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.: NERPC/SE(O)/2023/**2504-2547** November 2, 2023

To

As per list attached

Sub: Minutes of the 26th NETeST Coordination Committee Meeting

Sir/Madam,

Please find enclosed herewith the minutes of the 26th NETeST Meeting held on 10th October, 2023 at "NERPC Conference Hall" NERPC Complex, Lapalang, Shillong 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.

Encl: As above

(एस. एम. आइमोल / S. M. Aimol)
निदेशक / Director

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. Managing Director, TSECL, Banamalipur, Agartala -799 001.
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19. ED, NTPC, Bongaigoan Thermal Power Project, P.O. Salakati, Kokrajhar- 783369
20. Vice President (Plant), OTPC, Palatana, P.O Udaipur, Gomati Dist., Tripura - 799105
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8. Head of SLDC, Dept. of Power, Govt. of Nagaland, Dimapur – 797103
9. Head of SLDC, TSECL, Agartala – 799001
10. Chief Engineer (Elect), Loktak HEP, NHPC, Vidyut Vihar, Kom Keirap, Manipur- 795124
11. Addl GM (EED), NTPC Bongaigaon, P.O. Salakati, Kokrajhar- 783369
12. DGM (O&M), OTPC, Palatana, P.O Udaipur, Gomati Dist., Tripura – 799105
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(एस. एम. आइमोल / S. M. Aimol)
निदेशक / Director

North Eastern Regional Power Committee

MINUTES OF THE 26th NER TELECOMMUNICATION, SCADA & TELEMETRY (NE-TeST) COORDINATION SUB-COMMITTEE MEETING

Date : 10th October, 2023 (Tuesday)

Time : 10:30 hrs

Venue : "NERPC Conference Hall", Shillong.

The List of Participants in the 26th NETeST Meeting is attached at **Annexure – I.**

Shri K. B. Jagtap, Member Secretary, NERPC welcomed all the participants. He highlighted the following: -

(i) He highlighted the importance of NETeST meeting for communication related issues of NER and stated that with the onset of IEGC 2023 w.e.f 1st October, 2023, the compliance of regulatory measures needs to be ensured.

(ii) He requested the forum to take up role and responsibilities actively for timely execution of various projects in NER grid related to SCADA upgradation/SCADA AMC/ADMS AMC/ Cyber-Security/ etc.

(iii) He apprised the forum that communication outage procedure has been approved in 24th TCC/RPC, emphasized for its true implementation. He therefore requested all the constituents to follow SOP in its true spirit.

Thereafter, Member Secretary requested Director, NERPC to take up the agenda items for discussion.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 25th MEETING OF NETeST SUB-COMMITTEE OF NERPC.

The minutes of 25th meeting of NETeST Sub-committee held on 25th May, 2023 at Shillong were circulated vide letter No. NERPC/SE (O)/NETeST/2023/ dated 07th June, 2023.

The Sub-committee confirmed the minutes of 25th NETeST meeting of NERPC with no modifications as no other comments/observations were received from the constituents.

A. ITEMS FOR DISCUSSION

A.1 Upgradation Activities of SCADA-EMS systems at Regional/State level in North-Eastern Region.

The SCADA-EMS systems of NERLDC and SLDCs in NER were established under ULDC Phase-2 scheme during period of 2016-2018 with M/s GE T&D India Limited as the Contractor and all these systems at SLDCs & NERLDC are near to its life-cycle completion. Most of the hardware and software systems are obsolete and getting its support from OEMs is getting difficult with time. Most of the SLDCs have already completed seven (07) years AMC cycle and entered into extended AMC period of two (02) years with M/s GE T&D India Limited. Considering round-the-clock operations of SCADA-EMS systems at SLDCs and NERLDC, the associated systems need to be upgraded/replaced at the earliest.

As the SLDCs had applied for PSDF funding which got rejected in Techno-economic sub-group forum of PSDF Secretariat; subsequently the cognizance of the matter was taken by the Appraisal Committee of PSDF Secretariat on request made by Chairperson-NERPC vide letter dated 04th May 2023.

As per Minutes-of-meeting held on 19th June 2023 by Appraisal Committee, it has been mentioned that – ***"The Appraisal committee discussed the SCADA upgradation proposals of entities of NER (DPR 375 to 381). The Appraisal Committee suggested that SCADA Upgradation proposal of NER states may be considered as a special case for PSDF funding due to their poor financial conditions. It was discussed that the SCADA projects may be coordinated/ monitored by NERLDC (GRID-INDIA) for all NER states. In this regard, NERLDC may prepare the technical document along with BOQ and a combined tender may be floated for all states of NER. As per PSDF guidelines, the funds will be sanctioned and released to the respective states of NER through TSA account. Accordingly, NLDC to get the revise DPR from NER states. NLDC was also requested to put the above decision to Monitoring Committee for concurrence."***

Accordingly, NERLDC shared draft Technical Specifications & BoQ with all SLDCs and requested for nomination of nodal-officer(s) to discuss and finalize upon the Technical Specifications & Bill-of-Quantity. Subsequently, in-person meetings were held with all SLDCs (except Manipur SLDC) and majority of the clarifications were given regarding the ULDC Phase-3 project. The present status in this regard is mentioned in *table* below.

