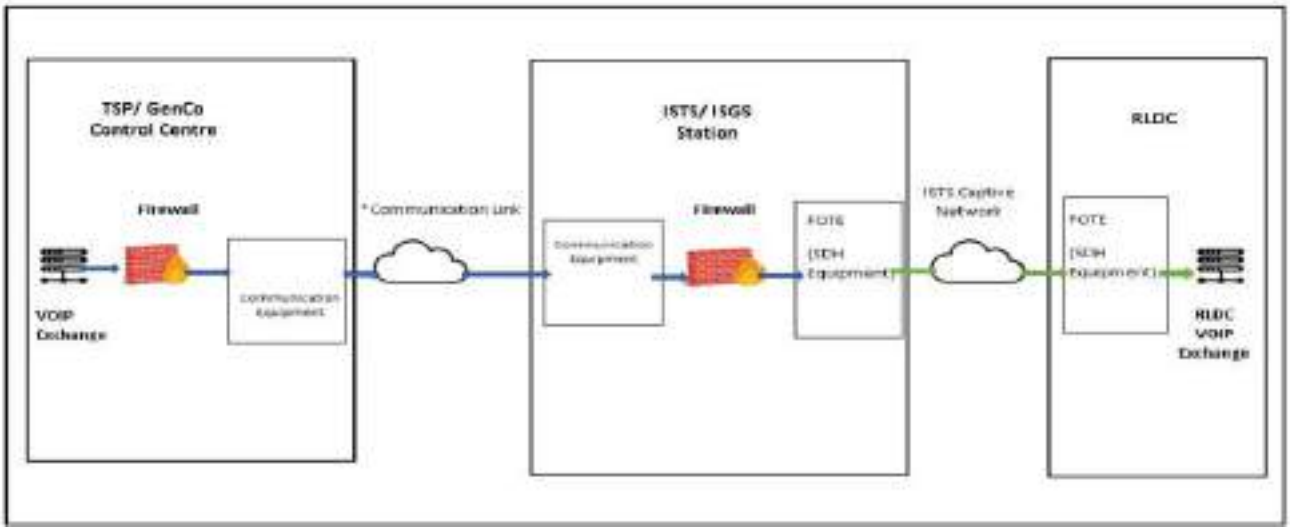
(ii) Incident Reporting: Applicant/ User shall promptly report any incidents or issues related to VoIP connectivity to RLDC for timely resolution in association with POWERGRID.

*****

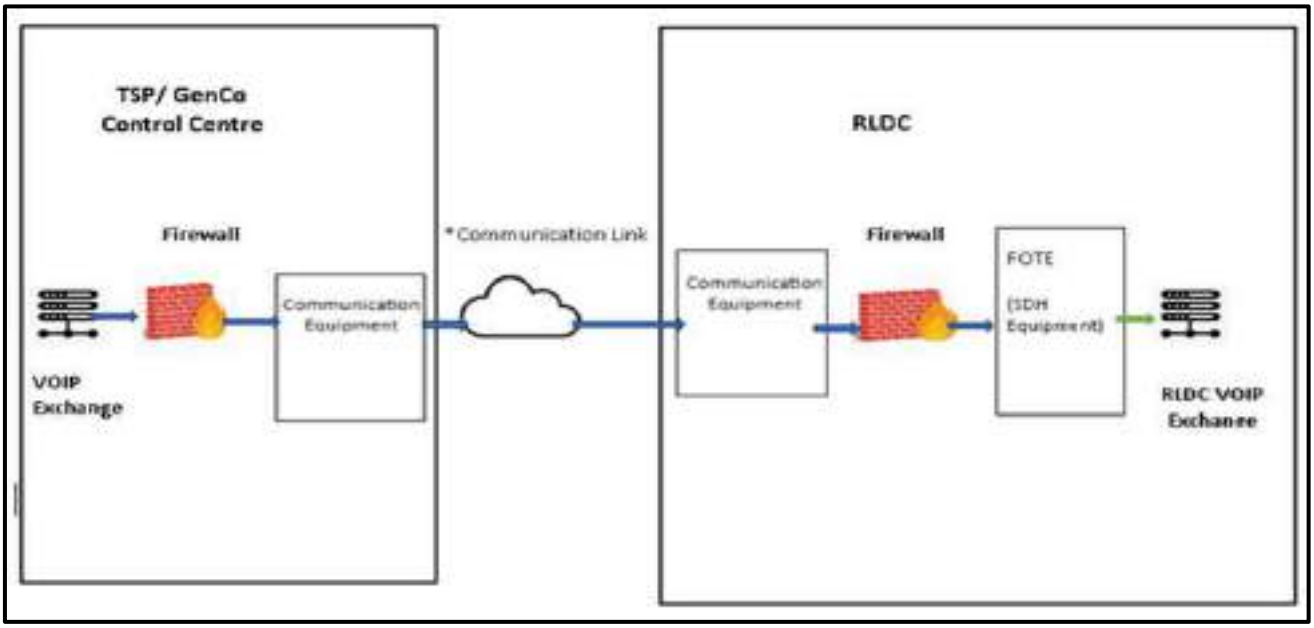
Annexure-I

Typical Connectivity diagram for VOIP connectivity

A. VOIP Connectivity Diagram for TSP/ GENCO's Control/Co-ordination Centre to VOIP Exchange system at RLDC through ISTS/ISGS Station



B. VOIP Connectivity Diagram for TSP/ GENCO Control/Co-ordination Centre to VOIP Exchange system at RLDCs directly



(*) For communication link mentioned in the architecture for VOIP connectivity between TSP/GENCO's Control/Coordination Centre to ISTS/ISGS Station/RLDC as the case may be, dedicated point to point links may be preferred. In case of leased line being used, POWERTEL leased lines may be preferred considering security, as mentioned in the CEA (Cyber Security in Power Sector) Guidelines 2021 mentioned below:

"*Article 1. Cyber Security Policy. Cardinal Principles: The Responsible entity will strictly adhere to following cardinal principles while framing cyber security policy:*
v. Communication between OT equipment/systems is done through the secure channel preferably of POWERTEL through the fibre optic cable."

Annexure-II

Application Format for VOIP connectivity

Name of applicant:

Designation:

Contact number and email:

Organisation/ Utility:

Control Centre / Coordination Centre for which VOIP connectivity is required:

Connectivity Required from : RLDC/ ISTS S/s / ISGS G/s

Name of above Location:

No. of VOIP Channels Required:

Cyber Security Compliance Provided : Yes/ No

Proposed Connectivity diagram:

सत्यमेव जयते

भारत सरकार/Government of India
विद्युत मंत्रालय/ Ministry of Power
केन्द्रीय विद्युत प्राधिकरण/Central Electricity Authority
राष्ट्रीय विद्युत समिति प्रभाग/National Power Committee Division
1st Floor, Wing-5, West Block-II, R.K. Puram, New Delhi-66

No. CEA-GO-15-14/1/2021-NPC Division/ 136 Date: 19.03.2024

To,

(As per distribution list)

विषय:- टीएसपी/जेनकोस के नियंत्रण केंद्रों को वीओआइपी कनेक्टिविटी प्रदान करने के लिए राष्ट्रीय स्तर पर एसओपी को अंतिम रूप देने के लिए उप-समिति का गठन के संबंध में।

Subject: - Constitution of Sub-Committee to finalise SOP at National level for providing the VOIP connectivity to control centres of TSPs/ Gencos-reg.

Madam/Sir,

It was decided in the 14th NPC meeting held on 03.02.2024 at Bangalore that a Sub-Committee may be constituted under chairmanship of Member Secretary, NRPC with representations from all RPCs' Secretariat, PCD Division (CEA), NPC Secretariat, RLDCs/GRID-India, CTU, POWERGRID and concerned private entities to finalise SOP at National level for providing the VOIP connectivity to control centres of TSPs/ Gencos etc. The Sub-Committee may submit its report within 4 months.

2. In this regards, NPC Secretariat vide email dated 28.02.2024 requested RPCs, PCD Division (CEA), RLDCs/GRID-India, CTU and POWERGRID to send nominations for Sub-Committee. NPC Secretariat also requested RPCs' Secretariat to seek nominations from concerned private entities for the Sub-Committee.
3. Accordingly, based on the nomination received from RPCs' Secretariat, PCD Division (CEA), NPC Secretariat, RLDCs/ GRID-India, CTU, POWERGRID and concerned private entities, the Constitution of the Sub- Committee is proposed as follows:-

Shri. V. K. Singh	Member Secretary	NRPC	**Chairperson**
Smt. Rishika Sharan/ Shri. Ravi Shankar Singh	Chief Engineer & Member Secretary (NPC)/ Deputy Director (NPC)	CEA	Member
Shri. Anil Kawrani	Superintending Engineer	NERPC	Member
Shri. Alikpantha De	Executive Engineer	ERPC	Member
Shri. B.V. Sandeep	Executive Engineer	WRPC	Member
Shri. A Shesha Sai Reddy	Assistant Executive Engineer	SRPC	Member

Ms. Priyam Srivastava	Deputy Director (PCD Div.)	CEA	Member
Shri. L. Murali Krishna	Sr. Deputy General Manager	ERLDC	Member
Shri. Ankur Gulati / Shri. Mohneesh Rastogi	Deputy General Manager/ Chief Manager	NRLDC	Member
*Representative from WRLDC	Nomination yet to be received.	WRLDC	Member
*Representative from SRLDC	Nomination yet to be received.	SRLDC	Member
*Representative from NERLDC	Nomination yet to be received.	NERLDC	Member
Ms. Shyama Kumari	Sr. Deputy General Manager(GA&C)	POWERGRID	Member
Shri. T. P. Verma	Chief Manager	CTU	Member
Shri. Sumeet Sharma/ Shri. Naman Vyas/ Shri. Narendra Rajput	Head- Automation & SCADA/ Manager- Automation & SCADA/ Lead, O&M	M/s Adani Energy Solution Limited	Member
Shri. Dipen Khandhediya	Head Engineering and performance	Veena Energy	Member
Shri. Anoob Cherian	Manager	Adani Power Ltd –Udupi	Member
Shri. Prayas Gupta	Deputy General Manager	IndiGrid	Member
Shri. Sanjiv Kumar	-	Kohima-Mariani Transmission Limited (KMTL)	Member
Shri. Mahesh Bhagat	Assistant Manager-Control Room In charge	Sterlite	Member
Shri. Vivek Karthikeyan	-	Indi Grid	Member
Shri. Chandra Shekhar	Station In charge	Devi Energies Pvt. Limited	Member
*Representative from concerned private entities of Eastern Region (ER)	Nomination yet to be received.	Concerned private entities of Eastern Region (ER)	Member
*Representative from concerned private entities of Western Region (WR)	Nomination yet to be received.	Concerned private entities of Western Region (WR)	Member
*Representative from concerned private entities of Southern Region (SR)	Nomination yet to be received.	Concerned private entities of Southern Region (SR)	Member
Shri. Praveen Jangra	Executive Engineer	NRPC	**Member Convener**

4. Terms of Reference of the Committee is proposed as follows:-

   i. Finalise SOP at national level for providing the VOIP connectivity to control centres of TSPs/ Gencos etc.
   ii. Any other suggestions/recommendations on related matters.

The Sub-Committee may submit its report within 4 months to NPC Secretariat for deliberations in the NPC meeting.

The Sub- Committee may co-opt any member, if required.

भवदीय/Yours faithfully

for Satyam 19.03.24

(ऋषिका शरण/Rishika Sharan)
मुख्य अभियन्ता एवं सदस्य सचिव,रा.वि.स /
Chief Engineer & Member Secretary, NPC

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20. Shri. Prayas Gupta, Deputy General Manager, IndiGrid, [Email:prayas.gupta@indigrid.com]
21. Shri. Sanjiv Kumar, KMTL , [Email: sanjiv.kumar@apraava.com]
22. Shri. Mahesh Bhagat, Assistant Manager - Control Room Incharge.
23. Shri. Vivek Karthikeyan, Indigrid. [Email:vivek.karthikeyan1@indigrid.com]
24. Shri. Chandra Shekhar, Station in charge, Devi energies pvt limited.

Copy for kind information to:

1. SA to Chairprson,CEA
2. SA to Member GO&D, CEA
3. Shri S. R. Narasimhan, Chairman & Managing Director, GRID-INDIA , B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi -110016. [Email: cmd@posoco.in]
4. Shri. R. K. Tyagi Chairman & Managing Director, POWERGRID, Saudamini, Plot No.2, Sector-29, Gurugram-122001.[Email: cmd@powergrid.in]
5. Shri. Prakash Chand Garg, Chief Operating Officer, CTU, Saudamini, Plot No.2, Sector-29, Gurugram-122001. [Email: pcgarg@powergrid.in]
6. Shri. Asit Singh, Member Secretary, SRPC, No.29, Race Course Cross Road, Bengaluru-560009. [Email: mssrpc-ka@nic.in] –**With a request to send the nomination from concerned private entity of SR at the earliest.**
7. Shri. N.S. Mondal, Member Secretary, ERPC,14,Golf Club Road, ERPC Building, Tollygunje,Kolkata-700033. [Email: mserpc-power@nic.in] - **With a request to send the nomination from concerned private entity of ER at the earliest.**
8. Shri. Deepak Kumar., Member Secretary, WRPC, Plot No- F-3, MIDC Area, Marol, Opp. SEEPZ, Central Road, Andheri (East), Mumbai-40093.[email: ms-wrpc@nic.in] **- With a request to send the nomination from concerned private entity of WR at the earliest.**
9. Shri. K.B. Jagtap, Member Secretary, NERPC, NERPC Complex, Dong Parmaw, Lapalang, Shillong-793006. [Email: ms-nerpc@gov.in]
10. Shri. SP Kumar, Executive Director, SRLDC, No.29, Race Course Cross Road, Bengaluru-560009. [Email: spkumar@grid-india.in] - **With a request to send the nomination at the earliest.**

11. Shri. Rajib Sutradhar, Executive Director, ERLDC, 14,Golf Club Road, ERPC Building, Tollygunje,Kolkata-700033.[Email: rajibsutradhar@grid-india.in]
12. Shri. V. Balaji, Executive Director, WRLDC, Plot No- F-3, MIDC Area, Marol, Opp. SEEPZ, Central Road, Andheri (East), Mumbai-40093.[Email: vbalaji@grid-india.in] **- With a request to send the nomination at the earliest.**
13. Shri. Nabarun Roy, Executive Director, NRLDC, 18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110066. [Email: nroy@grid-india.in]
14. Shri. Amaresh Mallick, Executive Director, NERLDC, Dongtieh, Lower Nongrah, Lapalang, Shillong-793006, Meghalaya [Email: amareshmallick@grid-india.in]-**With a request to send the nomination at the earliest.**

******

Annexure-V 15th NPC

भारत सरकार/Government of India
विद्युत मंत्रालय/Ministry of Power
केन्द्रीय विद्युत प्राधिकरण/Central Electricity Authority
एन.पी.सी. प्रभाग/National Power Committee Division
1st Floor, Wing-5 ,West Block-II, RK Puram, New Delhi-66

सं./MTGS/SG/NPC/CEA/2023/208 दिनांक: 08.07.2024

सेवा में/ To

(As per distribution list)

विषय: Revised Standard Operating Procedures (SOPs) for Third Party Protection System Audit, Grid Disturbances/Grid Incidents/Tripping's, and Communication audit for Substations, and Communication System Outage Planning- reg.

Madam/Sir,

As per the 14th NPC meeting held on 03.02.2024, the following Standard Operating Procedures (SOPs) are revised and attached herewith for your kind information and necessary action, please:

1. Third Party Protection System Audit.
2. Grid Disturbances/Grid Incidents/Tripping's.
3. Communication audit for Substations.
4. Communication System Outage Planning.

Encl: As above

Yours faithfully,
(सत्येंद्र कु. दोतान / Satyendra Kr. Dotan)
Director, NPC

Distribution List

1. SE/EE from RPCs of concerned subgroup of NPC (Protection/ Communication)

Copy to

1. Chief Engineer, NPC Secretariat, CEA
2. Member Secretary, NRPC
3. Member Secretary, WRPC
4. Member Secretary, SRPC
5. Member Secretary, ERPC
6. Member Secretary, NERPC

Revised Standard Operating procedure for Third Party Protection System Audit

A protection system audit is a review and evaluation of the protection systems of a substation with an objective to verify whether required protection systems have been put in place at station by the concerned utility, and to recommend suitable measures to provide for the same.

Ministry of Power, had constituted a Committee under the Chairmanship of Chairperson CEA to examine the grid disturbances on the 30th and the 31st July 2012. One of important recommendation of the committee was conducting of extensive audit of protection system. List of sub-stations where protection audit is to be undertaken on priority basis was prepared and audited across the country. This was the beginning of protection audit across the country and large number of important 400 and 220kV substations were audited.

Keeping in view the importance of Protection System Audit, Standard Operating Procedure has been prepared for the reference purpose. It will provides a step-by-step guide for RPCs to follow during the audit process.

1. All users shall conduct third party protection audit of each sub-station at 220 kV and above (132 kV and above in NER) once in five years or earlier as advised by the respective RPC.
2. After analysis of any event, each RPC shall identify a list of substations / and generating stations where third-party protection audit is required to be carried out and accordingly advise the respective users to complete third party audit within three months.
3. Third Party Protection Audit shall be carried out by the third party designated agencies in line with the IEGC Regulations 2023 or by the audit teams constituted by RPCs with the members from other states (at least two) who opt for the RPC coordinated third party protection audit.
4. The third-party protection audit report shall contain information sought in the format as per IEGC 2023 and its further amendments.
5. Annual audit plan for the next financial year shall be submitted by the users to their respective RPC by 31st October. The users shall adhere to the annual audit plan and report compliance of the same to their respective RPC.

6. **Criteria for choosing substations for third party protection audit:**

The following criteria are generally applied during choosing a substation for protection audit.

i. Substations/ Generating (SS/ GS) stations with frequent grid incidences or frequent maloperations or any grid occurrence in any substation which affected supply to large number of substations and caused significant load loss. In this case, third-party protection audit may be carried out within three months or as decided in the Protection sub-Committee Meeting of the RPC.

ii. Important 400kV and 765kV substations (SS) / Generating stations (GS) including newly commissioned SS/ GS. In this case, third-party protection audit may be carried out at a frequency decided in the Protection sub-Committee Meetings of respective RPCs.

7. Protection audit Procedure:

i. After identification of stations for protection audit, the same is communicated to the owner utility seeking nomination of one nodal officer for each Station.
ii. The nodal officer shall provide the details of substation for preparation of protection audit format (in line with IEGC and subsequent amendments).
iii. Meanwhile nominations shall be sought from all utilities to form regional teams for audit. Regional teams comprising of engineers from various utilities /utility (other than the team of host State) of the region shall be formed based on the no. of SS to be audited. (Each team may consists of 3 or 4 engineers from utilities other than the host utility and at the maximum a team will be able to audit 3 to 4 stations in 7-9 days or so)
iv. Once the team details and list of stations to be audited is finalised the details of nodal officers, team members , list of stations to be audited by each team is shared to all for further coordination regarding planning and conduction of audit.
v. Based on the inputs received from nodal officer regarding the list of elements in the substation to be audited, protection audit formats shall be prepared by RPC (in line with IEGC) and circulated to nodal officer. The nodal officer along-with the substation engineers shall fill the audit format and furnish the same along-with various attachments sought as part of the audit format within a week or so. List of attachments shall be given in the covering page of audit format.
vi. In case, other entity's bays /equipment are existing in the substation to be audited, the entity shall furnish all the details of its equipment to the Audit Team/Agency and the other entity shall be available during the Protection Audit.
vii. The filled in audit format along-with the received annexures shall then forwarded to the audit team by the nodal officer and any further clarification regarding the format or attachments shall be taken up by the audit team with the nodal officer under intimation to RPC.
viii. The SS/ GS shall be audited based on the data filled in audit format checking for compliance of Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, Central Electricity Authority (Technical Standards for Connectivity to the Grid) Regulations, 2007 & CEA (Measures relating to Safety and Electric Supply) Regulations, 2010, CERC regulations and amendments to the same, approved guidelines of RPC, best practices in industry, report of the Task Force on Power System Analysis Under Contingencies and as per the "Model Setting Calculations For Typical IEDs Line Protection Setting Guide Lines Protection System Audit Check List Recommendations For Protection Management Sub-Committee on Relay/Protection Under Task Force For Power System Analysis Under Contingencies" etc.
ix. After conduct of audit, the shortcomings observed in the audit shall be discussed in detail with the nodal officer and substation engineers and recommendations are finalised.
x. The filled in audit format along-with the recommendations and attachments shall be finalised and final protection audit report RPC (in line with IEGC) shall be compiled.
xi. The audit team shall check the criteria for activation/archival of DR, as decided in the respective Protection sub-Committees of RPC.

xii. Final protection audit report shall be discussed in Protection Coordination Committee and recommendations may be accepted/deleted/modified as per the scope of audit and compliance of various regulations/guidelines etc.

xiii. The recommendations of all SS audited shall be inserted into audit recommendations database and update regarding recommendations shall be sought from respective utilities.

xiv. Action plan for rectification of deficiencies detected, if any, shall be submitted to the respective RPC and RLDC and monthly progress will be submitted.

xv. The travel expense from place of duty to Substation/Generating Station to be audited shall be borne by respective Auditor (Parent Organisation). The expense for boarding, lodging any travel of the team during the audit period shall be borne by the organisation owning the Substation/Generating Station.

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2.

Revised Final Standard Operating Procedure (SOP) to address the Grid Disturbances (GDs)/Grid Incidents (GIs)/any other Protection Trippings

1. Immediately following an event (grid disturbance/incidence as defined in the CEA (Grid Standards) Regulations 2010 and subsequent amendment in the system, the concerned user/entity or SLDC shall inform to the RLDC through voice message.
2. Written flash report shall be submitted to RLDC and SLDC by the concerned user/entity within the time line specified in **Table 8** below, as per the IEGC, 2023.
3. In compliance of IEGC, 2023, All the Users, STU/SLDC are required to furnish the following information in respect of Grid Occurrences(GD/GI) within the time line specified in **Table 8** below, to RLDC/ RPC:
   (i) First Information Report (FIR)
   (ii) Event Logger (EL) output
   (iii) Disturbance Recorder (DR) output
   (iv) Trip event analysis report-TR (with pre and post fault system conditions)
   (v) Data Acquisition System (DAS)
4. RLDC shall report the event (grid disturbance or grid incidence) to CEA, RPC and all regional entities within twenty-four (24) hours of receipt of the flash report.
5. After a complete analysis of the event, the user/entity 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.
6. Based on the above detailed report submitted to RLDC by the entities, RLDC shall Categorize Grid Occurrences into grid incidents (GIs) and grid disturbance (GDs) based on criteria as per the CEA (Grid Standards) Regulations 2010 and subsequent amendment. RLDC shall also submit the Auto Reclosure (A/R) failure events, PLCC related events, any other protection related events to RPCs on monthly basis.
7. RLDCs and NLDC (for events involving more than one region) shall prepare a draft report of each grid disturbance or grid incidence including simulation results and analysis along with associated PMU plots of appropriate resolution, which shall be discussed and finalized at the Protection sub-committee/sub-group of RPC as per the timeline specified in **Table-8** below.

TABLE 8 : REPORT SUBMISSION TIMELINE

Sr. No.	Grid Event^ (Classification)	Flash report submission deadline (users/ SLDC)	Disturbance record and station event log submission deadline (users/ SLDC)	Detailed report and data submission deadline (users/ SLDC)	Draft report submission deadline (RLDC/ NLDC)	Discussion in protection committee meeting and final report submission deadline (RPC)
1	GI-1/GI-2	8 hours	24 hours	+7 days	+7 days	+60 days
2	Near miss event	8 hours	24 hours	+7 days	+7 days	+60 days
3	GD-1	8 hours	24 hours	+7 days	+7 days	+60 days
4	GD-2/GD-3	8 hours	24 hours	+7 days	+21 days	+60 days
5	GD-4/GD-5	8 hours	24 hours	+7 days	+30 days	+60 days

^*The classification of Grid Disturbance (GD)/Grid Incident (GI) shall be as per the CEA Grid Standards.*

(**The above table is as per the IEGC 2023**)

8. RPCs shall circulate all the GDs, GIs, near miss events, A/R events, PLCC mal-operation events, any other protection related event etc. along with the Agenda for Protection Co-Ordination Sub-Committee (PCSC) of RPCs. PCSC meetings are to be held in every month.
9. The implementation of the recommendations of the final report shall be monitored by the protection sub-committee of the RPC. Tripping portals deployed for reporting of the GDs & GIs on RLDCs portal, shall also have compliances reporting of PCSC recommendations on this portal. NLDC shall disseminate the lessons learnt from each event to all the RPCs for necessary action in the respective regions.
10. Constituents/entities shall furnish the following details to RPCs/RLDCs in respect of all the grid occurrences for analysis:

    a) Detailed analysis of the events
    b) SLD or equivalent pictorial representation clearly showing:
        i. Location of fault with distance
        ii. Fault details with type & relay indications
        iii. CT/PT/CVT rating details with location
        iv. Bus-bar arrangement/ Configuration of feeders and other information related to the ratings of the information required for analysis of the disturbance.
        v. CB positions (OPEN/ CLOSE) before and after fault
        vi. Isolator & Earth-switch positions (OPEN/CLOSE)
        vii. Voltage, frequency & power flows with direction at the time of fault
    c) Output of Event logger & Disturbance recorder
    d) Remedial Action(s) taken
    e) Relay setting details

HVDC Station Disturbance : Any additional data such as HVDC transient fault

record, switchyard equipment and any other relevant station data required for carrying out analysis of an event by RPC, NLDC, RLDC and SLDC shall be furnished by the users including RLDC and SLDC, as the case may be, within forty- eight (48) hours of the request. All users shall also furnish high-resolution analog data from various instruments including power electronic devices like HVDC, FACTS, renewable generation (inverter level or WTG level) on the request of RPCs, NLDC, RLDCs or SLDCs.

Generating Station Disturbance: Generating Station shall furnish high-resolution analog data from various instruments including AVR response, PSS response required for analysis of disturbance.

11. The respective entities (for which the Grid occurrence is placed in the PCSC agenda) shall present the Grid Occurrence which shall cover all related aspects such as:

    a) Antecedent conditions,
    b) Bus-configuration,
    c) Reasons of GD/ GI occurrence,
    d) Relevant Diagrams showing location of the fault,
    e) Bus bar arrangement/configuration of feeders and other connected equipment with proper CB positions (OPEN/ CLOSE) at the time of occurrence of the fault,
    f) Type of protections operated,
    g) Substantiation of the protections operated by relevant DRs & ELs,
    h) Reasons for protection systems mal-operation/non-operation,
    i) Remedial measures taken/ proposed, etc.

12. In respect of failure or Non-operation of A/R events, PLCC mal-operation events, any other protection related event as given in the PCSC agenda the concerned entities, shall furnish the reasons along with remedial action taken to RPCs/RLDCs. The same would be analyzed by the PCSC.
13. In the PCSC meetings, all the GDs, GIs, near miss events, A/R non-operation/mal-operation, PLCC mal-operations, other protection related trippings/events as circulated in the agenda shall be analyzed in detail by the PCSC forum and conclude the suitable recommendations to avoid the recurrence of such incidents in the future.
14. The action plan by the entities shall be furnished to RPC for implementation of the PCSC recommendations along with the timelines.
15. The implementation of the PCSC recommendations shall be followed up in the monthly PCSC meetings of RPC.
16. When grid disturbances or grid incidents occurred at major/critical substations and at substations that affected critical/essential/strategic loads, a Protection System Analysis Group (PSAG) shall be constituted consisting of the members from RPC, NLDC, RLDC, PGCIL, a Protection Expert from the region along with the Entity under whose jurisdiction GD/GI occurred to analyze the GD/GI in detail by visiting the respective substation/substations physically and conducting the meetings. PSAG would finalize the remedial actions and recommendations after deliberations and detailed analysis. The progress of implementation of the PSAG shall be followed up in the monthly PCSC Meetings.
17. If grid disturbance or grid incident is due to operational issue or transmission constraint/inadequacy, Grid-India shall share feedback to CTU or respective STU.

18. In case any user/entity fails to undertake remedial action identified by the RPC within the specified timelines as decided by PCSC of RPC, the concerned RPC may approach the Commission with all relevant details for suitable directions.
19. A date depository of the event as maintained by the RLDC shall be accessible to every entity and the entity shall upload all the relevant documents on the RLDC portal of trippings.

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3.

Revised Final Standard Operating Procedure (SOP) for Communication audit of Substations

1. This procedure has been prepared in compliance to Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017. As per clause 10 of the Regulation, RPC shall conduct annual audit of the communication system annually as per the procedure finalized in the forum of the concerned RPC. However, this SOP for communication audit of substations is finalized to maintain uniformity at the national level. It also mandates that RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the RPC Secretariat based on the audit report. An Annual Report on the audit carried out by respective RPC is to be submitted to the Commission within one month of closing of the financial year.
2. The Audit would be conducted in two phases. In first phase scrutiny of the reports, documents etc. In the second phase physical verification shall be carried out.
3. Each User/entity, using inter-state transmission or the intra-state transmission incidental to inter-state, shall submit the detailed report to RPC Secretariat and RLDC, as per prescribed format on yearly basis. The detailed report shall be submitted by the April end of the respective year. This report shall be considered as self-certificate regarding availability and healthiness of the Communication system of respective user/entity.
4. In respect of intra-state users/entities, SLDC shall submit detailed reports yearly by the April end of the respective year, to RPC Secretariat and RLDC.
5. Outage report of all the channels (including Network Management System, PLCC etc) report for a month shall be submitted by the Users/entities to RLDC and respective SLDCs, on monthly basis, by 7th day of the next month. RLDC and SLDCs after verifying the NMS data shall submit report to RPC Secretariat by 15th day.
6. All users/entities and Control Centers shall get the third-party cyber security audits done from a Cert-in certified vendor in compliance of CEA (Cyber Security in Power Sector) Guidelines, 2021. The detailed report of the Cyber Security Audit shall be submitted by 15th April for the previous financial Year.
7. RPC Secretariat may ask any other information required for Audit of the communication system in addition to these periodic reports.

Phase-I Audit: Scrutiny of the Information

8. A Communication System Audit Sub-Group comprising one member each from RPC, RLDC, PowerGrid and One of the respective Region SLDCs shall be constituted by RPC Secretariat with the approval of Member Secretary, RPC. The sub-group may co-opt any other member from any organization for facilitating the activities of the sub-group. Further, consultation from CEA may be taken, if required. The Audit team shall be formed excluding the member for the Organization/Utility whose system is to be audited.
9. The Communication System Audit Sub-group shall scrutinize the information received in RPC Secretariat. The Sub-group may also ask any additional information necessary for its activities. All the users/entities, RLDC, SLDCs shall provide the information to the subgroup on priority within the stipulated time period.
10. The sub-group shall also identify the nodes for physical inspection based on the criticality of the node in view of performance of the communication network or based on the deficiencies observed in the communication system.
11. The Audit would include but not limited to following aspects:
    a. Availability of communication channels. The outage reason needs to be clearly specified whether it is on account of the concerned entity or on account of any other entity, force majeure etc. The list of communication channels would be finalized by Communication System Sub Group in consultation with other stakeholders.
    b. Availability of terminal equipment. The outage reason needs to be clearly specified whether it is on account of the concerned entity or on account of any other entity, force majeure etc. The list of terminal equipment would be finalized by Communication System Sub Group. Part outage like failure of specific cards etc. would also be furnished along-with reasons.
    c. Availability of Auxiliary System e.g. Battery Charger, Battery bank, sufficient cooling equipment etc.
    d. Compliance of CERC and CEA Regulations and the procedures under these Regulations.
    e. Completion of periodic testing of the communication system in accordance with procedure for maintenance and testing prepared by CTU.
    f. Audit of all newly commissioned communication equipment within six months of its commissioning.
    g. Completion of 3rd party Cyber Security Audits.
    h. Network traffic w.r.t capacity.
    i. Spare availability, replenishment etc.

j. Any other parameters as agreed by the Communication Sub Group.

Phase-II Audit: Physical Verification

12. Based on the Recommendations of the Communication System Audit Sub-group, Audit team shall be constituted and the physical inspection Audit plan shall be prepared by RPC Secretariat.
13. Audit team shall be formed on regional basis.
14. Audit shall be carried out in a planned manner as included in this document by a team of three members. The audit team shall comprise of one representative from the RPC Secretariat, one representative from RLDC and one representative from any of the Utilities or SLDCs of respective Region. The Audit team shall be formed excluding the member for the Organization/Utility whose system is to be audited. The Audit team may co-opt any other member from any organization for facilitating the activities of the committee.
15. Once the plan is finalized, minimum 3 days advance notice shall be served to the concerned Auditee entity intimating the detailed plan so that availability of required testing equipment and the required documents is ensured by Auditee entity and is made available to the Audit team during the site visit.
16. Member Secretary, RPC in consultation with the Communication System Audit Subgroup may decide on any additional nodes/locations for physical inspection if a location is very critical in view of performance of the communication network at any time of the year.
17. The Scope of the physical verification shall include but not limited to the following:
    a. Available communication Network for its redundancy
    b. Availability of channel redundancy for all the functions for which it is configured.
    c. Communication equipment (hardware and software configuration) of all the nodes including repeater stations for its recommended performance.
    d. Documentation of the configuration of the respective site and its updation.
    e. Fibre layout / usage of fibre / Availability of dark fibre and its healthiness.
    f. Cable Schedule and identification / tagging.
    g. Healthiness of Auxiliary supply including the healthiness of Battery backup.
    h. Healthiness of Earthing / Earth protection for communication system.
    i. Availability of sufficient cooling equipment at the User's premises to maintain the stipulated temperature for the communication equipment.
    j. Optical power level
    k. Alternate modes of communication for speech

18. The format for collecting the details of Communication channels/links and Equipment is at **Annexure-I** and the same shall be furnished by the Auditee entity.

19. Communication Audit Checklist points are given in **Annexure-II** and the same are to be thoroughly verified by the Audit team.
20. Expenses towards Lodging, Boarding & Transportation (Excluding Air/Train Fair) between various places within the jurisdiction of Auditee entity shall be borne by respective Auditee entity. The Coordinating Officer(s) from the Auditee Utilities identified for each Team is (are) responsible for facilitating them to all the Members of respective Team.
21. Audit team shall submit report including recommendations for action on deficiencies, if any, found during the inspection, within 15 days from the date of inspection to Member Secretary, RPC. After approval of MS, RPC, the report would be communicated to the Auditee entity for compliance.

Audit Compliance Monitoring

22. Communication System Audit Sub-group would monitor the compliance of audit observations as applicable. Non-compliance of Audit Recommendations, if any, shall be put up to TCC and RPC.
23. The Annual Audit Report would be reviewed by a Communication System Sub Group at RPCs level. After considering the observations of Sub Group, RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the RPC Secretariat based on the audit report. An Annual Report on the audit carried out by RPC would be submitted to the Commission within one month of closing of the financial year.

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Audit Format (Annexure-I)

REGIONAL COMMUNICATION AUDIT REPORT			
General Information:			
1	**Substation Name**		
2	**SS Voltage level**		
3	**Date of commissioning of the substation**	**XX.XX.XXXX**	
4	**Region & State / Auditee**	**/**	
5	**Audit Date**		
6	**Name of the Utility which owns the SS**		
Details of Audit Team Members :			
SL	**Name**	**Designation**	**Organization**
1			
2			
3			
4			
Attached Documents, if any			
SL	**Name of the document**		**Original / Signed / Copy**
1			
2			

3		
4		
5		
6		
7		

Audit Format (Annexure-I)

8		
9		
10		
11		
12		
13		
14		
15		
16		
17		

Audit Format (Annexure-I)

Communication Channels and Equipments Audit Format

(A) List of channels in usage for data (64 kbps, 104, PMU, VC, 101) / Voice / Protection circuits / others:

Sl	Description (64 kbps, 104, PMU, VC, 101) / Voice / Protection circuits / Others)	Source	Destination	Channel Routing	Ownership details of terminal equipment / Links
1					
2					
3					
4					
5					
6					
7					
8					

(B) List of terminal communication equipments:

Sl	Name of Station	Equipment Type (SDH / PDH / Radio / VSAT / EPABX)	Make / Model	Ownership
1				
2				
3				
4				
5				
6				

7				
8				

(C) Communication System Details:

I. SDH Equipment

(1) Card Details:

Slot No	IP Address & Path / Direction Name	Card Details	Place a ✓mark if on usage, else Write as "Spare"	Whether Card is healthy / Faulty ? (H / F)	Cards Redundancy available Yes / No	Power Supply Card / Optical Card Yes / No	MSP configured? Yes / No	Action Plan for faulty cards	Other Information, if any
1									
2									
3									
And so on									

(2) Whether equipment is time synchronized : Yes / No

If Yes, how is it being done?

(3) Failures during last Fin. year / since last Audit :

Particulars	Number of failures of Card / Power Supply	Reason for failures	Measures taken for rectification
Card		**(i) (ii) (iii)**	**(i) (ii) (iii)**
Power Supply		**(i) (ii) (iii)**	**(i) (ii) (iii)**

(4) Configuration of the Node:

Name of Equipment	Number of Nodes	Number of directions	Name of Directions	Number of links down, with details	Details of corrective action, if any, taken

(5) Preventive maintenance schedule and its compliance:

Date of Last Preventive maintenance	Maintenance carried out as per schedule? (Yes / No)	Whether all the defects have been attended? (Yes / No) Give details

II. PDH Equipment

(1) Card Details :

Slot No	IP Address	Card Details	Place a ✓mark if on usage, else Write as "Spare"	Whether Card is healthy / Faulty ? (H / F)	Cards Redundancy available Yes / No	Power Supply Card / Optical Card Yes / No	MSP configured? Yes / No	Action Plan for faulty cards	Other Information, if any
1									
2									
3									
And so on									

(2) Whether equipment is time synchronized : Yes / No

If Yes, how is it being done?

(3) Failures during last Fin. year / since last Audit :

Particulars	Number of failures of Card / Power Supply	Reason for failures	Measures taken for rectification
Card		**(i)** **(ii)**	**(i)** **(ii)**
		(iii)	**(iii)**
Power Supply		**(i)** **(ii)** **(iii)**	**(i)** **(ii)** **(iii)**

(4) Configuration of the Node:

Name of Equipment	Number of Nodes	Number of directions	Name of Directions	Number of links down, with details	Details of corrective action, if any, taken

(5) Preventive maintenance schedule and its compliance:

Date of Last Preventive maintenance	Maintenance carried out as per schedule? (Yes / No)	Whether all the defects have been attended? (Yes / No) Give details

III. OPGW / Optical Fibre Details

Number of Directions	Name of Direction	No. of Pairs	No. of Fibers used	No. of spare & healthy Fibers	Unarmoured cable laid within PVC/Hume duct pipe?	Fibre Count in OPGW? Whether matching with Approach cable to FODP?	Overall Optical Fibre Path Attenuation (dB/km)	Power Received	Conformation to Compliance of CEA Standards

IV. Healthiness of Auxiliary System:

(1) Details of 2 independent Power Sources :

Source	Commissioning Date	Battery Back up (Hour)	Battery capacity (AH)	Supply Voltage (V)	Healthiness of Battery (Yes / No)	Make of Charger	Charger Capacity (A)	Periodicity of Maintenance Schedule	Date of Last 2 Actual Maintenance carried out	Remarks
1										
2										

(2) Conformation to Compliance of CEA Standards :

V. Healthiness of Earthing of each equipment:

Sl	Equipment	Status on Healthiness of Earthing

VI. Details of Voice communication available between Sub-station and Control Centre:

Sl	Voice communication (Sub-station - Control Centre)	Status on Healthiness of Voice communication	Healthiness of air-conditioning of communication room as per OEM recommendation

VII. PLCC Details:

Number of Panels	Make and Model	Direction	Frequency (Tx & Rx)	Status on Healthiness	Last preventive maintenance		Details of defects, if any, attended	Status of Availability of Spares	Conformation to Compliance of CEA Standards
					Schedule	Actual			

			KHz						

VIII. Radio Communication Details:

Number of Equipments	**Make and Model**	**Status on Healthiness**	**Last preventive maintenance**		**Details of defects, if any, attended**	**Status of Availability of Spares**	**Conformation to Compliance of CEA Standards**
			Schedule	**Actual**			

IX. Data Retention : (i) Earliest Date of availability of data : _____
(ii) Historical data availability : ____ days.

X. Control Command Delay : (i) Time delay in seconds from Control Centre for SCADA : ____ Seconds

(ii) Time delay in seconds from Control Centre for WAMS : ____ Seconds

XI. Wide Band Network : (i) Absolute channel delay in protection applications : _____ ms
(ii) Channel delay asymmetry in protection applications : _____ ms
(iii) Switching Time delay to alternate path/route during failure of one path : _____ ms

XII. Status of integration with U-NMS or state NMS:

XIII. Any other information :

Audit Team Member SRPC	Audit Team Member Co-Ordinator	Audit Team Member PGCIL (Internal / External)	Audit Team Member State (Internal / External)

Communication Audit Checklist (Annexure-II)

S.No	Check list points	Expected	Actual	Reference
1	Whether OPGW is terminated properly. Down lead shall be fixed property in sufficient locations. Metallic part shall be connected to earth mat riser.	Yes		
2	Distinct approach cable shall be laid 1 Protection & Communication 2 Fibers for commercial applications Item no 1 cable shall be terminated in communication room FODP One number FODP panel shall be available in communication room			
3	Fiber Identification shall be done in FODP properly			
4	Whether End to end tests were carried out during installation and records are available (both Optical Power Source/receiver test and OTDR Test results			
5	Whether patch chords 1 Cross labelled (source/ receive) 2 Tx – Rx Marking 3 Mechanical protection is provided for pach chords laid between panels			
6	Whether separate room for communication is available with following:- 1 Air conditioning with standby A/C Unit 2 AC Distribution board with ELCB 3 Single point earthing bar which shall be connected to substation Earth mat			
7	Two sets of 48 V (Positive Earthed) DC System shall be available with 1 Common DC Distribution board/ Panels with incoming MCB, coupler MCB , out doing MCBs etc 2. Minimum 200 Ah (2 sets of battery) VRLA batteries are preferred to keep chargers and battery in communication room. 3. Battery Charger shall be Thryristorised/ SMPS			

8	Battery Charger alarms /measurements shall be made available to SAS (if available) It can be achieved through MOD bus or connecting analogue/ digital signals to Common BCU of SAS. If such system is not available major			

	alarms shall b alarmed in common substation annunciator			
9	2 nos of substation Data (From RTU or SAS Gateway)shall route in different roots to Main and Standby Load Dispatch centres			
10	Kindly assure proper protection is available for AC Distribution (ELCB, MCB, Backup fuse),			
11	Aux Transformer neutral Earthing shall be connected to Stations earth mat (Aux Transformers shall be installed in yard earth mat area only)			
12	Whether DG sets with AMF panels are provided for Aux AC Supply			
13	Whether 2 nos 11 kV (or 33kV) supplies are available for Each station aux Transformer			

4.