S. No.	Description	Signing of MoU	Nomination of Nodal Officer(s)	Technical Specifications & BoQ	Tentative Location of Backup SLDC
1	Meghalaya	Signed on 28th October 2021.	Received on 28th September 2023.	Finalized version not submitted to NERLDC yet.	Mawphlang
2	Mizoram	Signed on 01st November 2021.	Received on 10th July 2023.	Finalized version not submitted to NERLDC yet.	Kolasib or Serchhip
3	Assam	Signed on 06th January 2022.	Received on 12th September 2023.	Finalized version not submitted to NERLDC yet.	Samaguri or Jorhat
4	Tripura	Signed on 20th May 2022.	Received on 10th August 2023.	Finalized version not submitted to NERLDC yet.	P.K. Bari
5	Arunachal Pradesh	Signed on 07th July 2022.	Received on 03rd August 2023.	Finalized version not submitted to NERLDC yet.	Namsai, Roing or Pasighat.
6	Nagaland	Signed on 01st March 2022.	Received on 13th July 2023.	Finalized version not submitted to NERLDC yet.	Zhadima or Kohima
7	Manipur	Signed on 11th June 2022.	Received on 13th July 2023.	Finalized version not submitted to NERLDC yet.	*Not yet decided.*

Establishment of Backup SLDCs has been mandated in "Disaster Management Plan for Power Sector" by CEA released in December 2022 and available at web-link https://cea.nic.in/wp-content/uploads/ps___lf/2023/01/Disaster_Management_Plan_DMP_2022_for_power_sector.pdf which states that - ***"Back up EOC/ Control room should also be set up preferably at remote location & kept ready to manage adverse situations if main control room dysfunctions or gets affected due to any disaster. Back up control room should be set up keeping all important features/functions of main control room with full access control so that officials can operate the entire system without any difficulty. Backup control room should be tested periodically for intended functionality by making it main control room."***

All SLDCs are requested to finalize the Technical Specifications/BoQ at the earliest so that Cost-Estimate can be taken from prospective bidders and revised DPR can be drafted for submission to PSDF Secretariat.

Deliberation of the sub-Committee:

NERLDC informed the forum that Appraisal Committee of PSDF has requested NER-SLDCs to finalize respective BoQ and Technical Specifications in consultation with NERLDC to come-up with an updated cost-estimate and submit revised DPR to PSDF secretariat for approval. In this regard, NERLDC briefly apprised the forum about steps undertaken jointly by NERLDC & SLDCs (**Annexure A1**).

In view of establishment of Backup SLDCs, ED, NERLDC informed the forum that the distance between existing SLDC & backup SLDC should be more than 100KMs. The forum noted the same; however, the forum also noted that this criterion may be difficult to fulfill considering resource constraints related to building requirements, OPGW connectivity, locating it within the state geographical area, avoiding remote hilly locations to ensure quick movement of manpower during crisis, etc. The forum advised all the SLDCs consider the above deliberation before finalization of the Backup SLDCs. All SLDCs agree to the same. SLDC, Manipur via email has proposed 400kV Thoubal station as the Backup SLDC for Manipur.

The forum further deliberated that all efforts shall be made to finalize a suitable location for Backup SLDCs and the initial BoQ for PSDF funding shall include equipment for Backup SLDC set-up also. However, in case of non-finalization of location/building infrastructure/OPGW connectivity by senior management of state-utilities before tendering, the same can be excluded on request in the form of letter from respective SLDCs to NERLDC.

The forum also deliberated on inclusion of

- "**Video Conferencing System with LED Displays and Existing RTUs maintenance of States" in BoQ of all NER SLDCs under ULDC Phase-III (in similar line with ULDC Phase-II)**".
- "VC System for NERPC" in BoQ of NERLDC as done in ULDC Phase-II.

The forum noted that it is necessary to include Video conferencing system with LED displays (in similar line with ULDC Phase-II) and to improve real-time power system

operational data availability in the states, maintenance of the existing RTUs is essential. Accordingly, it was decided that all SLDCs shall revise the DPR with inclusion of Video conferencing system with LED displays and furnish the list of stations and RTUs make/model details to NERLDC for considering as a line item in BoQ towards its maintenance under PSDF funding. NERLDC will include VC system for NERPC in their BOQ as done in ULDC Phase II.

States are requested to furnish the revised DPR/requisite data regarding TRUs as above within October 2023.

The Sub-Committee noted as above.

Action: All SLDC & NERLDC.