Revised Final Standard Operating Procedure (SoP) for Communication System Outage Planning

1. As per the following CEA and CERC Regulations, the Communication Outage for the Region shall be carried out by RPC Secretariat:
   a) Regulation 7.3 of Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017 stipulates as below:
   Quote:
   7.3 Role of National Power Committee (NPC) and Regional Power Committee (RPC):
   ……
   (iv) The RPC Secretariat shall be responsible for outage planning for communication system in its region. RPC Secretariat shall process outage planning such that uninterrupted communication system is ensured.
   ……
   Unquote

   b) Regulation 10 Central Electricity Authority (Technical Standards for Communication System in Power System Operations) Regulations, 2020 notified on 27.02.2020 envisages as below:
   Quote:
   10. Outage Planning: Monthly outage shall be planned and got approved by the owner of communication equipment in the concerned regional power committee, as per detailed procedure finalized by the respective regional power committee.
   Unquote

2. A Communication System Outage Planning Sub-Group/ TeST Sub Committee shall be formed in each region constituting the members from all the entities connected to ISTS including all CGS, ISGS, REGs/SPPDs/SPDs, STUs, SLDCs etc., of the respective Region, RLDC/Grid-India, PGCIL, CTUIL, Private Transmission licensees in respective region & RPC secretariat. The sub-group/ Sub Committee may co-opt any other member from any organization for facilitating the activities of the sub-group/ Sub Committee.

3. Communication System Outage Planning will be limited to the following systems:
   (i) ISTS Communication System including ISGS
   (ii) Intra-state Communication System being utilized for ISTS Communication
   (iii) ICCP links between Main & Backup RLDCs, Main & Backup SLDCs & Main & Backup NLDCs.
   (iv) Inter-regional AGC links.

(v) Any other system agreed by the sub-group.

4. Communication Equipment/link within the scope of the Procedure would include :

   (i) Optic Fibre links
   (ii) Any other link being used for ISTS communication
   (iii) ICCP links between Main & Backup RLDCs, Main & Backup SLDCs & Main & Backup NLDC
   (iv) VC links between LDCs
   (v) Inter-regional AGC links
   (vi) SPS Links
   (vii) Tele-Protection
   (viii) AMR
   (ix) PMU
   (x) SDH & PDH
   (xi) DCPC
   (xii) RTU & its CMU cards
   (xiii) DTPCs
   (xiv) Battery Banks and Charging Equipment
   (xv) EPABX
   (xvi) Any other equipment/link agreed by the sub-group

5. A Web Portal named as "Communication System Outage Planning Portal" shall be developed by respective RLDCs or a module for communication system outage planning shall be provided in the U-NMS. Log-in credentials shall be provided to all the ISTS connected entities/concerned entities.

6. Entities/Users/Owners shall add their communication links and the equipment to the Web Portal as soon as they are commissioned. The same has to be furnished to RPC Secretariat /RLDCs.

7. Entities/Users/Owners of the communication equipment shall upload the outage proposals of communication links and the equipment (in the prescribed format only) to be availed during subsequent month by 7th/8th of every month in the Web Portal.

8. RPC Secretariat consolidates the list of outage proposals received from various Entities/Users/Owners of the communication links and equipment by downloading from the Web portal and circulate the same among all the respective region entities by 15th of every month. Communication outages affecting other regions would be coordinated by respective RLDC through NLDC.

9. Communication System Outage Planning (CSOP) meeting shall be conducted during the third week of every month normally (preferably through VC) to discuss and approve the proposed outages of communication links and equipment.

10. The approved outages of Communication links and equipment in the CSOP meeting shall be published in the RPC website and respective RPCs Communication Outage Portal within 3 days from the date of CSOP meeting.

11. Outage of the approved communication links and equipment shall be availed by the respective owner /entities after confirming the same with RLDC on D-3 basis.

12. In case of any emergency outage requirement of communication links and equipment, Entities/Users/Owners may directly apply to respective RLDC with intimation to respective RPCs on D-2 basis. Confirmation of approval/rejection will be provided on D-1 basis by RLDCs in consultation with respective RPCs considering 24hrs processing window.

13. Entities/Users/Owners shall take the code from the respective RLDC before availing the planned outage of the communication links & equipment and before restoration of the same.

14. Entities/Users/Owners of the communication links and equipment shall submit the deviation report for the approved outages (approved dates & approved period) availed during the previous month and the report on planned / forced / other outage of communication links / equipment by 10th of the month to RPC Secretariat as per the format at **Annexure-I** .

15. In the monthly CSOP meetings, communication links and equipment whose outage duration (Planned / Forced / Others) more than 48 hours for the last 12 months of rolling period shall be deliberated for the measures to be taken in future for the better outage management. The date deviations and non-availing the outages that were approved in the previous CSOP meetings shall also be deliberated in the CSOP meetings.

Note: The manual for implementation of Communication System Outage Planning through web portal received from SRPC is attached at **Annexure-II** for ready reference.

***

Annexure: DCOA-I

Outage Deviation Report : List of outages of Communication Links, availed / deviated during the month of June, 2021

Dated :

A Details of Communication Links (Point to Point) availed :

SL	Name of Requesting Agency	Description of Link	Source	Destination	Channel Routing	Ownership	Reason for availing outage with the details of equipment attended	Approved Start Date : Time [dd-mm-yy<><>hh:mm]	Approved End Date : Time [dd-mm-yy<><>hh:mm]	Approved Outage Hours	Outage availed Start Date : Time [dd-mm-yy<><>hh:mm]	Outage availed End Date : Time [dd-mm-yy<><>hh:mm]	Total hours of outage availed now	Deviation ? (Y/N)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Example**	Back up Control Center (BCC) : Data	KAYATHAR 230 kV SS	MADURAI LDC	Data will be availble throug	TANTRANSCO	Shifting of FODB panel at Kayathar 230 KV SS	10-Mar-2021 09:00	10-Mar-2021 18:00	**09:00**	10-Mar-2021 14:07	10-Mar-2021 17:30	**03:23**	**N**

Annexure: DCOA-II

Outage Deviation Report : List of outages of Communication Equipment availed / deviated during the month of June, 2021

Dated : **0:00**

B Details of Communication Equipment availed :

SL	Name of Requesting Agency	Name of the communication equipment	Location of the Equipment / Name of Station	Name of the Link/Channel/Path / directions affected	Alternate Channel/Path available ? (Furnish details)	Ownership	Reason for availing outage with the details of faults	Approved Start Date : Time [dd-mm-yy<><>hh:mm]	Approved End Date : Time [dd-mm-yy<><>hh:mm]	Approved Outage Hours	Outage availed Start Date : Time [dd-mm-yy<><>hh:mm]	Outage availed End Date : Time[dd-mm-yy<><>hh:mm]	Total hours of outage availed now	Deviation ? (Y/N)
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	**Example**	DC Charger -2, Amararaja, 48v,	Edamon	Nil	Nil	KSEBL	Monthly maintenance. No interruption as alternate chargers available	16/Mar/21, 11:00	16/Mar/21, 16:00	**05:00**	16/Mar/21, 10:30	16/Mar/21, 16:00	**05:30**	**Y**

COMSR

MANUAL-2023

ग्रिड-इंडिया
GRID-INDIA

PREPARED BY

SRLDC, GRID-INDIA

Table of Contents

1. Need for Communication Outage Portal?

In line with the requirements for outage planning of communication equipment as per CERC Communication System for Inter State Transmission of Electricity Regulations 2017, SRPC has devised a procedure for Outage planning for Communication system in Southern Region available at the website of Southern Regional Power Committee (SRPC) (https://www.srpc.kar.nic.in/website/2020/communication/com_outg_proc.pdf) and attached as **Annex-I**. As per the "Procedure on Outage Planning for Communication System -SR", monthly meetings are being conducted with participation of Nodal Officers from users, SLDCs, SRLDC, SRPC & CTU. These meetings are conducted to discuss and approve/reschedule / dispose of the proposed list of outages pertaining to communication links / equipment scheduled for the next month. In order to provide a seamless experience for applying and availing communication outages and monitoring availed outage timelines, SRLDC has developed a web portal which is used to register communication equipment/links, configure outage proposals for already registered equipment/links, view deviations between approved outage timelines and actual outage timelines .The web portal facilitates entering observations/remarks by RLDC/RPC on any outage proposal with the facility to concur/deny the proposal by SRPC.

2. COMSR (Communication Equipment Outage Coordination Meeting - SR) Outage Portal:

The web portal is accessible through the following URL: https://srcom.srldc.in/login

2.1. Login Page:

Figure 1 COMSR Portal Login Page

- User name & initial password are created and shared by web admin (SRLDC).
- Note: Password Change can be enforced after first time login.

2.2. Roles defined in the Communication outage portal

1. **Administrator (RPC)**
2. **Supervisor (RLDC)**
3. **User**
4. **Operator**

The administrator role is assigned to the respective RPC. Supervisor Role is assigned to the respective RLDC. User Role is assigned to each entity/utility, who can apply for outages. Operator Role is assigned to real time shift operators at RLDC.

- Only Administrator can approve/deny the proposed outages. Supervisor can provide remarks against each proposed outage and do necessary configuration and maintenance of web-portal front end and Db for smooth functioning of the entire process.
- Operator can view the portal for list of approved outages and issue codes for availing outages
- User can apply for the outages proposed for the next month and once the outage is approved, the respective user can view the approval details under their account login . User can also apply for emergency outages. User can also update the actual time duration (Start time, End time) of each outage availed.

2.3. Main Tabs in COMSR Portal:

- **Meetings**
- **Links**
- **Equipment**
- **COA1(Link) -** Communication Outage Approval for Communication Links
- **COD1(Link) -** Communication Outage Deviation for Communication Links
- **COA2(Equipment)-** Communication Outage Approval for Communication Equipment
- **COD2(Equipment) -** Communication Outage Deviation for Communication Equipment
- **Rolling Report- 12 Months Outage Time > 48hours**
    - **COD3- Communication Outage Rolling 12 Months Deviation – Links**
    - **COD4-Communication Outage Rolling 12 Months Deviation - Equipment**

Note:
1. Formats for COA1, COA2, COD1, COD2, COD3 & COD4 have been finalized by SRPC.
2. All Reports can be downloaded from the web portal in Excel Format

2.4. Meetings Tab

Figure 2 below shows the Meeting summary Page, where details for upcoming monthly meeting can be configured with a unique meeting number for each meeting. The details configured include opening and closing dates for receipt of applications for

communication links/equipment outages proposed for next month (M+1month outages proposed in timelines defined in Mth month).

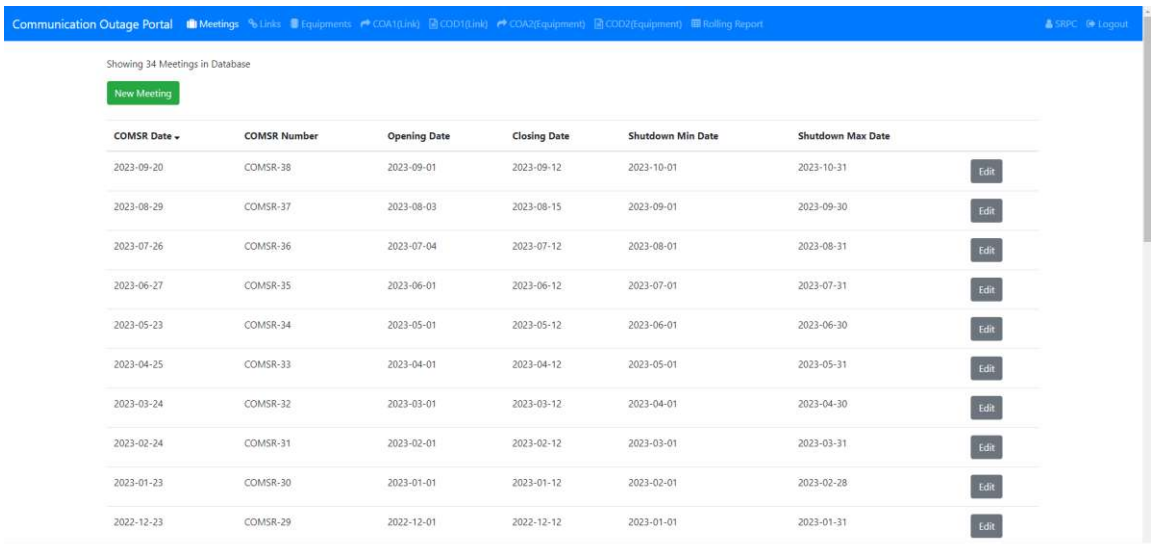


Figure 2 Meeting summary Page

A sample meeting creation page screen in shown in Figure 3 below:

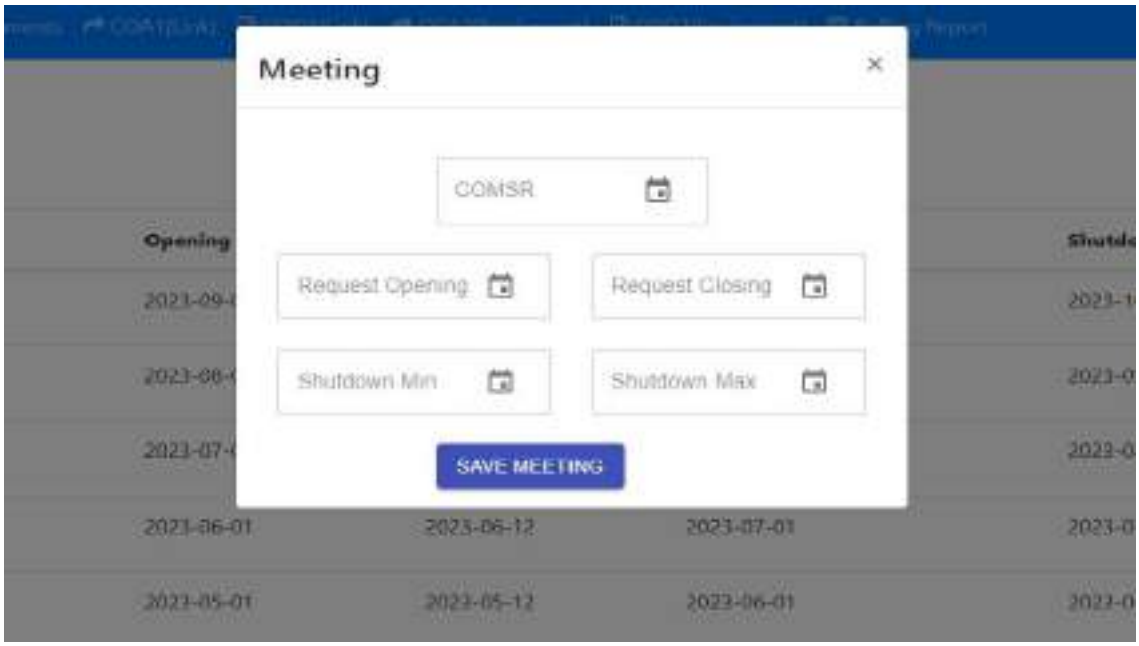


Figure 3 New Meeting Creation Page

All options available on this webpage are customisable and presently the meeting creation option is automated with default Opening and Closing dates for proposed outages as 1st and 12th of the current month.

2.5. Work Flow for availing communication outages:

RPC (Administrator Login) configures the upcoming COMSR Meeting details in the web portal through manual/automated mode and intimation for the next meeting is sent to all stakeholders through e-mail.

2.5.1. Planned Outages:

- User can apply planned outages for the M+1 month by furnishing various details during current month (M) window (planned outages to be submitted between defined timelines---*opening and closing date* as shown in Figure 3 above) and the applied outage details intimation are sent automatically through mail to RLDC and RPC by the portal itself.
- User can edit their applied outages till end of c*losing date* of requests for M+1 Month.
- RLDC can provide observations for the proposed outages.
- RPC consolidates the list of outage proposals received from various Users/Owners and releases the list around mid of the M^{th} month for outages proposed for M +1 month.
- On the meeting date, the proposed outages are deliberated, and RPC approves, revises or rejects the applied outages as per the outcome of discussions.
- Facility has been provided in the portal for RPC to change/defer (approval/rejection) of approved requests till D-1 day (D being the day of availing outage).
- User need to intimate RLDC about availing approved outages(confirmation) before D-3 through email (D being the date of availing outage).
- A consolidated view of day-wise approved outages is available under Operator Login. The facility has been made available to enable Grid Operators to issue unique codes to the concerned user seeking equipment/link outage on the day of outage.

Detailed flowcharts covering activities involved in creating a meeting instance on web portal, entering of planned outages by Users, provision for entering review/observations by RLDC/RPCs, discussions on proposed outages in monthly meeting, approval/denial of proposed outages, availing of outages on the proposed dates, computing deviations between actual outage timeline with proposed timeline and preparation of Rolling Window for outages for last 12 months are depicted in figures 4 and 5 below.