A.2 <u>Issues related to Maintenance activities of SCADA/EMS system of SLDCs:</u>

It has been found and observed since last few months that various issues related to Hardware/Software (incl. Auxiliary Power Supply System) are getting faced at SLDCs in NER and AMC personnel deployed at NERLDC, Shillong are being involved in resolution of the same by GE. Due to this, the maintenance activities of NERLDC are getting delayed and affected. So, it is requested that M/s GE T&D India Limited may work upon a comprehensive check-list (daily/weekly/ monthly basis) and share with the SLDCs so that it can be reviewed by them to know the correct status of the SCADA-EMS system. A sample checklist for the same is attached as **Annexure A2**.

<u>Deliberation of the sub-Committee:</u>

NERLDC informed the forum that a checklist has been prepared for evaluating healthiness of devices/software which can be used to monitor on daily/weekly basis for which data/observation is required to be filled by M/s GE and respective SLDCs. M/s GE submitted that they will review the checklist and will add if found anything necessary. NERPC advised SLDCs to minutely follow the checklist as it will help in system maintenance during the extended AMC period.

The Sub-Committee noted as above.

Action: All SLDC, NERLDC & M/s GE.

A.3 <u>Establishment of VSAT Communication in selected remote locations for state-utilities in North-Eastern region:</u>

The Detailed Project Reports (DPRs) for establishment of VSAT Communication in selected stations under ownership of state-utilities in NER were submitted for PSDF

funding. The cost-details in respective DPRs are – Arunachal Pradesh: ₹ 6.328 Crores; Assam: ₹ 0.951 Crores; Manipur: ₹ 0.422 Crores; Meghalaya: ₹ 0.317 Crores; Mizoram: ₹ 0.898 Crores; Nagaland: ₹ 2.696 Crores; Tripura: ₹ 0.792 Crores.

In 74th Meeting of Techno-Economic Sub-Group (TESG) meeting held on 17th March 2023, it was deliberated and recorded in MoM that – ***"TESG recommended these proposals (Proposal nos. 388 to 394) as deemed returned and suggested entities to submit a comprehensive DPR consist of installation OPGW, FOTE after assessing the proper requirement and consider VSAT communication (up to 66kV) for only in exceptional terrains where OPGW laying is not feasible. Entities agreed for the same. NLDC is requested to communicate the above decision to the entities."***

The same matter was put up in Appraisal Committee meeting held on 19th June 2023 and it was recorded in MoM that – ***"Regarding NER proposals of VSAT (DPR 382 to 388), Appraisal Committee accepted the suggestion of TESG that instead of installation of VSAT communication having low bandwidth, the entities may submit a comprehensive DPR consisting of the implementation of reliable communication network through the installation of OPGW based fiber optic network. VSAT communication (up to 66kV) may only be considered for only in exceptional terrains where OPGW laying is not feasible. The Appraisal committee returned the present proposal for the installation of VSAT communication network (i.e. DPR 382 to 388)."***

The DPRs were rejected by TESG on the grounds of low bandwidth, exploring OPGW as the primary option, some 33kV stations were also included in DPRs, etc. It seems that the urgent need of VSAT communication in NER due to difficult terrain and long execution period (of the order of several years) has not been put up with clarity in front of TESG and Appraisal Committee leading to rejection of the associated DPRs. Moreover, the bandwidth of 128kbps is sufficient to cater real-time power system operational data transfer requirements of SLDCs. SLDCs are dependent upon establishment of VSAT to meet various deadlines given to CERC in reply to petitions Petition No. 197/MP/2020 (Arunachal Pradesh), Petition No. 201/MP/2020 (Tripura), Petition No. 263/MP/2020 (Nagaland) and Petition No. 556/MP/2020 (Mizoram) against which an Order has also been issued by CERC on 04th August 2023 available on web-link https://cercind.gov.in/2023/orders/197_MP_2020-Ors.pdf. Hence, the

forum may discuss and plan for putting up these DPRs again with more detailed justification.

Deliberation of the sub-Committee:

The forum noted that the DPRs had been deemed returned by TESG/ PSDF Appraisal Committee. SLDCs stated that all stations upto 66kV level are being monitored for ensuring reliable operation of the electricity grid. However, improvement of real-time data availability is a big challenge due to issues in laying of OPGW in hilly terrains and remote stations. The forum noted that VSAT for NER electricity grid can act as a critical technology for faster installation at places as per following criteria –

- Locations with no OPGW planned.
- Locations with OPGW planned but will take several years to get commissioned.
- Locations where feasibility of alternate physical redundant OPGW is difficult.
- Station with hilly terrain or remote stations (66 kV level and above) where laying OPGW is not economically viable for state.

POWERGRID-NERTS informed the forum that VSAT technology had been put into its three (03) nos. of stations in Arunachal Pradesh i.e., Roing, Tezu and Namsai considering the long planning and implementation period of OPGW projects in NER.