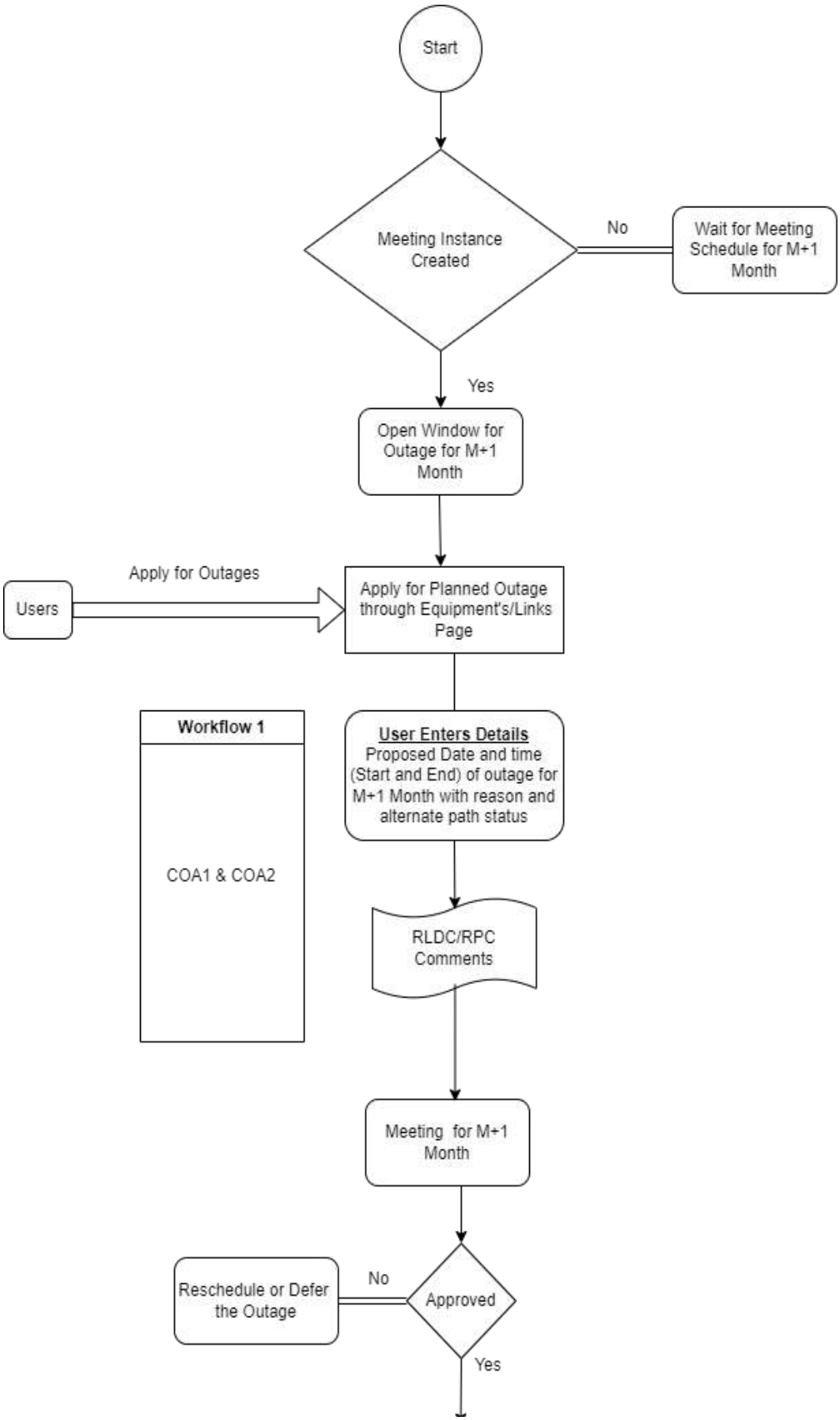


Figure 4 Flowchart for Planned Outage processing through web portal

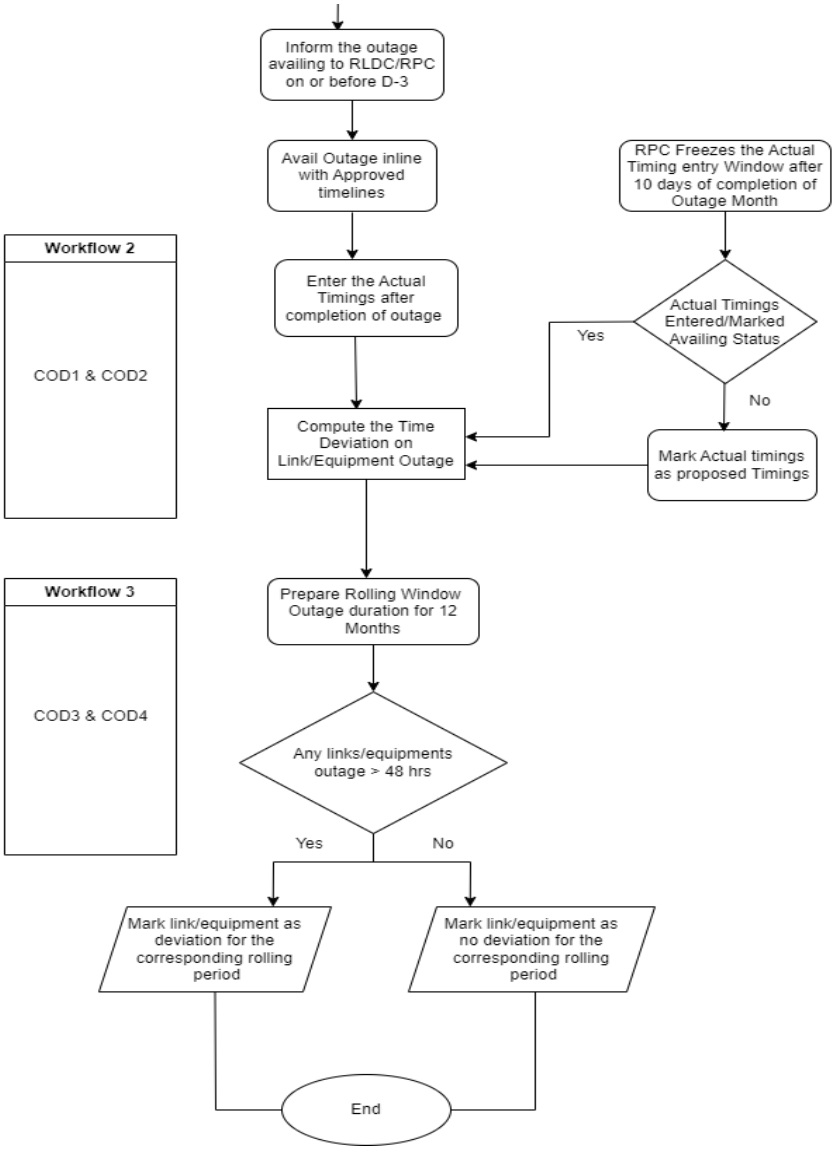


Figure 5 Flowchart for availing approved outages and entering deviations between approved/actual outage timelines through web portal

2.5.2. Emergency & Forced Outages:

- User can apply Emergency outages for D Day on D-1 Day i.e1 Day before the proposed outage. The details of applied Emergency Outage will be sent to registered email ids of RLDC and RPC for concurrence.
- User can submit details for Forced outages availed for links/equipment in previous Month (M-1) till 12th of the current Month(M). The details of reported Forced Outages will be sent to registered email ids of RLDC and RPC.

Flowchart covering various activities involved in application and approval of emergency outages is depicted in Figure 6 below.

Flowchart covering various activities involved in reporting of forced outages and its inclusion in 12 months rolling report is depicted in Figure 7 below.

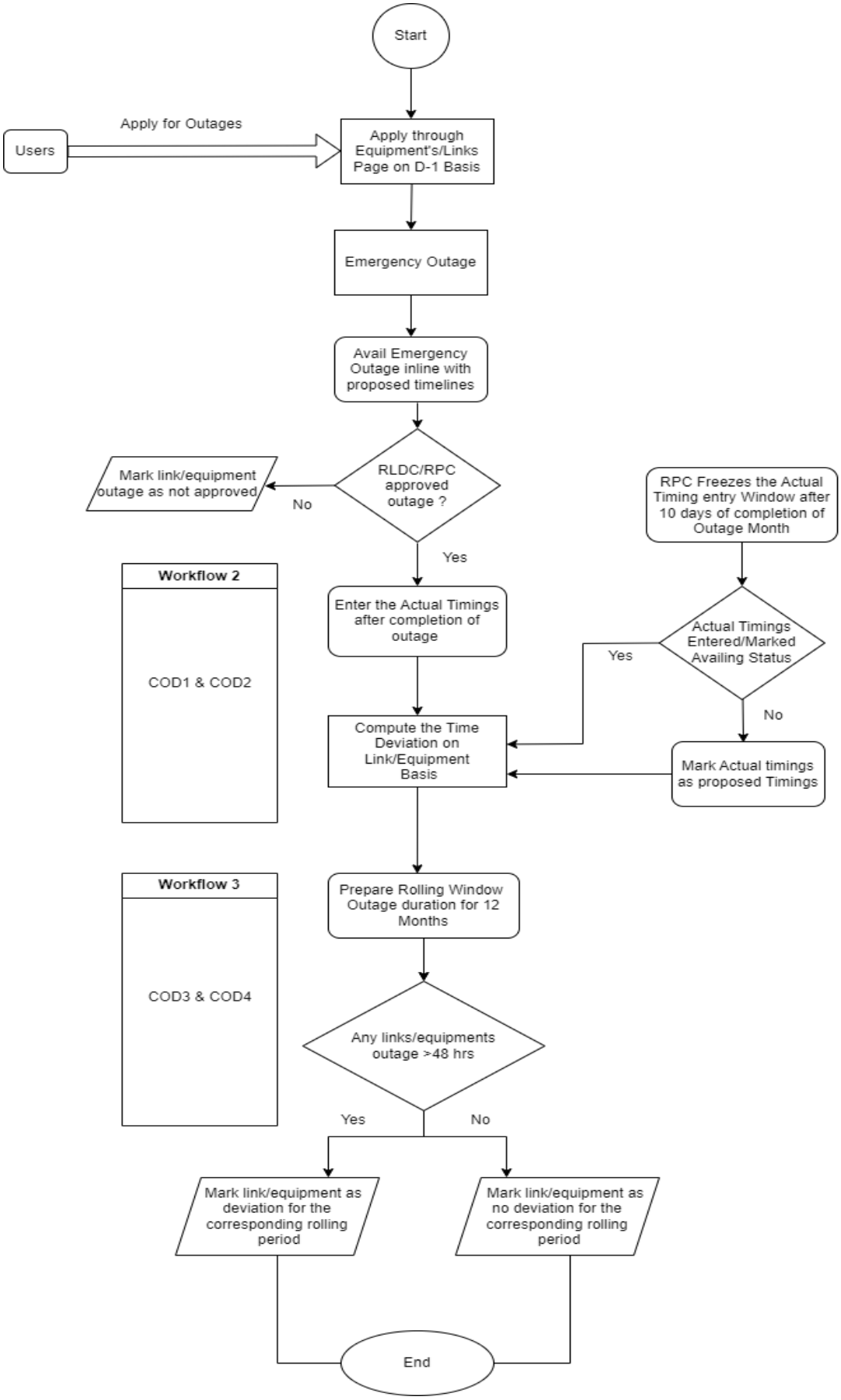


Figure 6 Emergency Outage Workflow

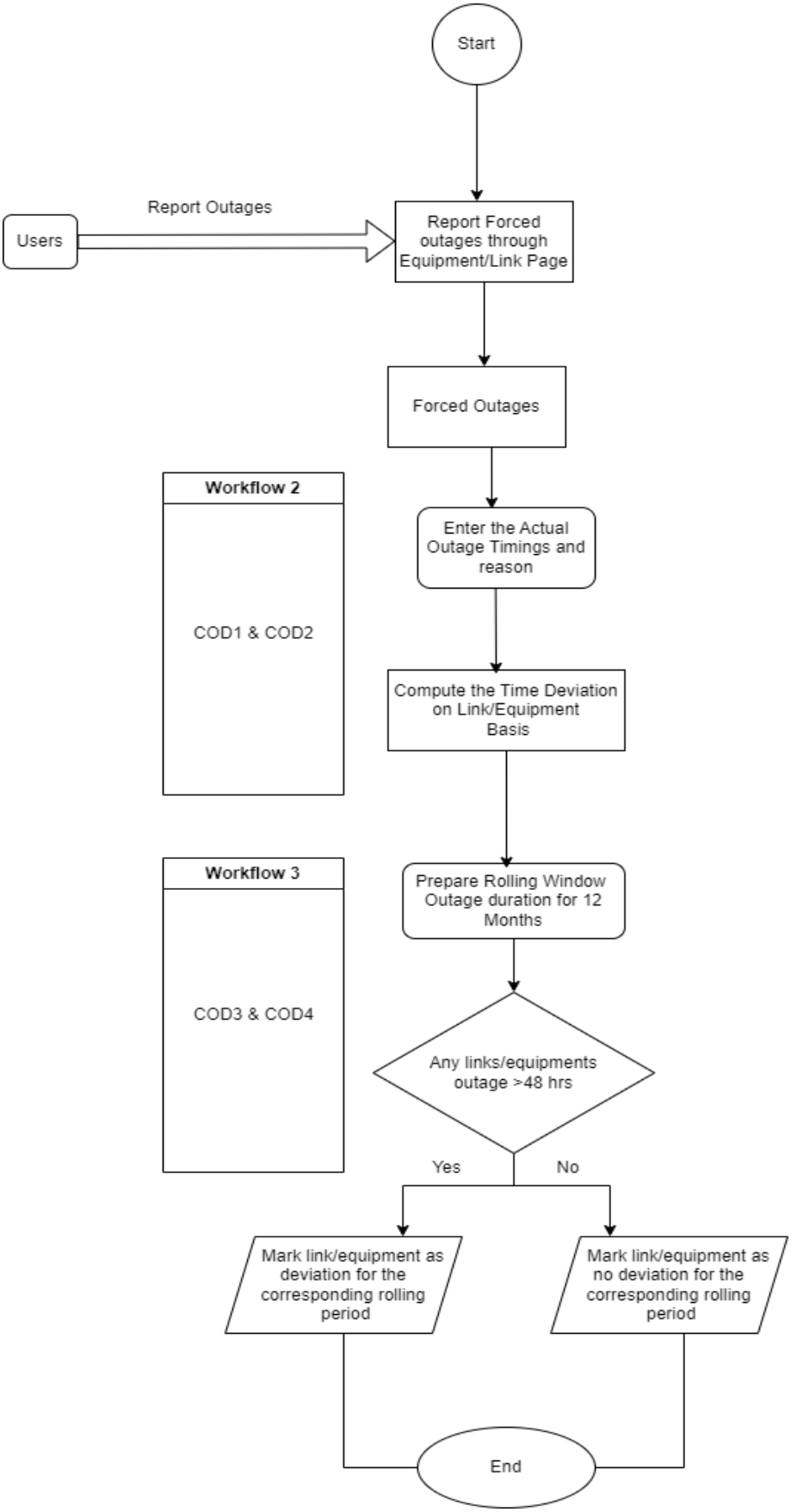


Figure 7 Forced Outage Workflow

2.6. Adding new/modified Equipment/Link to the portal database:

- Under the **Equipment** Tab, provision is there for User to add new/modified equipment details and request RPC/RLDC for addition/updating of the equipment in COMSR Database through "Request to Add new Equipment to Database option". Screenshot of the "Create New Equipment" widget is shown in Figure 8 below.

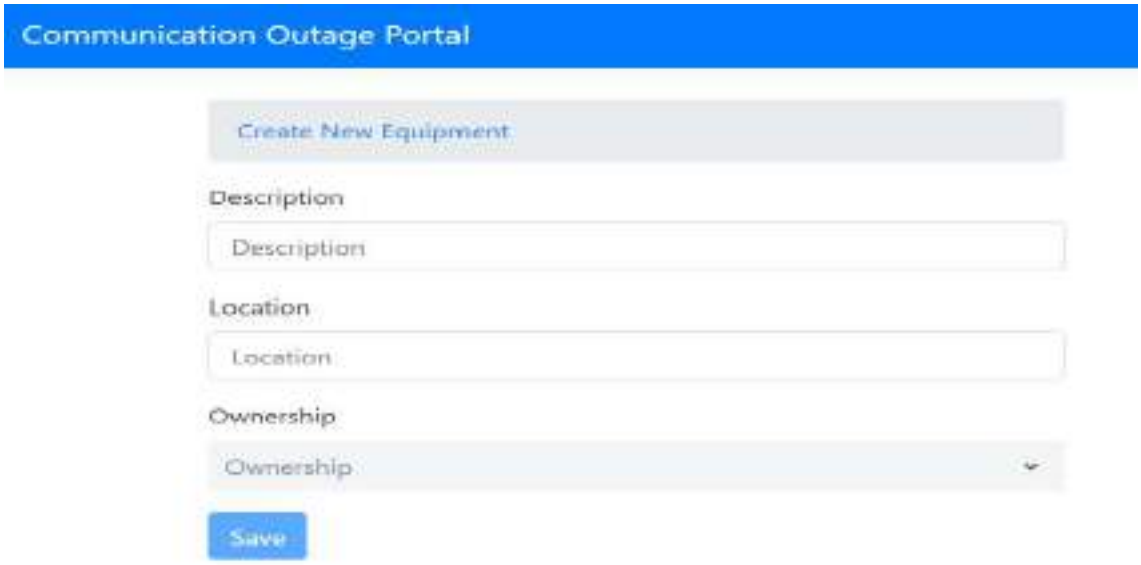


Figure 8 Create new Equipment Request screen

Similarly, any new/modified Communication Channel (links) can be added through the **Links** Tab by User and User can further request RPC/RLDC for approval of addition of the same in Communication outage portal database, Screenshot of the "Create New Link" widget is shown in Figure 9 below.

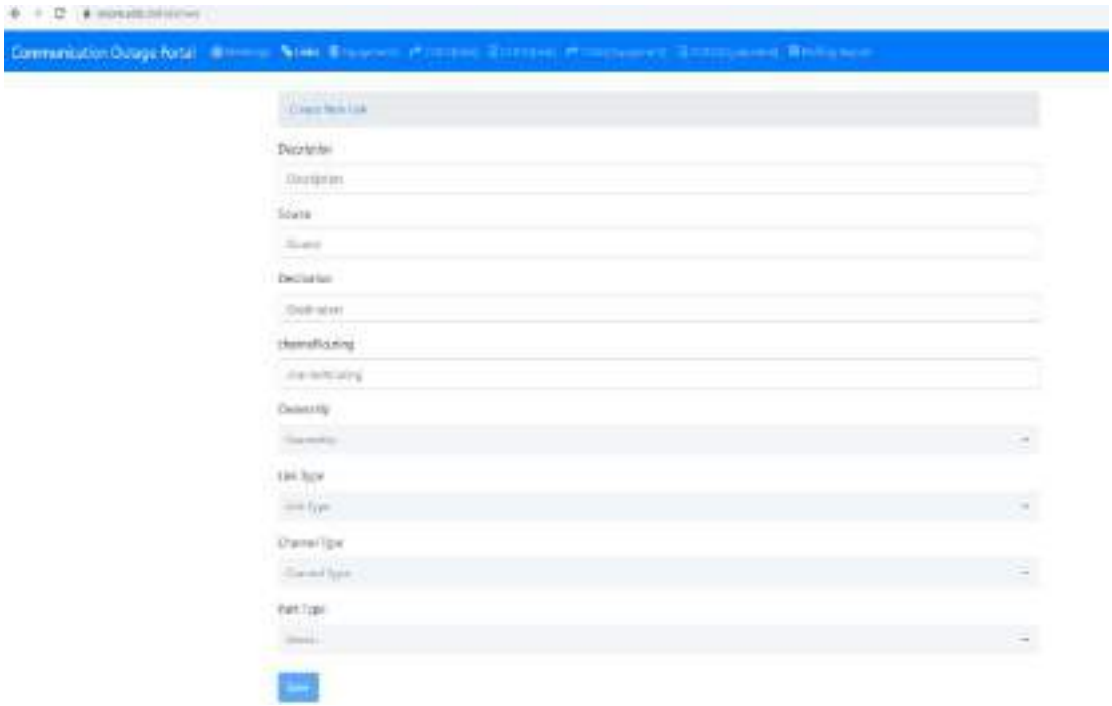


Figure 9 Create the communication Channel screen

Workflow depicting activities involved in adding new/modified Equipment/Link to the portal database is depicted below (Figure 10).

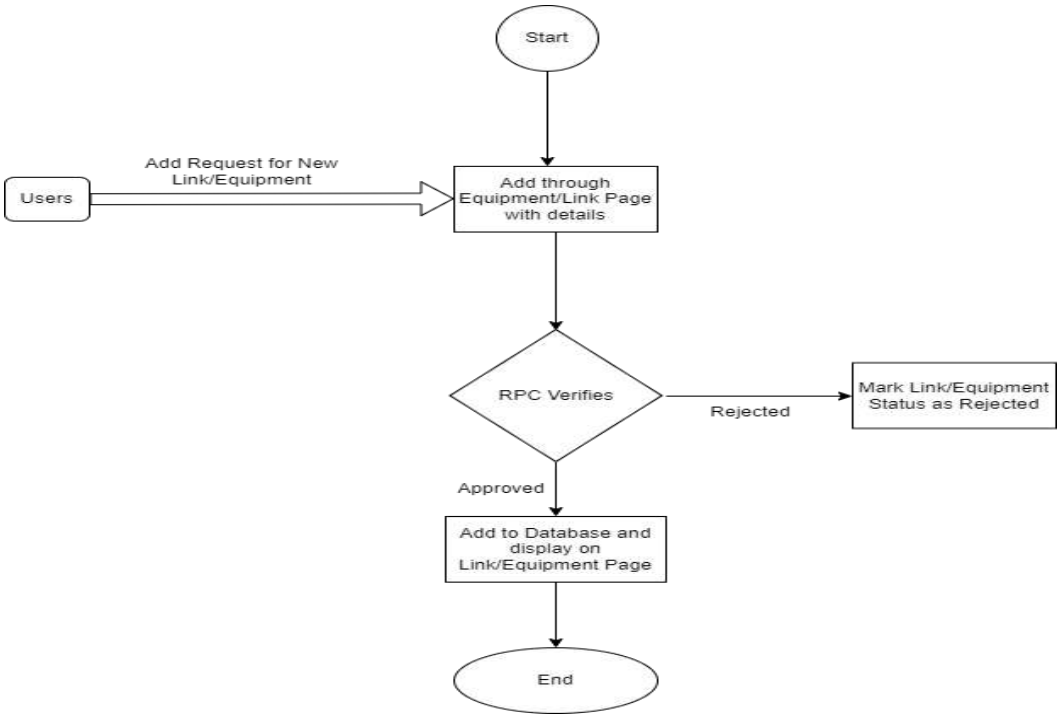


Figure 10 Adding New Links/Equipment's Workflow

Once a user requests for the addition/modification of the communication equipment or links, the request is forwarded to RPC for approval. Screenshot of widget showing the pending equipment/link approval of respective RPC/RLDC sample view is shown in Figure 11 below.