The forum deliberated that 128kbps bandwidth shall be sufficient for each station to transfer its data to respective SLDC and Extended-C band technology need to be used in order to avoid data interruption during bad weather conditions as tested during earlier demo-pilot projects at Killing and Tezu stations of NER. The forum unanimously agreed to the deployment of VSAT technology as it is very critical to improve the availability of real-time power system operational data at SLDCs in NER. Currently, the OPGW projects are being planned in discrete manner and also taking several years for getting completed and operational.

SLDCs agreed to review the list of stations again (66kV level and above) for VSAT deployment and merge respective DPR under its "State Reliable Communication Scheme" (which can include OPGW, End Equipment, RTUs & Any other associated equipment required for communication) for 90% PSDF funding. Balance 10% funding will be from state-utility side.

The Sub-Committee noted as above.

Action: All SLDCs & NERLDC.

A.4 Cyber Security aspects in SCADA/IT systems at Load Despatch Centres in

North Eastern Region:

State-Utilities may update the status with respect to CII Status by NCIIPC, ISO 27001:2013 implementation, VA-PT twice a year, Cyber Crisis Management Plan (CCMP), Cyber Management Team (CMT), patching of vulnerabilities and virus alerts from CERT-In/CERT-GO, etc, participation in various trainings and workshops on Cyber Security being conducted by CEA, Ministry of Power and Grid-India, etc.

During 25th NETeST meeting, MS NERPC advised Arunachal Pradesh to submit its compliance in a timely manner & Arunachal Pradesh has agreed to submit the same.

Member Secretary also emphasized that cyber security is to be ensured by all the state utilities. He requested NERLDC to monitor the status of work of all SLDCs in cyber security aspect and update the forum regularly. A summary of the present status of each SLDC is attached in as ***Annexure–A4.***

Deliberation of the sub-Committee:

NERLDC updated the status of cyber security related activities to the forum. A summary of the state wise status of CII, CCMP etc., is attached as ***Annexure-A4.***

The forum noted the same & advised all the SLDCs to ensure VA-PT test by December, 2023 for FY 2023-24.

The Sub-Committee noted as above.

Action: All state utilities, ISTS/ISGS Licencee, NERLDC & NERPC.

A.5 Implementation of Guwahati Islanding Scheme:

During the 23rd TCC/RPC meeting, the Guwahati Islanding Scheme was referred back to the Sub-Committee for review as the forum felt that the cost estimate of ₹84.88Cr (including taxes) is exorbitant.

Subsequently, the Guwahati Islanding Scheme is being regularly reviewed in OCCM, NETeST and Special meetings.

NERLDC and Assam are requested to update on the latest status on progress of the Scheme and timeline for submission of DPR thereof.

Deliberation of the sub-Committee:

NERLDC informed that subsequent to the meeting held on 29th September 2023, SLDC Assam has submitted details regarding priority of load, feeders to be disconnected during island formation, SLDs of 132 kV GMCH and 132 kV Paltan Bazar. POWERGRID has also provided the requirement of UFRs and heavy-duty relays for 400 kV Bongaigoan (PG). NERLDC requested SLDC Assam to provide

details for UFRs and heavy-duty relays for Assam owned stations. The forum advised SLDC Assam to provide the details by 20th October 2023.

The Sub-Committee noted as above.

Action: SLDC Assam, POWERGRID & NERLDC.

A.6 Periodic Auditing of Communication System:

Regulation 10 of Communication System for inter-state transmission of electricity Regulation, 2017 states "The RPC Secretariat shall conduct performance audit of communication system annually as per the procedure finalized in the forum of the concerned RPC. Based on the audit report, RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the RPC Secretariat. An Annual Report on the audit carried out by respective RPCs shall be submitted to the Commission within one month of closing of the financial year".

Accordingly, Audit plan has been made for FY 2023-24. In the 25th NETeST meeting it was also decided that states can also suggest additional names of substations to be audited and nomination for audit committee from states/ISTS shall be sought as and when required.

Deliberation of the sub-Committee:

Agenda clubbed & discussed with Agenda A7

A.7 Standard Operating Procedure (SoP) for Communication Audit of Substations:

Regulation 10 of Communication System for inter-state transmission of electricity Regulation, 2017 states "The RPC Secretariat shall conduct performance audit of communication system annually as per the procedure finalized in the forum of the concerned RPC. Based on the audit report, RPC Secretariat shall issue necessary instructions to all stakeholders to comply with the audit requirements within the time stipulated by the RPC Secretariat. An Annual Report on the audit carried out by respective RPCs shall be submitted to the Commission within one month of closing of the financial year".

Accordingly, NPC has circulated a SoP for Communication (**Annexure-A.7**). Members may discuss and propose any changes, if required.