Figure 11 Pending Approval Widget for equipment's

- RPC/RLDC can add/update the Communication outage portal database with equipment/links proposed by users through **Equipment** tab on the web portal which contains a widget for **Pending Equipment to be added to Database** or through **Links** tab on the web portal with a widget for **Pending Links to be added to Database.**

2.7. Links Tab

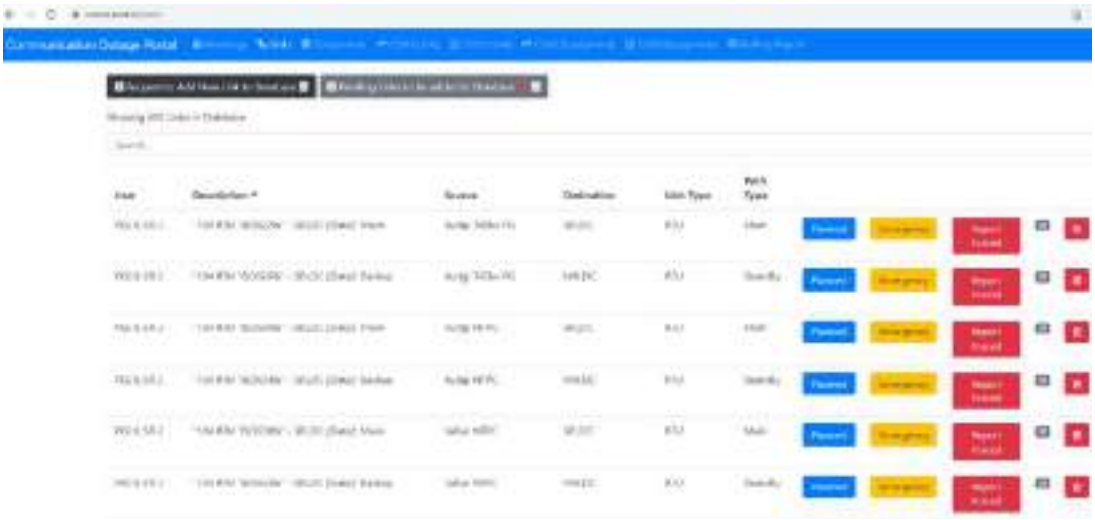


Figure 12 Links Tab sample screen

From **Links** tab, user can apply for proposed outages in communication links in either planned or emergency category and can also report the forced outages availed.

Sample View page screens for entering planned, emergency or forced outage details for communication equipment by the User are shown below in Figures 13,14 and 15 respectively.

2.7.1. Planned Outage Application for Links:

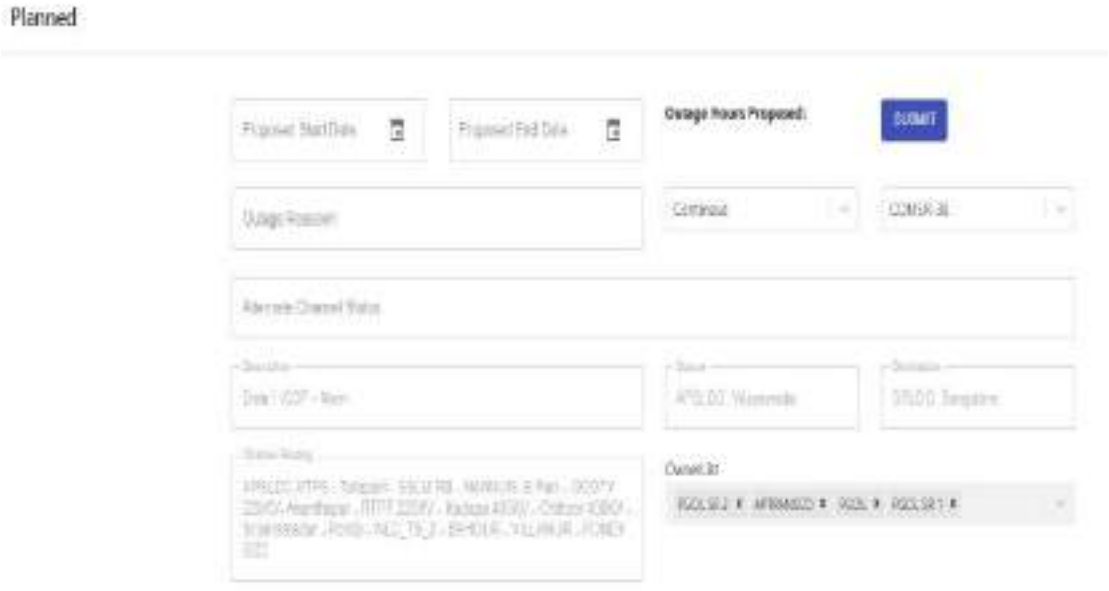


Figure 13 Planned Outage Application Screen for Links

2.7.2. Emergency Outage Application for Links:

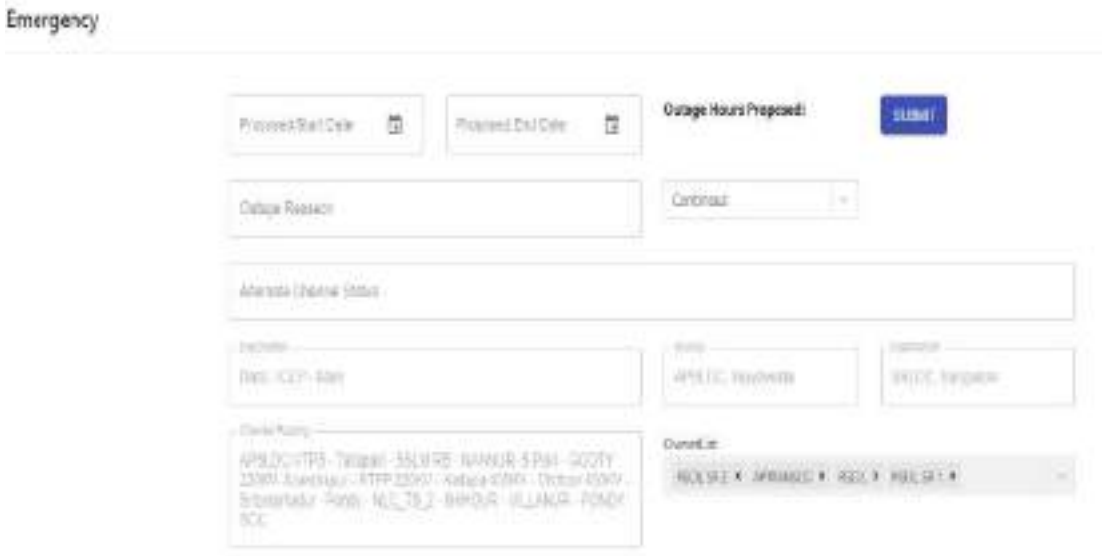


Figure 14 Emergency Outage Application Screen for Links

2.7.3. Forced Outage Reporting for Links:

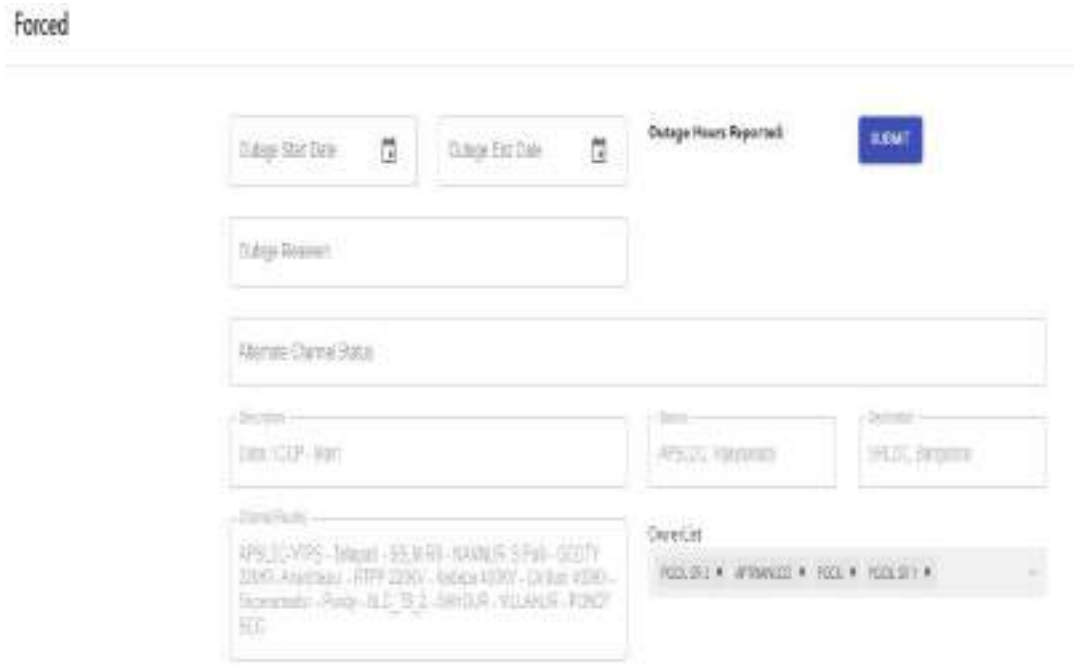


Figure 15 Forced Outage Reporting Screen for Links

2.8. Equipment Tab

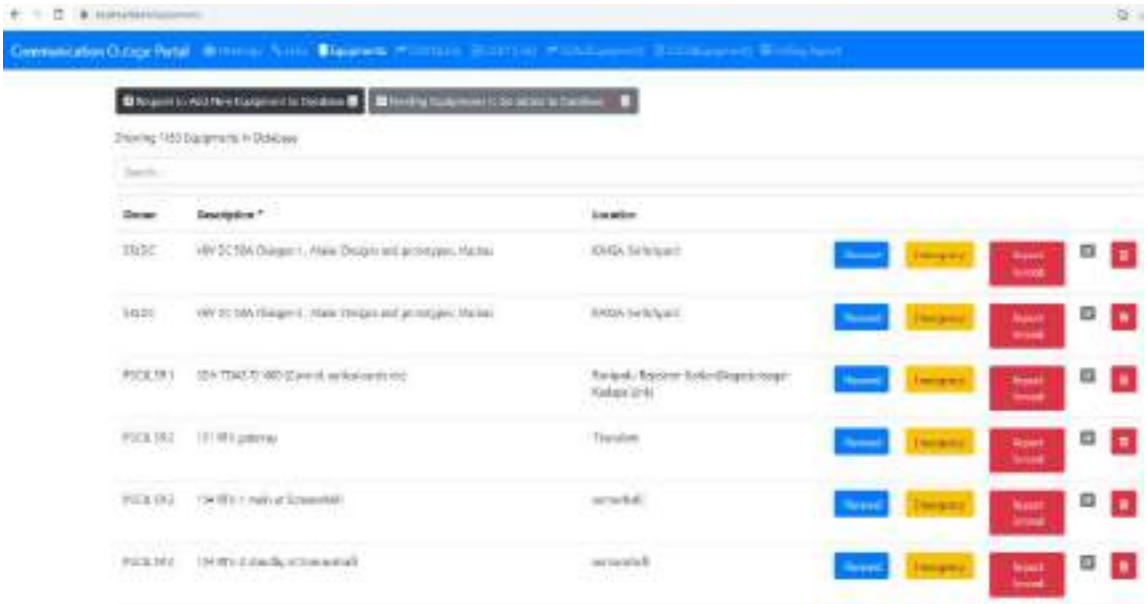


Figure 16 Equipment Tab sample screen

From **Equipment** tab (Figure 16 above), user can apply for proposed outages in communication equipment in either planned or emergency category and can report the forced outage availed. Sample View page screens for entering planned, emergency or forced outage details for communication equipment by the User are shown below in Figures 17,18 and 19 respectively.

2.8.1. Planned Outage Application for Equipment:

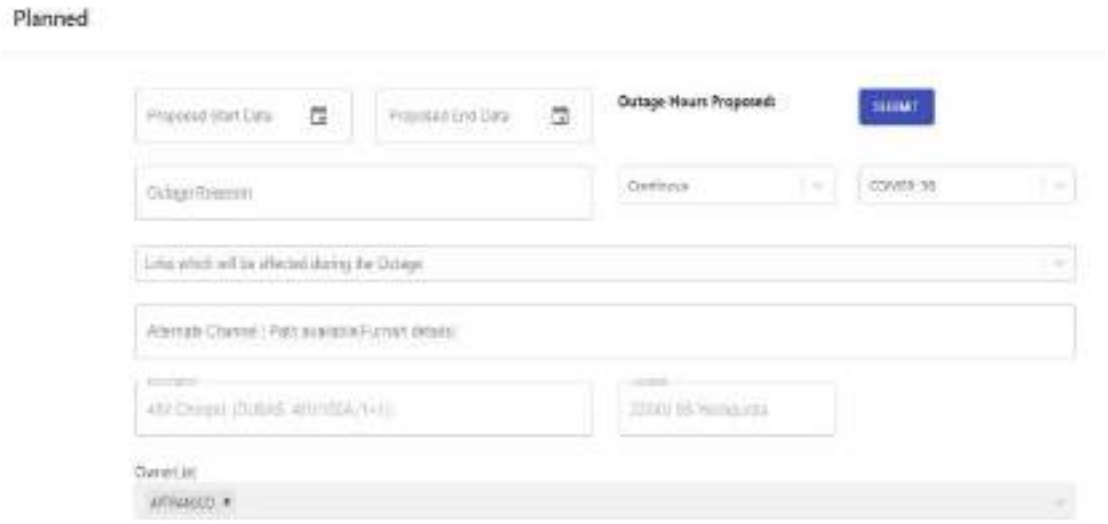


Figure 17 Planned Outage Application Screen for Equipment

2.8.2. Emergency Outage Application for Equipment:

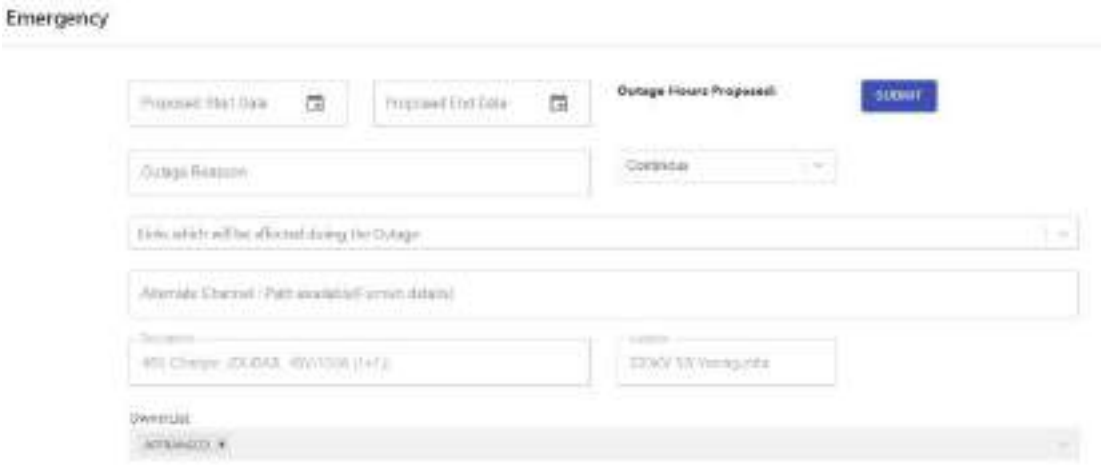


Figure 18 Emergency Outage Application Screen for Equipment

2.8.3. Forced Outage Reporting for Equipment:

Figure 19 Forced Outage Reporting screen for Equipment

2.9. COA1(Link) - Communication Outage Approval Links

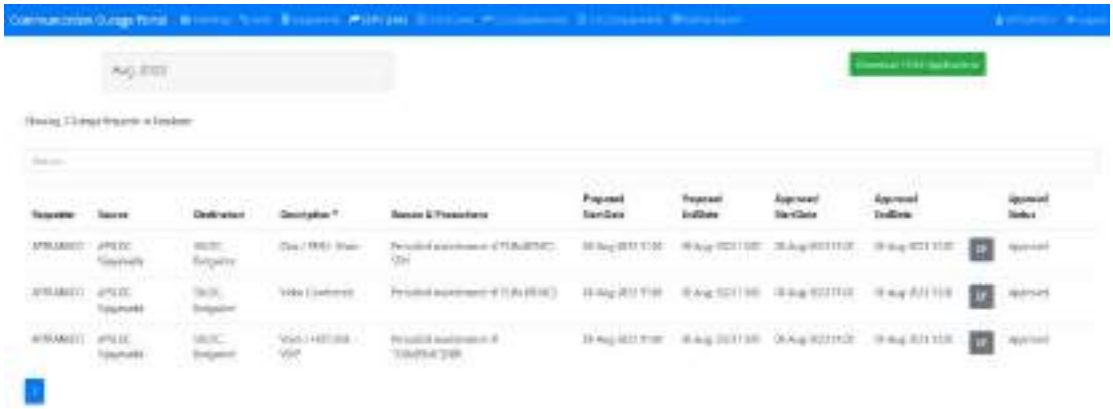


Figure 20 Communication Outage Application links (COA1) details for selected month

Through COA1 tab (Figure 20 above), Users can view the consolidated list of outage requests (for communication channels) submitted by them along with the current status of each outage request i.e., whether approved/rejected/revised (along with approved

timelines). Through this tab, users can edit their outage requests within the scheduled timeline window for submission of proposed outages.

Under Admin/Supervisor logins (RPC/RLDC) COA1 tab provides a consolidated list of all outage requests (for communication channels) from all users with proposed start and end date / time along with approved start and end date/ time for each outage.

2.10. COD1(Link) - Communication Outage Deviation - Links

Once communication link outage is approved in COMSR meeting, the final approved list for outage of communication links is communicated by RPC to all stakeholders and also updated on COMSR web portal. After availing the approved outage, concerned users have to enter the actual outage times (including start and end date, time) through COD1(Links) Tab (Figure 21 below) for communication channels

Note: In case of Emergency outage, approved start and end date times shall be null.

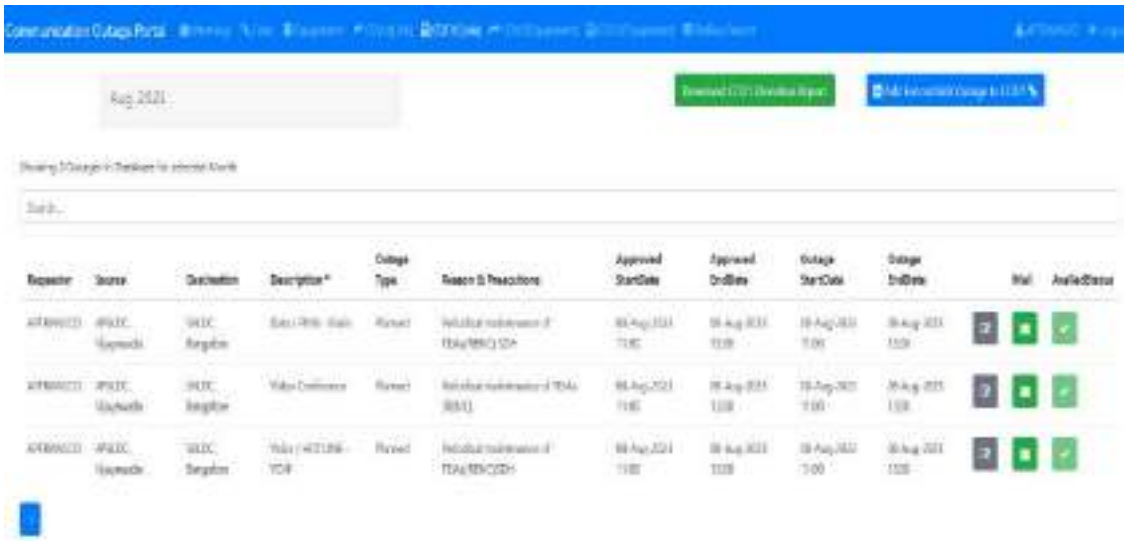


Figure 21 Communication Outage Deviation entry page for communication links (COD1)

Once the User enters the timings for actual outage duration for each approved outage, any deviation between the actual outage timing from the approved outage timing is computed and displayed in the COD1 tab. Sample screen for entry options available for Users against each approved outage under COD1 tab is shown in Figure 22 below. In case the user didn't avail the approved outage, user can select the "*Not availed*" option and submit the same in Communication Outage web portal. Similar Procedure is to be followed by Users for entering details of Emergency Category outages also.

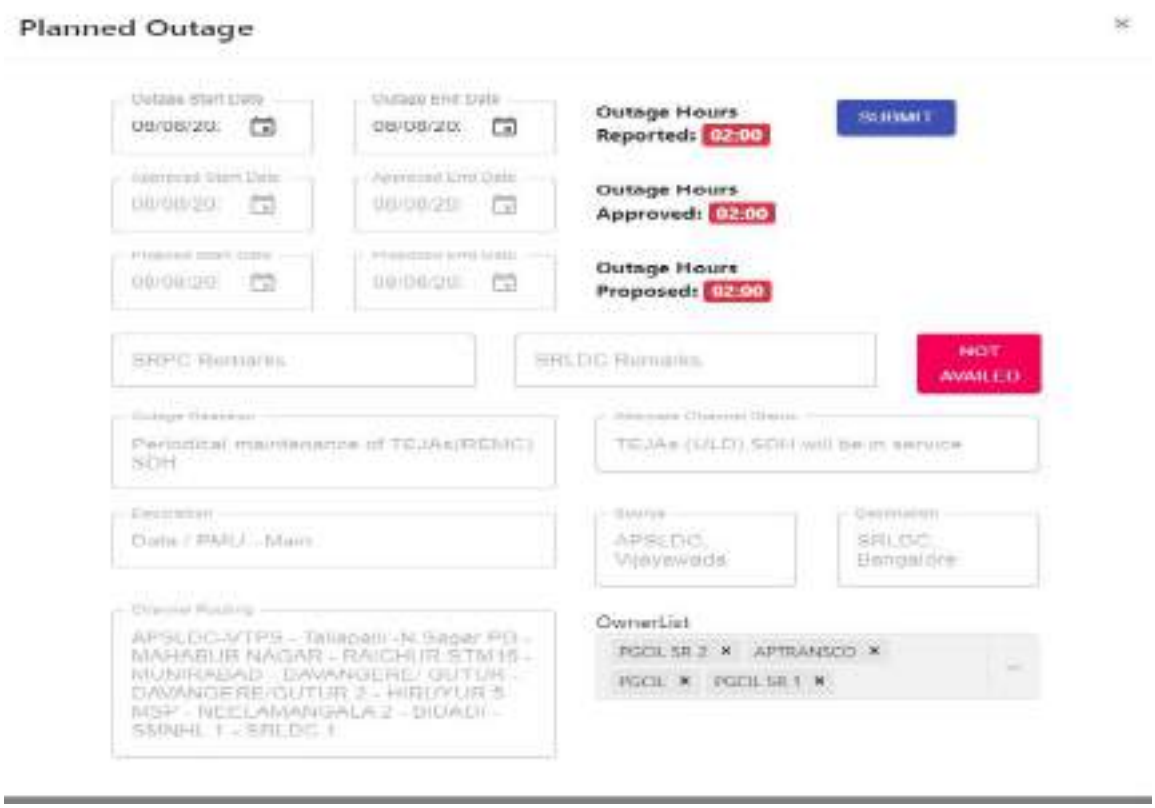


Figure 22 Planned Outage - actual time reporting entry screen

For reporting forced outages of communication links, user can use the "Add Forced Link Outage to COD1" Button which is located in the right corner of COD1(Links) Page (Fig. 22 above). On clicking this button, it shall navigate to Links Page where user can submit the details for the outage by selecting the respective links Sample screen for Forced Outage reporting widget is shown in Figure 23.

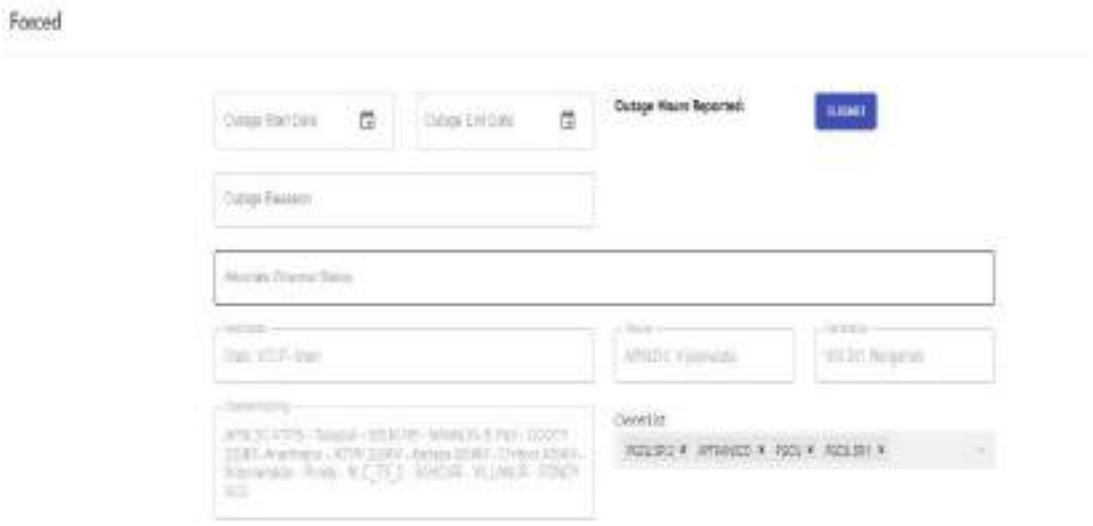


Figure 23 Forced Outage Reporting with actual outage times screen

2.11. COA2 (Equipment)- Communication Outage Approval for Equipment

Figure 24 Communication Outage Application links (COA2) details for selected month

Through COA2 tab (Figure 24 above), Users can view the consolidated list of outage requests (for communication equipment) submitted by them along with the current status of each outage request i.e., whether approved/rejected/revised (along with approved durations). Through this tab, users can edit their outage requests within the scheduled timeline window for submission of proposed outages.

Through COA2 tab, RPC/RLDC can view consolidated list of all outage requests (for communication equipment) from all users with proposed start and end date / time along with approved start and end date/ time for each outage.

2.12. COD2(Equipment) - Communication Outage Deviation for Equipment

Once communication equipment outage is approved in COMSR meeting, the final approved list for outage of communication equipment is communicated by RPC to all stakeholders and also updated on COMSR web portal. After availing the approved outage, concerned users have to enter the actual outage times (including start and end date, time) through COD2(Equipment) Tab (Figure 25 below) for communication equipment.

Note: In case of Emergency outage, approved start and end date times shall be null.

Figure 25 Communication Outage Deviation entry page for communication Equipment (COD2)

Once the User enters the timings for actual outage duration for each approved outage, any deviation between the actual outage timing from the approved outage timing is computed and displayed in the COD2 tab. The sample screen for entry options available for Users against each approved outage under COD2 tab is shown in Figure 26 below.

In case the user didn't avail the approved outage, the user can select the "Not Availed option" and submit the same in COMSR web portal. Similar Procedure is to be followed by Users for entering details of Emergency Category outages also.

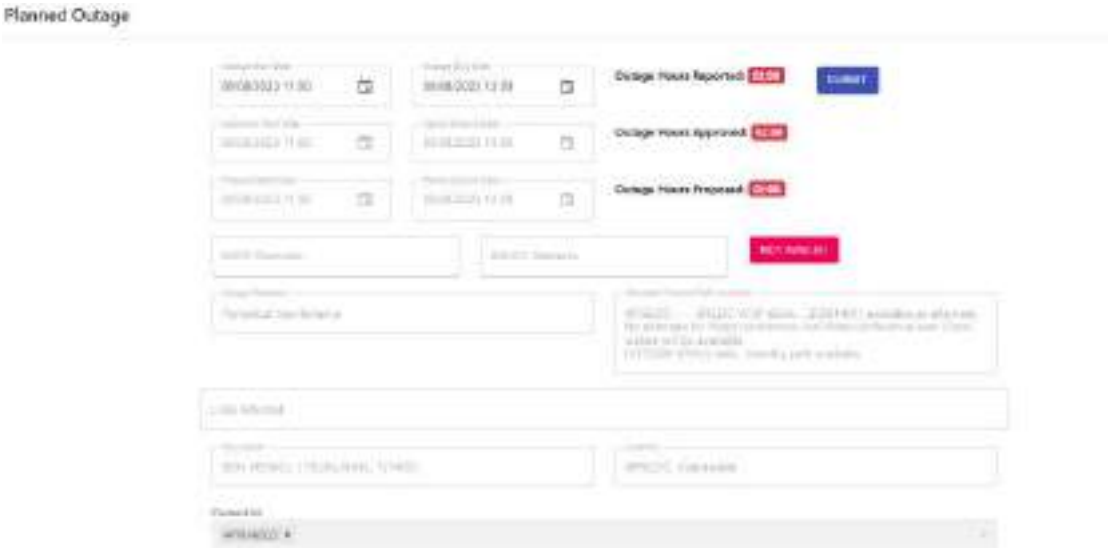


Figure 26 Planned Outage (Equipment) - actual time reporting entry screen

For reporting forced outages of communication equipment, user can use the "Add Forced Link Outage to COD2" Button located in the right corner of COD2(Equipment's) Page (Fig. 27 below). On clicking this button, it shall navigate to Equipment Page where user can submit the details for the respective Forced Outage.

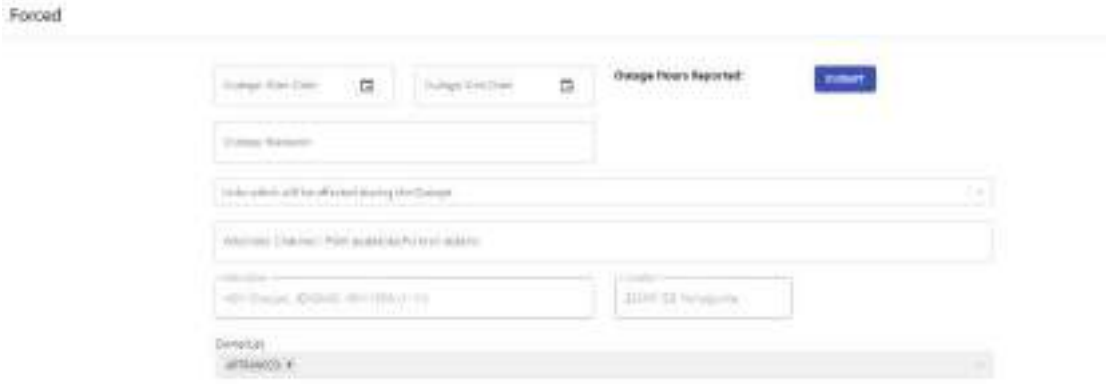


Figure 27 Forced Outage (Equipment's) Reporting with actual outage times screen

As per the approved Outage Procedure, all users/owners of communication equipment's/links need to submit the deviation report for outages availed by them in the M-1 month (considering M as current month) by 10th of the Mth Month. This requirement has been facilitated through the COD1(Links) & COD2(Equipment) tabs in the Communication Outage web portal.

Once this COD1 (links) & COD2 (equipment) is filled by respective Users/owners, RPC freezes the COD1& COD 2-page entry option after 10th of Mth month for outages availed in M-1 Month using "Freeze COD Application button" (Figure 28 and 29 below), available under Admin role login. In cases wherein the user has not entered the actual outage

timelines of approved outages, the portal automatically takes the approved outage timelines as actual outage timelines for planned outages. In case of emergency outages, if the user doesn't enter the actual outage timelines for the outage availed, the portal automatically takes proposed outage timings as actual outage timings. In all such cases, wherein User doesn't enter the actual outage timelines, the outage is deemed to be availed by respective entity.

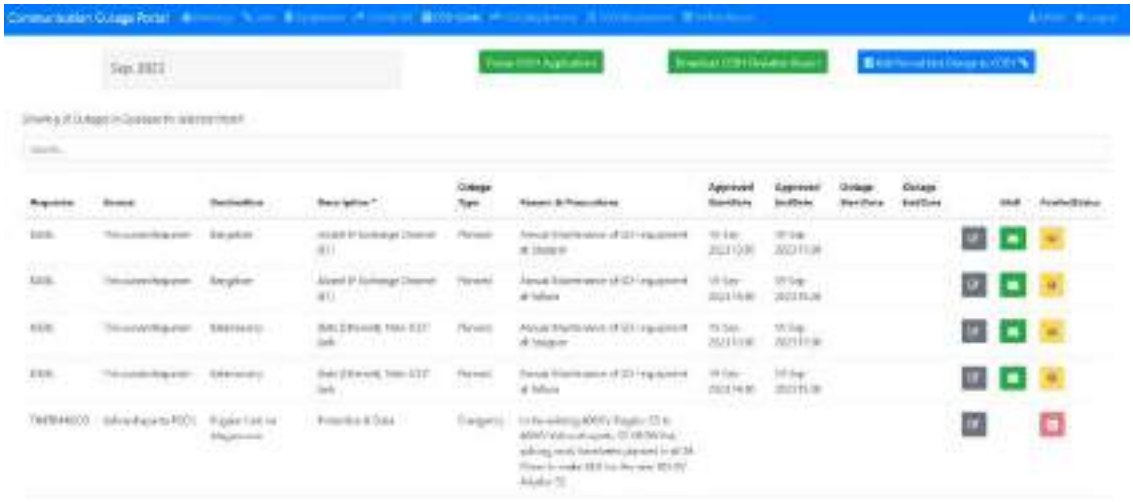


Figure 28 RPC view for Freezing COD1 Application.

Figure 29 RPC view for Freezing COD2 Application

2.13. Rolling Report-- 12 Months Outage Time > 48hours

In order to monitor and highlight excessive outages of any of the communication link/equipment registered in the COMSR Db, Rolling Outage Reports for last twelve (12) months are provided which cumulatively adds the outage duration of communication links/equipment as per COD1/COD2 reports of last 12 months and summarizes the same in COD3 report (for communication links) and COD4 report (for Equipment). COD3 and COD4 reports are available for downloading in excel from the web portal. Sample screen showing download option is shown in Figure 30 and sample report format for COD3 (links) and COD4 (equipment) are shown in Figure 31 and Figure 32 below.

Figure 30 Rolling Report - 12 Months Outage Time download option

Figure 31 Sample COD3 Links Generated Report

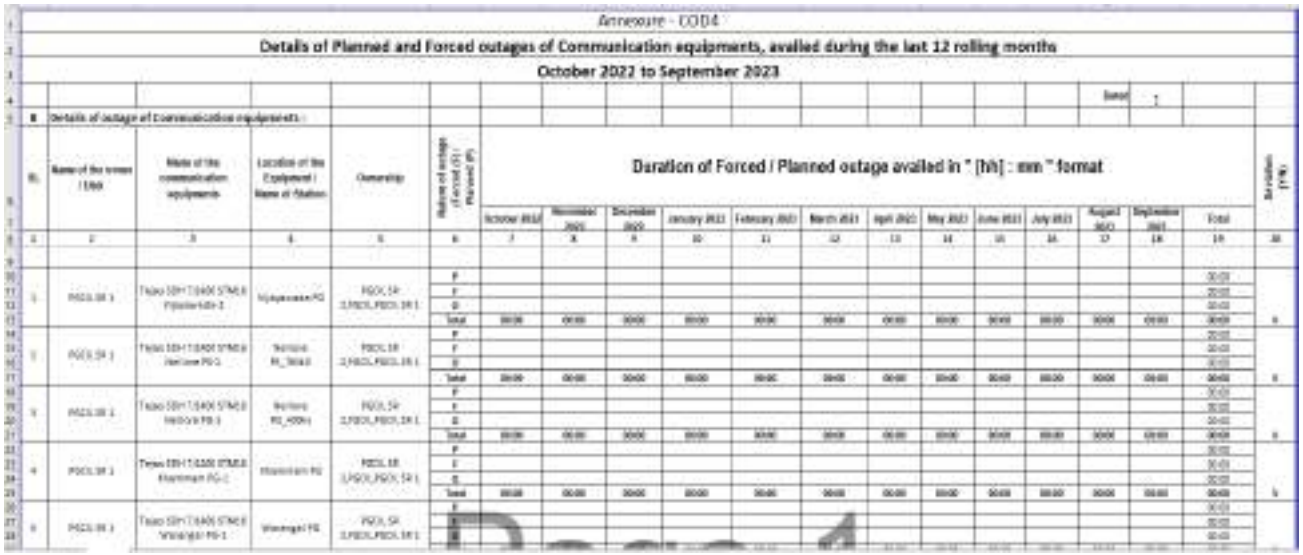


Figure 32 Sample COD4 Links Generated Report

Annexure 4

Responsibility of Users as per IEGC			
Sr. No.	**Clause**	**Description**	**Responsibility**
1	5.2.(i)	Demand Forecasting:	DISCOM
2	5.3.a.(i)	Assess the existing generation resources and identify the additional generation resource requirement to meet the estimated demand	STU
3	5.3.a.(ii)	Prepare generation resource procurement plan.	DISCOM
4	5.4.a	Transmission resource adequacy assessment	CTU
5	5.4.b	Transmission resource adequacy assessment	STU
6	7 (1)	All Users connected to or seeking connection to the grid shall comply with all the applicable regulations as enacted or amended from time to time,	Transmission Utility/Generator/DISCOM
7	8.2	Preparation a detailed procedure covering modalities for first time energization and integration of new or modified power system element and submit for approval of the Commission.	NLDC
8	9(1)	In case of users seeking connectivity to the ISTS under GNA Regulations, Connectivity Agreement shall be signed between such users and CTU. In case of multiple transmission licensees connected at same station, the Site Responsibility Schedule including the responsibility for operation & protection coordination and data sharing among the licensees, shall be specified in the Connectivity Agreement.	Transmission Utility/Generator/DISCOM
9	11 (1) 11(2)	Reliable speech and data communication systems shall be provided to facilitate necessary communication, data exchange, supervision and control of the grid by the NLDC, RLDC and SLDC in accordance with the CERC (Communication System for Inter State Transmission of Electricity) Regulations, 2017 and the CEA Technical Standards for Communication.	Transmission Utility/Generator/DISCOM
10	13 (1) & 13(2)	All users connected to the integrated grid shall provide and maintain effective protection system having reliability, selectivity, speed and sensitivity to isolate faulty section and protect element(s) as per the CEA Technical Standards for Construction, the CEA Technical Standards for Connectivity, the CEA (Grid Standards) Regulations, 2010, the CEA Technical Standards for Communication and any other applicable CEA Standards specified from time to time. Back-up protection system shall be provided to protect an element in the event of failure of the primary protection system.	Transmission Utility/Generator/DISCOM
11	13.3	develop the protection protocol and revise the same, after review from time to time, in consultation with the stakeholders in the concerned region, and in doing so shall be guided by the principle that minimum electrical protection functions for equipment connected with the grid shall be provided as per CEA Standards	RPC
12	14.1	review of the protection settings, assess the requirement of revisions in protection settings and revise protection settings in consultation with the stakeholders of the respective region, from time to time and at least once in a year.	RPC
13	14(2)	All users connected to the grid shall: (a) furnish the protection settings implemented for each element to respective RPC in a format as prescribed by the concerned RPC; (b) obtain approval of the concerned RPC for (i) any revision in settings, and (ii) implementation of new protection system; (c) intimate to the concerned RPC about the changes implemented in protection system or protection settings within a fortnight of such changes; (d) ensure correct and appropriate settings of protection as specified by the concerned RPC. (e) ensure proper coordinated protection settings	Transmission Utility/Generator/DISCOM