Deliberation of the sub-Committee:

NERPC informed the forum that CEA has released the Standard Operating Procedure (SoP) for carrying out the audit of Communication system, and requested forum to provide the comments if any by 31st October 2023. Once SoP is accepted an audit group will be formed to carry out the audit at the selected stations as decided in the 25th NETeST meeting.

The Sub-Committee noted as above.

Action: All state utilities, ISTS/ISGS Licencee, NERLDC & NERPC.

A.8 Non-availability of real-time data pertaining to POWERGRID-owned bays installed at AEGCL-owned stations:

It has been observed that the real-time data of POWERGRID-owned bays installed at AEGCL stations are not reporting to NERLDC. These bays have been identified as follows –

a. Nirjuli bay installed at Gohpur station since 16th Dec-2022
b. Silchar bays installed at Srikona station isolator data since 28th November -2022.
c. Silchar bays installed at Hailakandi.

All these bays are ISTS elements, thus data availability is important for real-time drawl calculation and monitoring of ISTS element. During 24th NETeST meeting, it was decided that AEGCL and POWERGRID will jointly work to resolve the matter bilaterally at the earliest. During 25th NETeST meeting, it was decided that AEGCL and POWERGRID will jointly work to resolve the matter bilaterally within one month.

Deliberation of the sub-Committee:

POWERGRID – ULDC informed the forum that the Nirjuli bay issue was rectified. However, the issue has again propped out in the last month. It was also informed that there is no issue in the communication channel/OPGW & this appears to be hardware issue. SLDC, Assam also agreed to the same. The forum noted the same and referred the natter to the OCC forum.

The Sub-Committee noted as above.

Action: SLDC ASSAM, POWERGRID & NERPC.

A.9 Connectivity of 132 kV Khupi S/s with ULDC network:

132 kV Khupi S/s will be connecting to Kameng HEP over 132 kV line. Thus, it is requested to connect 132 kV Khupi S/s with ULDC network by installing OPGW and associated end equipment.

During 24th NETeST meeting, GM (T&C), Comprehensive-PGCIL informed the forum that OPGW stringing is completed in 132 kV Khupi-Kameng (Kimi) line, FOTE installation is under progress which will be completed by 15th April 2023.

During 25th NETeST meeting, DD, NERPC informed the forum that Comprehensive-POWERGRID has assured to complete all the pending work by the end of May, 2023.

Deliberation of the sub-Committee:

Comprehensive T&D Arunachal Pradesh informed the forum that the link between Khupi – Kameng is completed in all aspects. ULDC-POWERGRID informed the forum that Kameng – Balipara link is also completed and equipment are power up at Kameng, which shall be commissioned by October 2023. NERLDC enquired about the interpatching of Tejas and Fibcom SDH at Kameng, Comprehensive Arunachal Pradhsesh – POWERGRID informed that necessary patch chord and SFP are installed. Once Fibcom equipment is commissioned by ULDC-POWERGRID the Khupi will be connected till Balipara via this link. Comprehensive-POWERGRID further informed that the 7.5 Kms of OPGW stringing is pending in Balipara – Khupi line which is getting delayed due to very tough terrain and unfavourable weather. However, team is working in the field and expected to complete the Stringing by October 2023. DoP, Arunachal Pradesh enquired about the LILO of Balipara – Khupi at Tenga. NERLDC informed that as per Devi Energies, OPGW is already laid from LILO point to Tenga but the splicing of fibres at LILO point may be discussed further. After detailed deliberation the forum requested Comprehensive-POWERGRID to take the necessary steps in connecting the same.

The Sub-Committee noted as above.

Action: Comprehensive-POWERGRID, POWERGRID ULDC.

A.10 OPGW Installation in 220kV Kohima- New Kohima line:

Related to commissioning of 220 kV downstream transmission line of DOP Nagaland at New Kohima (400/220kV) SS Concerns of KMTL: 1. OPGW wire for 220 KV downstream Transmission line has not been installed so it is very difficult to achieve the protection of 220 KV transmission line by using line differential relay. As line length is 10 KM

(Approx.) for 220 kV Transmission line, therefore Line Differential Relay has been considered for both the end. 2. PLCC & SDH panel has not been installed at 400/220 KV GIS substation, New Kohima till date. 3. 220 KV downstream transmission line conductor parameters yet to receive from DOP, Nagaland for Relay setting at 400/220 KV GIS substation, New Kohima.

In 196th OCCM, Manager, KMTL requested the forum to ensure installation of OPGW, LDP, PLCC, SDH equipments in the 220kV downstream line. He also requested for providing parameters to KMTL for finalization of settings. Member Secretary, NERPC requested POWERGRID to include OPGW for the 220kV New Kohima – Zhadima D/C under regional scheme – State Sector and proceed for early implementation as the line is in final stage of commissioning. NERTS agreed to the same.

In the 198th OCC meeting, DGM (AM), NERTS updated the forum that quantity margin of OPGW is available under reliable communication scheme. However, prior approval of RPC forum is required to install OPGW on intra state lines.

In the 25th NETeST Meeting, the forum recommended PGCIL to include the link under Reliable communication of ULDC as quantity variation.

The matter was deliberated in the 24th TCC/NERPC meeting as below:

Deliberation of the TCC : CTUIL representative stated that this line being intra-state line is not under their purview. Member Secretary, NERPC requested POWERGRID to find out a way to help them to lay OPGW for this line as a special case.

In response to this, CGM (i/c), NERTS stated that a special arrangement can be made bilaterally with Nagaland by devising a mutually agreed policy/philosophy of work including deposit work or other alternatives, AMC, O&M etc.

The TCC recommended the matter for discussion and approval of the RPC.

Deliberation of the RPC : In view of the constraints faced by Nagaland and urgency of the requirement of the OPGW link, the forum approved and advised PGCIL to execute the work by formulating a bilateral philosophy with Nagaland as decided by the TCC forum. Further, the work progress can be monitored in Sub-Committee of NERPC.

Deliberation of the sub-Committee:

NERLDC informed the forum that OPGW laying and associated works has been completed by DoP, Nagaland.

The Sub-Committee noted as above.

A.11 Issues of SLDCs in SCADA AMC:

Assam, Meghalaya and other SLDCs:

(a) Signing of LOA for Extension of AMC of SCADA-EMS system of Meghalaya:

The AMC of the existing SCADA-EMS system for Meghalaya had expired on 31st March 2023. However, GE is yet to sign the LOA which incorporates the GST related amendment made by POWERGRID besides other terms and conditions as in the Original Contract. Moreover, a request was made by GE for a consideration of the Maintenance component only (exclusive of Supply and Services) for the purpose of PBG.

In the 25th NETeST meeting M/s GE representative agreed to sign the LOA extension.

Deliberation of the sub-Committee:

Agenda clubbed & discussed with Agenda A.11 (c)

(b) Degraded performance of the UPS battery banks of Meghalaya SLDC:

During the 24th NETeST meeting, GE had assured that all issues relating to the inadequate performance of UPS battery banks would be resolved. However, subsequent to the last Preventive Maintenance Visit on the 20th March 2023 wherein it was observed that UPS-1 battery bank was giving a backup of less than 2 hours along with the detection of defective battery cells, there has seemingly been no effort on the part of GE to resolve the problems.

During the 25th NETeST meeting, SLDC Meghalaya requested M/s GE to ensure the availability UPS battery supply for at least 3.5 Hrs. In this regard, M/s GE had assured the same and informed that 30 battery cells shall be supplied to SLDC, Meghalaya and would be installed by June, 2023. However, till date, the same, though received at site, are yet to be installed.

Deliberation of the sub-Committee:

M/s GE informed the forum that the batteries shall be installed/commissioned by October, 2023.

The Sub-Committee noted as above.

Action: SLDC Meghalaya & M/s GE.

(c) GST related amendment in AMC of the SCADA-EMS system:

Since the Contract was originally prepared by POWERGRID and signed by individual states with ALSTOM / GE, the matter relating to the amendment in GST and calculations thereof was requested during meeting dtd 29.12.2022 to POWERGRID.

A letter has been received from Powergrid on 31.03.2023. Point No. 3.0 states that "The rate is approved as 89% [Eighty Nine percentage] of the original rate of the AMC portion". Another email has been received from M/S GE T&D Ind. Ltd. on 12.05.2023, in which revised rate for AMC calculation has been shared. As per the calculation the existing contract value is Rs. 1,65,62,935 .00. And the Contract value after GST amendment is Rs. 1,73,94,394.00. While calculating the same M/S GE T&D Ind. Ltd. has taken 89% of the original contract value which is inclusive of service tax of 12.36%. So, there is no change in the base value after GST amendment. However, there is significant enhancement in the contract value.

In the 25th NETeST meeting, POWERGRID agreed to share the corresponding calculation sheet with the states. Further POWERGRID also informed the forum that if other state wants GST amendment calculation, they need to give details to POWERGRID and they will provide the separate GST amendment to each state.
In a special meeting held online on 30th August, 2023 POWERGRID informed that they had requested details from all the states & are waiting for details from the states to make amendment of GST for all state together. Member Secretary, NERPC advised POWERGRID to process & issue the amendment of GST state wise. He also advised POWERGRID to do the needful for Meghalaya & Tripura within 02 weeks enabling them to sign the AMC of SCADA-EMS with M/s GE. POWERGRID requested M/s GE to depute a person to NERTS RHQ along with all relevant documents/details for swift processing and issuance of the amended GST. M/s GE has agreed to the same.

Till date, it is regretted that the GST Amendment Clause is yet to be conveyed to Assam/ Meghalaya/Tripura as resolved during the above meeting. It may be mentioned that quarterly payments to GE had been stalled on account of the above delay. POWERGRID / GE may please update on the status.