14	14.3.a, 14.3.b	maintain a centralized database and update the same on periodic basis in respect of their respective region containing details of relay settings for grid elements connected to 220 kV and above (132 kV and above in NER). carry out detailed system studies, once a year, for protection settings and advise modifications / changes, if any, to the CTU and to all users and STUs of their respective regions.	RPC
15	15(1), 15(2), 15(4), 15(5), 15(6) and 15(7)	Protection Audit (Internal & Third Party) and deficiency rectification. Submission to RPC, RLDC or SLDC as the case may be. Annual audit plan by 31st Oct. Protection Indices every month	Transmission Utility/Generator/DISCOM
16	16.2	perform regular load flow and dynamic studies and mock testing for reviewing SPS parameters & functions, at least once in a year.	RLDC or NLDC, as the case may be, in consultation with the concerned RPC(s)
17	16(3) & 16(4)	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. The performance of SPS shall be assessed as per the protection performance indices	Transmission Utility/Generator/DISCOM
18	17(1)	All users shall keep the recording instruments (disturbance recorder and event logger) in proper working condition.	Transmission Utility/Generator/DISCOM
19	19(6) & 19(7)	Start-up power shall not be used by the generating station for construction activities; The onus of proving that the interchange of infirm power from the unit(s) of the generating station is for the purpose of pre-commissioning activities, testing and commissioning, shall rest with the generating station, and the concerned RLDC shall seek such information on each occasion of the interchange of power before COD. For this, the generating station shall furnish to the concerned RLDC relevant details, such as those relating to the specific commissioning activity, testing, and full load testing, its duration and the intended period of interchange. The generating station shall submit a tentative plan for the quantum and time of injection of infirm power on day ahead basis to the respective RLDC.	Generator
20	20 (1)	The details of the generation station shall be furnished by each regional entity generating station to the concerned RLDC, RPC and the beneficiaries of the generating station, wherever identified, prior to notice of	Generator
21	21(1)	The generating company proposing its generating station or a unit thereof for trial run or repeat of trial run shall give a notice of not less than seven (7) days to the concerned RLDC. Repeat trial run is to take place within forty eight (48) hours of the failed trial run, fresh notice shall not be	Generator
22	21(2)	The transmission licensee proposing its transmission system or an element thereof for trial run shall give a notice of not less than seven days to the concerned RLDC, CTU, distribution licensees of the region and the	Transmission Utility
23	22(1), 22(2), 22(3)	TRIAL RUN OF GENERATING UNIT	Generator
24	23	TRIAL RUN OF INTER-STATE TRANSMISSION SYSTEM	Transmission Utility
25	24(1) and 24(2)	DOCUMENTS AND TESTS PRIOR TO DECLARATION OF COMMERCIAL OPERATION	
26	24(3)	Documents and Tests Required for Thermal (coal/lignite) Generating Stations:	Thermal Generator
27	24(4)	Documents and Tests Required for Hydro Generating Stations including Pumped Storage Hydro Generating Station:	Hydro Generator
28	24(5)	Documents and Test Required for Gas Turbine based Generating Stations	Gas Generator

29	24(6)	Documents and Tests Required for the Generating Stations based on wind and solar resources	Wind and Solar Generator
30	24(7)	Documents and Tests Required for Energy Storage Systems	Energy Storage
31	24(8)	Documents and Tests Required for HVDC Transmission System or SVC or STATCOM	Transmission Utility
32	26	DECLARATION BY GENERATING COMPANY AND TRANSMISSION LICENSEE regarding meeting CEA regulations, standards. Installation of main plant and auxiliary system, emergency supply, etc.	Transmission Utility/Generator
33	27	DECLARATION OF COMMERCIAL OPERATION (DOCO) AND COMMERCIAL OPERATION DATE (COD)	
34	28(7)	Every generating station, and transmission substation of 110 kV and above shall have a control room manned by qualified operating personnel round the clock. Alternatively, the same may be operated round the clock from a remotely located control room, subject to the condition that such remote operation does not result in a delay in the execution of any switching instructions and information flow: Provided that a transmission licensee owning a transmission line but not owning the connected substation, shall have a coordination centre functioning round the clock, manned by qualified personnel for operational coordination with the concerned load despatch centres and equipped to carry out the operations as directed by concerned load despatch centres	Transmission Utility/Generator
35	28(8)	ESS and Bulk Consumers, which are regional entities shall have coordination centres functioning round the clock and manned by qualified personnel for operational coordination with the concerned load despatch	ESS and Bulk Consumers
36	29(4)	Except in an emergency, or when it becomes necessary to prevent imminent damage to critical equipment, no user shall suddenly reduce its generating unit output by more than 100 (one hundred) MW without prior permission of the respective RLDC.	Generator
37	29(5)	Except in an emergency, or when it becomes necessary to prevent imminent damage to critical equipment, no user shall cause a sudden variation in its load by more than 100 (one hundred) MW without the prior permission of the respective RLDC.	Generator
38	29(6)	All generating units shall have their automatic voltage regulators (AVRs), Power System Stabilizers (PSSs), voltage (reactive power) controllers (Power Plant Controller) and any other requirements in operation, as per the CEA Technical Standards for Connectivity. If a generating unit with a capacity higher than 100 (hundred) MW is required to be operated without its AVR or voltage controller in service, the generating station shall immediately inform the concerned RLDC of the reasons thereof and the likely duration of such operation and obtain its permission.	Generator
39	29(7), 29(8)	The tuning of AVR, PSS, Voltage Controllers (PPC) including for low and high voltage ride through capability of wind and solar generators or any other requirement as per CEA Technical Standards for Connectivity shall be carried out by the respective generating station:– at least once every five (5) years;– based on operational feedback provided by the RLDC after analysis of a grid event or disturbance; and– in case of major network changes or fault level changes near the generating station as reported by NLDC or RLDC(s), as the case may be. – in case of a major change in the excitation system of the generating station.Power System Stabilizers (PSSs), AVRs of generating units and reactive power controllers shall be properly tuned by the generating station as per the plan and the procedure prepared by the concerned RPC.	Generator
40	29(12)	All distribution licensees, STUs and bulk consumers shall provide automatic under-frequency relays (UFR) and df/dt relays for load shedding in their respective systems to arrest frequency decline that could result in grid failure as per the plan given by the RPCs from time to time.	Distribution licensees

41	29(18)	All defence mechanisms shall always be in operation and any exception shall be immediately intimated by the concerned user to the concerned RLDC and SLDCs along with the reasons and the likely duration of such exception. The concerned user shall also obtain permission from the concerned RLDC or SLDC, as applicable.	User/RLDC/SLDC
42	30(3)	All users shall adhere to their schedule of injection or drawl, as the case may be, and take such action as required under these regulations and as directed by NLDC or respective RLDCs or respective SLDCs so that the grid frequency is maintained and remains within the allowable band	Generator/SLDCs
43	30(10)(d), 30(10)(g), 30(10)(h), 30(10)(i), 30(10)(j), 30(10)(k), 30(10)(l), 30(10)(m)	Primary control/ Governor action The generating stations and units thereof shall have electronically controlled governing systems or frequency controllers in accordance with the CEA Technical Standards for Connectivity and are mandated to provide PRAS. The generating stations and units thereof with governors shall be under Free Governor Mode of Operation. Drop settings -3 to 6 % (for thermal generating units and WS Seller) or 0-10% (for hydro generating units) Primary response as per Table-4	Generator
44	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	Generator/SLDCs
45	30(11)(j)	The SRAS Providers shall start responding to SRAS signals within thirty (30) secondsof receipt of the signal and shall be capable of providing the entire SRAS capacityobligation within fifteen (15) minutes and sustaining it at least for the next thirty (30)minutes.	Generator
46	30(11)(w)	All thermal generating stations having a capacity of more than 200 MW and hydro generating stations having a capacity of more than 25 MW shall make arrangements to enable automatic operation of the plant from the appropriate load despatch centre by integrating the controls and telemetering features of their system into the automatic generation control in accordance with the CEA Technical Standards for Construction and the CEA Technical Standards for Connectivity. The communication system shall be established in accordance with the CEA Communication Regulations.	Thermal Generator
47	30(12)(j) 30(12)(l)	Tertiary reserves to be provided by the TRAS provider shall be capable of providing TRAS within fifteen (15) minutes of despatch instructions from RLDC or SLDC, as the case may be, and shall be capable of sustaining the service for at least the next 60 minutes. The modalities for information exchange and timelines in respect of tertiary reserves shall be as per detailed procedure prepared by NLDC	Generator
48	30(11)(x)	All renewable energy generating stations and ESS shall be equipped with the facility to control active power injection in accordance with the CEA Connectivity Standards and the communication system shall be established in accordance with the CEA Technical Standards for Communication.	Renewable Engery
49	31(2)(f) 31(2)(h)	The entities such as bulk consumers or distribution licensees that are directly connected to ISTS shall estimate and furnish such a demand estimate to the concerned RLDC	Bulk consumers or distribution licensees
50	32(2)(d) 32(3)(f)	Protection relay related outages, auto–re-closure outages and SPS testing outages shall be planned on a monthly basis with the prior permission of the concerned RPC, which shall consult the concerned RLDC & NLDC. All users, CTU and STUs, licensees shall follow the annual outage plan. If any deviation is required, the same shall be allowed only with the prior permission of the concerned RPC, which shall consult the concerned RLDC and NLDC	All users, CTU and STUs, licensees

51	32(3)(g)	Each user shall obtain the final clearance from NLDC or the concerned RLDC, prior to the planned outage of any grid element. The clearance shall also be obtained from SLDC for a grid element of the State Control areas.	Transmission Utility/Generator/DISCOM
52	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.	SLDC/RLDC/NLDC
53	34(4)	Simulation studies shall be carried out by each user in coordination with RLDC for preparing, reviewing and updating the restoration procedures considering the following: (a) Black start capability of the generator; (b) Ability of black start generator to build cranking path and sustain island; (c) Impact of block load switching in or out; (d) Line/transformer charging; (e) Reduced fault levels; (f) Protection settings under restoration condition.	Generator with RLDC
54	34(5)	The thermal and nuclear generating stations shall prepare themselves for house load operation as per design. The concerned user and SLDC shall report the performance of house load operation of a generating station in the event where such operation was required	thermal and nuclear generating stations
55	35(5)(b)	Any planned operation activity in the ISTS system [such as generating unit synchronization or de-synchronization, transmission element opening or closing (including breakers), protection system outage, SPS outage and testing etc.] shall be done by taking operational code from RLDC or NLDC, as the case may be. The operational code shall have validity period of sixty (60) minutes from the time of issue. In case such operation activity does not take place within the validity period of the code, the entity shall obtain a fresh operational code from RLDC or NLDC, as the case may be.	Transmission Utility
56	37(2)	Post Despatch Analysis: Event Reporting	
57	38(2)	Daily and monthly reports covering the performance of the regional grid shall be prepared by each RLDC based on the inputs received from SLDCs and users. Data submission for preparation of reports (Generation MUs, drawl, etc.)	RLDC/SLDC
58	39(1), 39(2), 39(3)	REACTIVE POWER MANAGEMENT	
59	39(8)	Reactive power facility shall be in operation at all times and shall not be taken outwithout the permission of the concerned RLDC or SLDC	RLDC/SLDC

60	40(1) and 40(2)	PERIODIC TESTING 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) 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.	Transmission Utility/Generator
61	40(3)	Testing requirements	
62	45(2)	The regional entity generating stations and the entities participating in Ancillary Services must be capable of receiving the load set point signals from the RLDCs or the NLDC as per CEA Technical Standards for Connectivity, or in terms of Ancillary Service Regulations, as applicable.	Generating stations
63	45(5)(a)	Requirement for Commencement of Scheduling: (a) The following documents shall be submitted to the respective RLDC by the seller or the buyer, as the case may be, before commencement of the scheduling of transactions under GNA or T-GNA, as the case may be:	Seller or buyer
64	45(6)	Adherence to Schedule: Each regional entity shall regulate its generation or demand or both, as the case may be, so as to adhere to the schedule of net injection into or net drawl from the inter-State transmission system	Regional entity (SLDCs and Generator)
65	45(8)(a), 45(8)(b)	Declaration of Declared Capacity by Regional entity generating stations	
66	45(9)(a)	Ramping Rate to be Declared for Scheduling.(i) Coal or lignite fired plants shall declare a ramp up or ramp down rate of notless than 1% of ex-bus capacity corresponding to MCR on bar per minute;(ii) Gas power plants shall declare a ramp up or ramp down rate of not less than3% of ex-bus capacity corresponding to MCR on bar per minute;(iii) Hydro power plants shall declare a ramp up or ramp down rate of not less than10% of ex-bus capacity corresponding to MCR on bar per minute;(iv) Renewable Energy generating stations shall declare a ramp up or ramp downrate as per CEA Connectivity Standards.	Generator

67	45(11)(d), 45(11)(e), 45(11)(f)	Scheduling of WS seller and ESS by QCA: (d) QCA registered with the concerned RLDC shall, on behalf of wind, solar or renewable hybrid generating stations or Energy Storage System shall: (i) Coordinate and facilitate scheduling of power with the concerned RLDC; and; (ii) Undertake commercial settlement of deviations with the concerned RLDC in accordance with the DSM Regulations. (iii) Submit a copy of the consent to the concerned RLDC certifying that QCA shall undertake all operational and commercial responsibilities on behalf of generating stations as per the CERC Regulations. (e) The concerned wind, solar or renewable hybrid generating stations including energy storage systems shall indemnify the RLDC for any act of commission or omission on the part of QCA including compliance with the Grid Code and settlement of its financial liability in the pooled account. (f) Contract between the generating stations and QCA shall invariably contain provisions for internal dispute resolution, and any disputes arising between the generating stations and QCA shall be settled in accordance with the said mechanism	QCA
68	45(12)	Minimum turndown level for regional entity thermal generating stations:	Generator
69	45(15)	For meeting its power requirements during non-generation hours, whether before or after COD, a generating station, including renewable energy generating station, shall enter into a valid contract with a seller or distribution licensee or through power exchange: Provided that where the generating station including a renewable energy generating station is unable to enter into a contract for the drawl of power during non-generation hours, it may draw power from ISTS on payment of deviation charges as per the DSM Regulations.	Generator
70	46(4)(i), 46(5) ©	SCUC46(4(i)All the generating stations identified under SCUC shall be available on bar, and inthe event of such stations or units thereof being on Unit Shut Down (USD), the timeto start a unit under different conditions such as HOT, WARM and COLD andminimum time for which it shall be brought on bar, shall be as specified in theDetailed Procedure to be prepared by NLDC and approved the Commission. 46(5)(c) All regional entity generating stations shall declare DC for 'D' day within 2 hours ofannouncement by NLDC, for consideration under three day ahead SCUC.	Generator
71	47(2), 49(10)	In case a generating station, or unit thereof, opts to go under unit shut down (USD) or in the event of forced outage, the generating company owning such generating station or unit thereof shall fulfil its obligation to supply electricity to its beneficiaries who had made requisition from the said generating station prior to it going under USD, In the event of forced outage of a generating station or unit thereof, the generating company owning the generating station or unit thereof shall fulfil its supply obligation to the beneficiaries which made requisition from such generating station or unit thereof,	Generator
72	47(3)	In case of emergency conditions, for reasons of grid security, a generating station or unit thereof, which is under USD may be directed by NLDC to come on bar, and in such event the generating station or unit thereof shall come on bar under hot, warm and cold conditions as per the time period to be specified in the detailed procedure under subclause (i) of clause (4) of Regulation 46 of these regulations.	Generator and NLDC
73	48	SCHEDULING FROM ALTERNATE SOURCE OF POWER BY A GENERATING STATION (1) A generating station may supply power from alternate source in case of (i) USD in terms of clause (1) of Regulation 47 of these regulations or (ii) forced outage of unit(s) or (iii) a generating station other than REGS replacing its scheduled generation by power supplied from REGS irrespective of whether such identified sources are located within or outside the premises of the generating station or at a different location.	Generator

74	49	PROCEDURE FOR SCHEDULING AND DESPATCH FOR INTER-STATE TRANSACTIONS	
75	49(12)	Energy Metering and Accounting: operation and periodic calibration of IEM shall be done by the respective entity.The installation, operation, calibration and maintenance of Interface EnergyMeters (IEMs) with automatic remote meter reading (AMR) facility shall be inaccordance with the CEA Metering Regulations 2006.(c) The installation, operation, and maintenance of additional communication links, ifany, required for the purpose of AMR facility shall be in accordance with CEACommunications Regulations.(d) Access to such metering data to the concerned RLDC and SLDC(s) shall be inaccordance with the CEA Metering Regulations 2006.(e) Entities in whose premises the IEMs are installed shall be responsible for (i)monitoring the healthiness of the CT and PT inputs to the meters, (ii) takingweekly meter readings for the seven day period ending on the preceding Sunday2400 hrs and transmitting them to the RLDC by Tuesday noon, in case suchreadings have not been transmitted through automatic remote meter reading(AMR) facility (iii) monitoring and ensuring that the time drift of IEM is within thelimits as specified in CEA Metering Regulations 2006 and (iv) promptly intimatingthe changes in CT and PT ratio to RLDC.	Transmission Utility/Generator/DISCOM
76	49(13)	Inspection of Records: The operational logs and records of the regional entity generating stations and inter-State transmission licensees shall be available for inspection and review by the RLDCs and RPCs.	RLDC/RPC
77	51	CYBER SECURITY AUDIT All users, NLDC, RLDCs, SLDCs, CTU and STUs, power exchanges, QCAs, SNAs, shall conduct Cyber Security Audit as per the guidelines mentioned in the CEA (Cyber Security in Power Sector) Guidelines, 2021 and any other guidelines issued by an appropriate Authority.	All users, NLDC, RLDCs, SLDCs, CTU and STUs, power exchanges, QCAs, SNAs

Annexure B 2.19

Re: Submission of Logic for SPS Salakati

Bimal Swargiary (बिमल स्वर्गीयारी)

Mon 09-12-2024 11:59

To:SLDC ASSAM <sldcassam@aegcl.co.in>; Protection Cell <protection.aegcl@gmail.com>;

Cc:Biswajit Sahu (बिस्वाजित साहू) <biswajit@grid-india.in>; nerpc <nerpc@ymail.com>; vikashiitk308@gmail.com <vikashiitk308@gmail.com>; GM TnC and Comm AEGCL <gm.tcc@aegcl.co.in>; NERLDC Protection <nerldcprotection@grid-india.in>;

Bcc:Keshab Borah (केशब बोराह) <keshabborah881@grid-india.in>;

सर/मैडम,
कार्यान्वयन के लिए कुछ सुझावों के साथ 14 अक्टूबर 2024 को एनईआरएलडीसी द्वारा एसपीएस योजना की समीक्षा की गई। हालाँकि, 2 x 160 एमवीए आईसीटी के एन-1 उल्लंघन को संबोधित करने के लिए बीटीपीएस में एसपीएस योजना के कार्यान्वयन के संबंध में एईजीसीएल से कोई अपडेट प्राप्त नहीं हुआ है, जो चिंता का विषय है।
इसलिए, एईजीसीएल टीम से एक बार फिर अनुरोध है कि असम पावर सिस्टम के बीटीपीएस क्षेत्र में विश्वसनीय संचालन सुनिश्चित करने के लिए एसपीएस के कार्यान्वयन और कमीशनिंग को जल्द से जल्द प्राथमिकता दें।
यह आपकी जानकारी एवं आवश्यक कार्यवाही हेतु प्रस्तुत है।
सुरक्षित, विश्वसनीय और एकीकृत ग्रिड संचालन सुनिश्चित करने के लिए सहयोग का अनुरोध किया गया।
Sir/Madam,
The SPS scheme was reviewed by NERLDC on 14th October 2024, with a few suggestions for implementation. However, no update has been received from AEGCL regarding the implementation of the SPS scheme at BTPS to address the N-1 violation of the 2 x 160 MVA ICTs, which is the matter of concern.
Therefore, it is once again request to the AEGCL team to prioritize the implementation and commissioning of the SPS at the earliest to ensure reliable operation in the BTPS area of the Assam Power System.
This is submitted for your kind information and necessary action.
Co-operation requested for ensuring safe , reliable and integrated grid operation.
भवदीय / Regards,
बिमल स्वर्गीयारी/ Bimal Swargiary
उप महाप्रबंधक/ Dy General Manager
उ.पु.क्षे.भा.प्रे.कें. /NERLDC
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड (ग्रिड - इंडिया)/
Grid Controller of India Limited (GRID - INDIA)
Member CIGRE
Follow GRID-INDIA on:

From: Bimal Swargiary (बिमल स्वर्गीयारी)
Sent: 14 October 2024 16:43:19
To: SLDC ASSAM; Protection Cell
Cc: Biswajit Sahu (बिस्वाजित साहू); nerpc; vikashiitk308@gmail.com
Subject: Fw: Submission of Logic for SPS Salakati

Sir/Madam,

Please find the trailing mail and implement the scheme at earliest.
भवदीय / Regards,

बिमल स्वर्गीयारी/ Bimal Swargiary
उप महाप्रबंधक/ Dy General Manager
उ.पु.क्षे.भा.प्रे.कें. /NERLDC
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड (ग्रिड - इंडिया)/
Grid Controller of India Limited (GRID - INDIA)
Member CIGRE
Follow GRID-INDIA on:

From: Bimal Swargiary (बिमल स्वर्गीयारी)
Sent: 23 September 2024 17:22
To: CGM T&C , Communication; nerpc; vikashiitk308; shankar vikash308; NERLDC Protection
Cc: sldcassam; GM TnC and Comm AEGCL; DGM LA MRT TandC Circle AEGCL; AGM TandC Division Bongaigaon AEGCL; agm salakati; AGM Dhaligaon GSS AEGCL; DGM Bongaigaon T and T Circle AEGCL
Subject: Re: Submission of Logic for SPS Salakati

Sir/Madam,
Thank you for sharing the scheme. The scheme has been reviewed from our end. For the OC Stage-2 and Stage-3, the proposed SPS pickup of 121% seems too close to the existing ICT Backup Overcurrent (B/U OC) pickup of 120%. Therefore, we kindly request that the SPS OC pickup for Stage-2 and Stage-3 be increased to 122% for sufficient margin.
It is requested to implement the scheme as soon as possible as a short term solution until upgradation of 2 X 160 MVA ICT/installation of 3rd ICT.
भवदीय / Regards,
बिमल स्वर्गीयारी/ Bimal Swargiary
उप महाप्रबंधक/ Dy General Manager
उ.पु.क्षे.भा.प्रे.कें. /NERLDC
ग्रिड कंट्रोलर ऑफ इंडिया लिमिटेड (ग्रिड - इंडिया)/
Grid Controller of India Limited (GRID - INDIA)
Member CIGRE
Follow GRID-INDIA on:

From: CGM T&C , Communication <cgm.tcc@aegcl.co.in>
Sent: 21 September 2024 16:41:46
To: nerpc; vikashiitk308; shankar vikash308; NERLDC Protection; Bimal Swargiary (बिमल स्वर्गीयारी)
Cc: sldcassam; GM TnC and Comm AEGCL; DGM LA MRT TandC Circle AEGCL; AGM TandC Division Bongaigaon AEGCL; agm salakati; AGM Dhaligaon GSS AEGCL; DGM Bongaigaon T and T Circle AEGCL
Subject: Submission of Logic for SPS Salakati

Sir/Madam,
The logic designed for SPS Salakati (Preserving system stability against loss of N-1 contingency for 2x160MVA, 220/132kV ICTs at Salakati during peak load conditions) has been attached herewith.