Deliberation of the sub-Committee:

POWERGRID – ULDC informed the forum that an empowered committee has been set up by POWERGRID and the amended LoA/BoQ shall be issued within a month. Further they also requested all the SLDCs/M/s GE to furnish the details of executed quantity along with their price details in the Pre-GST era & post GST era. SLDC

Assam informed the forum that while the price for NERLDC has been constant in the pre-GST and post-GST, there has been price escalation for all the SLDCs. After detailed deliberation, the forum requested all the SLDCs/M/s GE to furnish the data as requested by POWERGRID. The forum also decided to conduct a separate meeting for further deliberation (if required).

The Sub-Committee noted as above.

Action: All SLDC, POWERGRID, NERLDC, M/s GE & NERPC.

(d) AMC of existing RTUs

TSECL is requesting provision for inclusion of maintenance of existing RTUs to be incorporated under new SCADA upgradation project (ULDC Phase-III)

Deliberation of the sub-Committee:

Tripura SLDC and Arunachal Pradesh SLDC has requested for inclusion of AMC for existing RTUs (66kV and above level) under ULDC Phase-3 project. NERLDC opined that maintenance of existing RTUs of some old make-and-model may be a challenge for new vendors. However, the matter was deliberated and forum noted that to improve real-time power system operational data availability in the states, maintenance of the existing RTUs is essential. Accordingly, it was decided that all SLDCs shall submit the "list of stations and RTUs make/model" details to NERLDC for considering as a line item in BoQ towards its maintenance and same will be put up in DPR also for PSDF funding.

The Sub-Committee noted as above.

Action: All state utilities & NERLDC.

(e) Replacement of anti-virus installed in OT system of LDCs in NER:

M/s GE T&D India Limited has provided Microsoft System Center Endpoint Protection (SCEP) 2012 as antivirus solution for the SCADA system during the project implementation phase. The anti-virus installed has been declared end-of-life by the OEM i.e., Microsoft from 12-July-2022 onwards which means that all associated definitions, engine, and platform updates will not be available now. Non-availability of antivirus is a critical cyber security vulnerability to the system. Therefore, M/s GE T&D India Limited has to replace and maintain an updated antivirus solution in

SCADA system at all LDCs of NER. Further, all SLDCs have to follow up with M/s GE T&D India Limited regarding implementation of the same on priority basis.

In 23rd NETeST meeting, M/s GE informed the forum that they will replace all the obsolete antivirus by a new eSCAN anti-virus solution till 10th August 2022 at NERLDC as well as NER-SLDCs.

In 24th NETeST meeting, M/s GE T&D Ind. Ltd. representative requested all SLDCs to inform this issue to the site engineer and M/s GE will resolve it expeditiously.

In 25th NETeST meeting, M/s GE representative informed that in view of cyber security, internet is not directly connected to the SCADA systems and therefore regular updates of antivirus software could not be undertaken. However, M/s GE requested all SLDCs to provide a dedicated workstation class computer system which shall be configured as Anti-virus management server. The computer should have internet facility to download the patches and will be connected to SCADA external firewall to push the patches to respective systems.

In this connection it is to inform that SLDC, AEGCL is planning to have a dedicated system connecting the SCADA (IT-OT integration). The system is planned to be used for downloading reports (generated in SCADA), database. Therefore, in view of the above, M/S GE T&D Ind. Ltd. was requested to –

a) Share the necessary minimum specifications for the dedicated workstation.
b) Comment whether the same dedicated PC may be used as the IT interface PC for implementing the IT-OT integration work.

Comments are yet to be received from M/S GE T&D Ind. Ltd.

Deliberation of the sub-Committee:

M/s GE informed the forum that they will provide the architecture for IT-OT integration. The forum advised SLDC, Assam & M/s GE to bilaterally discuss and sort out any other related issues, if any.

The Sub-Committee noted as above.

Action: SLDC Assam & M/s GE.

(f) Deployment of Suitable Manpower at LDCs in NER for AMC by M/s GE T&D India Limited:

SCADA/EMS project was awarded to M/s GE T & D Limited in the year 2014 and T&C extended during January 2017. Since then, the SCADA/EMS system is under Comprehensive-AMC with M/s GE T&D Limited. As per the contractual terms and conditions, two (02) manpower with "5 years of working experience in delivered SCADA/EMS system" has to be deployed at each SLDC of North-Eastern Region.

It has been observed that manpower deployed at various SLDCs are not as per the provision of the contract and due to this many-a-times, technical support through remote desktop needs to be extended from NERLDC. As a result, various works are getting hampered and delayed.