With regards,
Chief General Manager,
T&C and Communication,

Narengi, Guwahati-781026.

Agenda Item for 27th TCC meeting of NER

Annexure B 2.23

Item No. 1	**Procurement of cold spare transformers and reactor for Northern Estern Region (Agenda by POWERGRID)**

1. CERC had set up a Committee on dated 15.03.2018 consisting of representatives from CERC, NLDC, CEA & POWERGRID under the Chairmanship of the Chief (Engineering) of the CERC to assess the requirement of regional spares including bus reactors, line reactors, ICTs, etc. This would ensure reliability of the grid and reduce downtime in case of any failure/outage.

2. As per CERC Committee recommendation, the following spares transformers & reactors are required to be kept as spare for North Eastern Region as per POWERGRID assets base:

i) Transformer:

MVA Rating of Transformers	Voltage Rating	Total Installed unit in POWERGRID	Installed State	Spare Required as per CERC report	Available Spare (As per RPC Approved)	Qty Proposed for procurement	Location/State of spare requirement
3Ø-315MVA	400/132/33kV	1 No-**Silchar**	**Assam, Silchar**	1	0	1	**Assam, Silchar**
3Ø-160MVA	220/132kV	06 Nos **02-Balipara** **02- Dimapur** **02- Kopili**	**Assam-Balipara** **Nagaland-Dimapur** **Assam-Balipara**	2	**1(Assam- Balipara)**	1	**Nagaland , Dimapur**
3Ø-100MVA	220/132kV	02 Nos **01 No-Dimapur** **01 No- Salakati**	**Nagaland-Dimapur** **Assam-Salakati**	2	**1(Nagaland- Dimapur)**	1	**Assam, Salakati**
3Ø-50MVA	132/33kV	04 Nos **02- Imphal** **02- Nirjuli**	**Manipur- Imphal** **Arunachal Pradesh**	2	**1 (Arunachal Pradesh - Nirjuli)**	1	**Manipur, Imphal**
	TOTAL:					**4**	
	Tentative Cost						**43.94 Cr**

Agenda Item for 27th TCC meeting of NER

Annexure B 2.23

ii) Reactors:

MVAr Rating of Reactors	Voltage Rating	Total Installed unit in POWERGRID	Installed State	Spare Required as per CERC report	Available Spare (As per RPC Approved)	Qty Proposed for procurement	Location/State of spare requirement
3Ø-125MVAR#	420kV	06 Nos 01-Silchar 01-Imphal 01 – Balipara 01 – BNG 02- Mariani	Assam-Silchar **Manipur-Imphal** Assam-Balipara Assam-Bongaigaon Assam-Mariani	2	**1(Assam-Silchar)**	1	**Manipur, Imphal**
3Ø-63MVAR*	420 kV	**22 Nos** 06- Balipara 06-Bongaigaon 04-Silchar 02- Imphal 04- BNC	Assam-Balipara Assam- Bongaigaon Assam-Silchar **Manipur- Imphal** Assam- BNC	2	**1(Assam-Balipara)**	1	**Manipur, Imphal**
3Ø-50MVAR*	420 kV	**9 Nos** 02- Balipara 04- Bongaigaon 02- Silchar 01-Misa	Assam- Balipara Assam-Bongaigaon Assam-Silchar **Assam-Misa**	1	0	1 *** proposed to be replaced with 63 MVAr**	**Assam-Misa**
3Ø-31.5MVAR	245kV	01-Mokukchung	**Nagaland-Mokukchung**	1	0	1	**Nagaland,Mokukchung**
3Ø-20MVAR	245kV	01-Mariani	**Assam-Mariani**	1	0	1	**Assam, Mariani**
3Ø-20MVAR	132kV	3		3	0	3	**Manipur- Imphal**

		01 No- Imphal 01 No- Aizwal 01 No- Kumarghat	Manipur-Imphal Mizoram-Aizwal Tripura-Kumarghat				**Mizoram- Aizwal Tripura-Kumarghat**
	TOTAL:					**8**	
	Tentative Cost						**50.0 Cr**

- Quantity considered for both 125MVAR & 80MVAR reactors in Manipur. In case of failure of existing 80MVAR reactor, replacement can be done with 125MVAR.

* - Quantity considered for both 50MVAR & 63MVAR reactors. In case of failure of existing 50MVAR reactor, replacement can be done with 63MVAR.

01 In view of the above, it is requested for approval for procurement of cold spare transformers & reactors of various ratings as per CERC committee recommendation as mentioned above. The Tariff for the investment made is to be shared by constituents as per the provisions of CERC Regulation.

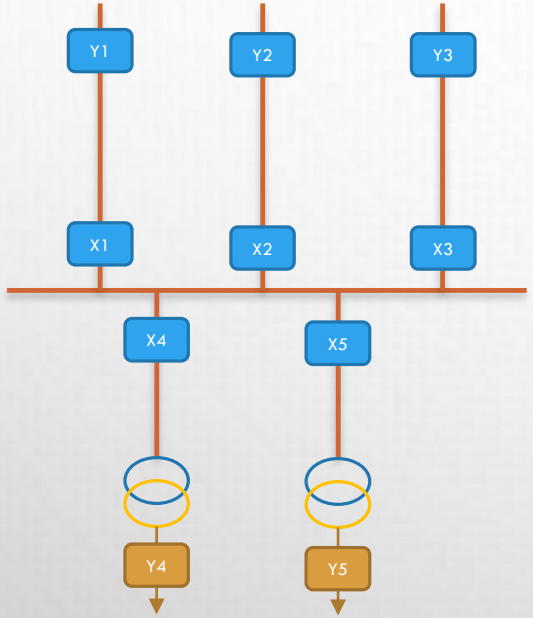
Annexure 5

METERING PHILOSOPHY IN NER

1. ACCOUNTING OF STATES
2. ACCOUNTING OF GENERATORS

ENERGY ACCOUNTING OF STATES

CASE 1: ISTS SUBSTATION WITH TRANSFORMERS USED FOR DRAWAL BY STATE



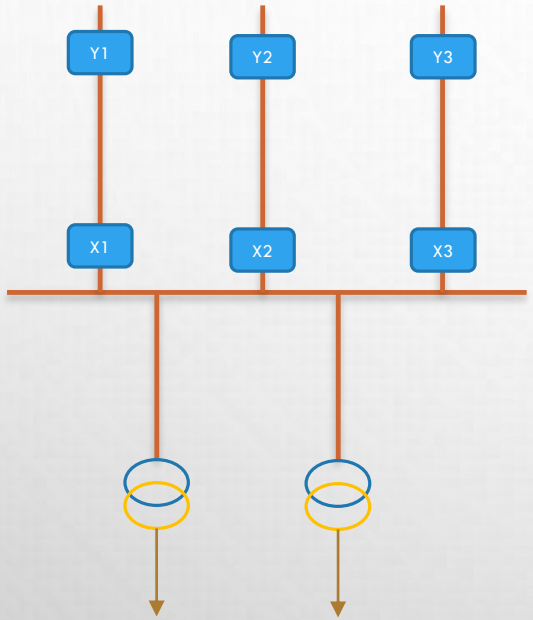
X1,X2,X3,X4,X5: Meters installed at ISTS SS
Y1,Y2,Y3,Y4,Y5: Meters installed at other end

Primary Drawal Data:
1. X4+X5

In Absence of Main Meter Data :

1. Y4, Y5
2. Net Bus

CASE 2: STATE OWNED SUBSTATION WITH ISTS LINES



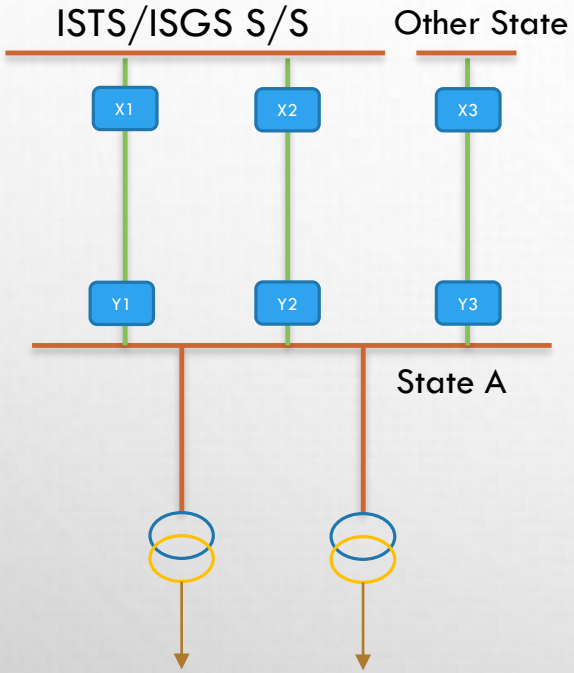
X1,X2,X3: Meters installed at State owned SS
Y1,Y2,Y3: Meters installed at other end

Primary Drawal Data:
1. -X1-X2-X3

In Absence of Main Meter Data :

1. Y1, Y2, Y3

CASE 3: STATE OWNED SUBSTATION WITH STU OWNED LINES



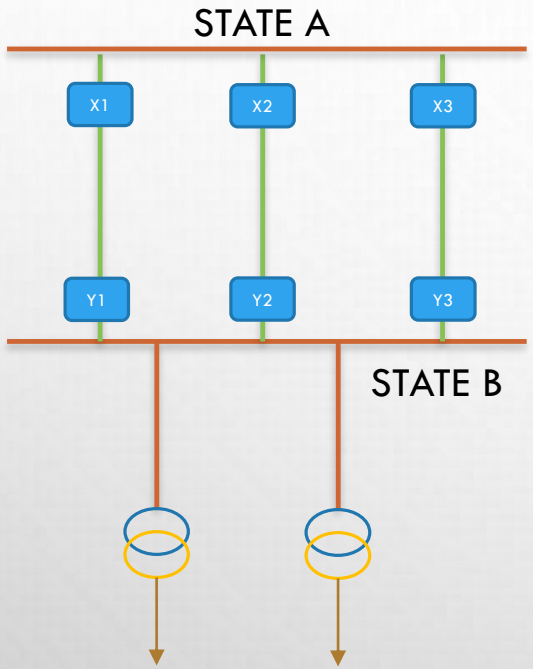
X1,X2,X3: Main meters installed at other end
Y1,Y2,Y3: Standby meters installed at state owned SS

Primary Drawal Data (State A):
1. X1+X2-Y3

In Absence of Main Meter Data (State A):

1. -Y1, -Y2, X3

CASE 4: FEEDERS BETWEEN TWO STATES



X1,X2,X3: Meters installed at STATE A end
Y1,Y2,Y3: Meters installed at STATE B end

Primary Drawal Data (STATE A):
1. -X1-X2-X3

In Absence of Main Meter Data (STATE A):

1. Y1, Y2, Y3

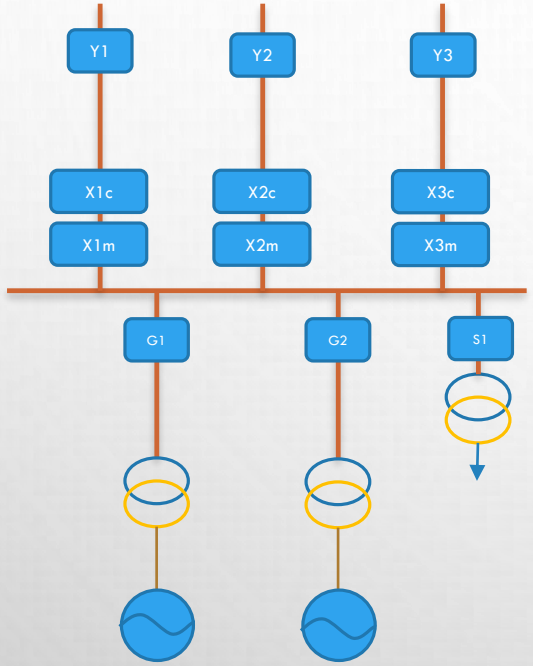
Primary Drawal Data (STATE B):
1. -Y1-Y2-Y3

In Absence of Main Meter Data (STATE B):

1. X1, X2, X3

ENERGY ACCOUNTING OF ISGS

CASE 1: ISGS SUBSTATION (ALL UNITS UNDER COMMERCIAL OPERATION)



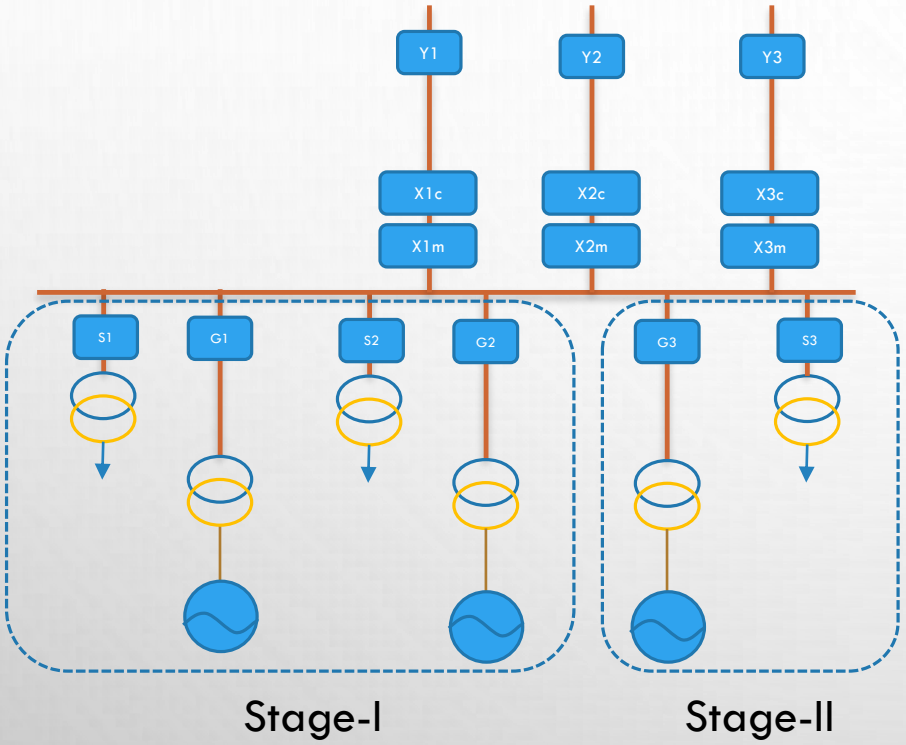
Primary Injection Data:
1. X1m+X2m+X3m

In Absence of Main Meter Data:

1. X1c, X2c, X3c
2. Net Bus
3. -Y1, -Y2, -Y3

X1m,X2m,X3m: Main Meters installed at ISGS SS
X1c, X2c, X3c: Check Meters installed at ISGS SS
Y1,Y2,Y3: Meters installed at other end
G1,G2: Meters installed on HV side of GT
S1: Meter installed HV side of ST

CASE 2: TWO STAGE ISGS CONNECTED AT SAME BUS (ALL UNITS UNDER COMMERCIAL OPERATION)



X1m,X2m,X3m: Main Meters installed at ISGS SS
X1c, X2c, X3c: Check Meters installed at ISGS SS
Y1,Y2,Y3: Meters installed at other end
G1,G2,G3: Meters installed on HV side of GT
S1,S2,S3: Meter installed HV side of ST

Total Injection :

1. X1m+X2m+X3m---------->(Z)

Injection for Stage-II:

1. G3+S3

Injection for Stage-I:

1. Z-(G3+S3)

In Absence of Main Meter Data:

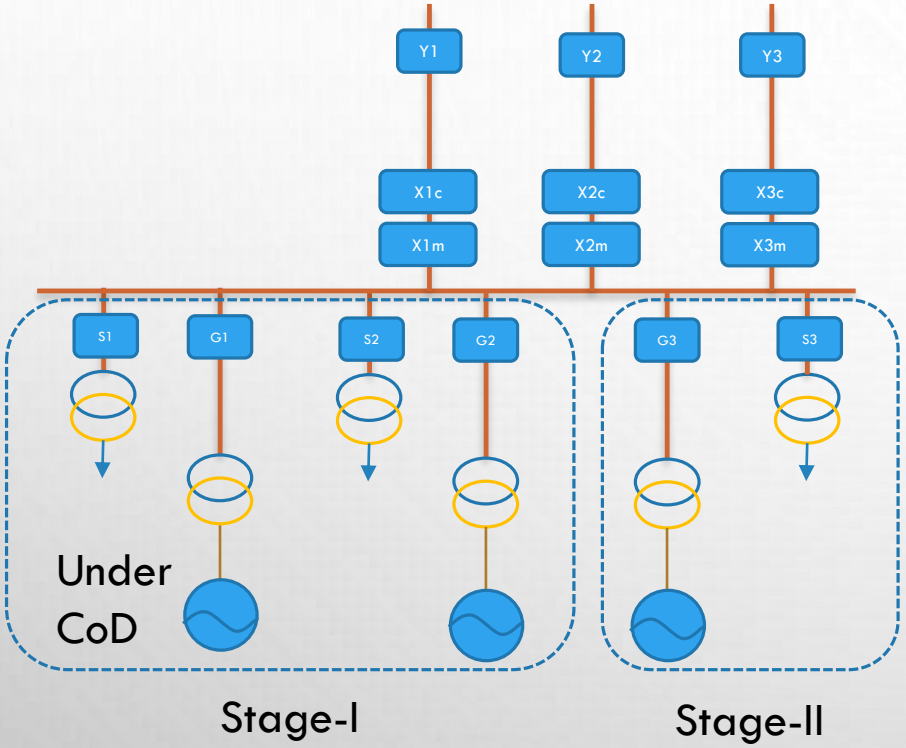
For Total Injection:

1. X1c, X2c, X3c
2. -Y1, -Y2, -Y3

For Stage II:

Net Bus

CASE 3: TWO STAGE ISGS CONNECTED AT SAME BUS (NOT ALL UNITS UNDER COMMERCIAL OPERATION)



X1m,X2m,X3m: Main Meters installed at ISGS SS
X1c, X2c, X3c: Check Meters installed at ISGS SS
Y1,Y2,Y3: Meters installed at other end
G1,G2,G3: Meters installed on HV side of GT
S1,S2,S3: Meter installed HV side of ST

Total Injection :

1. X1m+X2m+X3m---------->(Z)

Injection for Stage-II:

1. G3+S3

Injection for Stage-I Unit not under CoD:

1. G2+S2

Injection for Unit under CoD:

1. Z-(G2+S2+G3+S3)

In Absence of Main Meter Data:

For Total Injection:

1. X1c, X2c, X3c
2. -Y1, -Y2, -Y3

For Stage-I or II:

1. Net Bus