In 23rd NETeST meeting, M/s GE assured to the forum that all issues related to manpower will be resolved before next NETeST meeting. It was deliberated that M/s GE should not take this matter lightly and fulfil the requirements as per the provision of the contract which quotes that service engineer with minimum 5 years of working experience in delivered SCADA/EMS system should be deployed at all control centers. In 24th NETeST meeting, M/s GE T&D Ind. Ltd representative informed that they will be sending experts from back office on quarterly basis to each SLDC, for resolving state issues as well as training each personnel deployed there. Further, online training will also be provided to all their deployed personnel. He assured the forum that man-power related issue at all SLDCs will be resolved by April 2023.

During 25th NETeST meeting, M/s GE informed that necessary training has been imparted to the site engineers and their performance are being monitored on a regular basis. They also requested all the SLDCs to inform any lagging of the site engineers for smooth execution of the contract. SLDC, Assam informed that the training imparted appears to be inadequate as the site engineers of M/s GE often seeks remote help for regular works. The forum advised M/s GE to look into and resolve the matter urgently. M/s GE agreed for the same

Deliberation of the sub-Committee:

M/s GE informed the forum that training has been imparted to the deployed manpower. SLDC Assam informed that monthly meetings were earlier held with M/s GE to sort out any issue, which has now stopped. M/s GE agreed to start the monthly meeting again.

The Sub-Committee noted as above.

Action: SLDC Assam & M/s GE.

(g) Non-functioning of "Historian" system services at Mizoram SLDC and Arunachal Pradesh SLDC:

The historian system services in SCADA/EMS system of Mizoram SLDC and Arunachal Pradesh SLDC are not functioning since its inception. During 24th NETeST meeting, M/s GE T&D informed the forum that they will resolve the issue by 15th April 2023. Further, NERLDC also requested concerned constituents to calculate the availability according to contract clause if the issues are not resolved by 15th April 2023.

During 25th NETeST meeting, M/s GE informed that historian services have been restored at Mizoram SLDC on 15th May 2023 (Mizoram SLDC confirmed the same) and they will resolve the historian issue of Arunachal Pradesh by July 2023.

Deliberation of the sub-Committee:

M/s GE informed the forum that the issues pertaining to the historian of SLDC Arunachal Pradesh & SLDC Mizoram has been resolved.

The Sub-Committee noted as above.

(h) Battery Bank issues of Tripura SLDC.

Regarding replacement of deteriorated batteries of 40 KVA UPS system in Tripura & Assam, it was already discussed in SCADA AMC meeting, however GE has not taken action till date.

Deliberation of the sub-Committee:

M/s GE informed the forum that the batteries shall be installed/commissioned by October, 2023.

The Sub-Committee noted as above.

Action: SLDC, Tripura & M/s GE.

(i) **Reconciliation of the Spares for ASSAM SLDC.**

SLDC, AEGCL would like to inform the forum that the AMC for SCADA/EMS awarded to M/S GE T&D Ind. Ltd. has been extended for two years at the same rate and same terms and condition as per the provision in the existing AMC. As such SLDC, AEGCL would like to reconciliate the spares that the contractor needs to maintain at site in presence of the contractor.

In the 25th NETeST Meeting held on 25th May, 2023 SLDC, Assam & M/s GE agreed to reconcile by 1st Week of June, 2023.

At the request of SLDC, AEGCL, material reconciliation of the spares have been performed on 28.06.2023 in presence of representative of M/S GE T&D Ind. Ltd. Few items were found to be not available and M/S GE T&D Ind. Ltd. has been requested to replenish the same. One Item (Dust Filter) is yet to be replenish.

Deliberation of the sub-Committee:

The forum advised M/s GE to replenish the Dust Filter at the earliest.

The Sub-Committee noted as above.

Action: SLDC, Assam & M/s GE.

(j) Support for Fortinet Firewall during Extended AMC.

The license of the internal firewall of the SCADA/EMS system of SLDC, AEGCL has already expired. As per M/S GE T&D Ind. Ltd. the, OEM of the firewall does not support for any further extension in the service/ licence. The matter has already been discussed in several meetings. As per the minutes of the special meeting dated 13.02.2023 SLDC, AEGCL has written a letter to CERT-GO & CISO-MOP seeking clarification and guidance on this issue, however, no response has been received yet. Also, once the firewall issue is resolved, specific amendment in LOA may be made as per requirement.

In the special meeting held online on 30th August, 2023, M/s GE informed that they are suppling Firewall to SRLDC at around ₹ 9.75 Lakhs (exclusive of taxes) per Firewall and they will consider the same rate for NER SLDCs. SLDC, Meghalaya informed the forum that they have already initiated the process of procuring Firewall from M/s GE at the same rate. The forum opined that all the SLDCs may procure firewall for SCADA-EMS system to avoid/mitigate cyber security threats. In this regard M/S GE T&D Ind. Ltd. was asked to provide with the techno commercial offer for the same. But, SLDC, AEGCL is yet to receive any response for the same.

Deliberation of the sub-Committee:

M/s GE assured the forum that techno-commercial offer will be provided to SLDC Assam at the earliest.

The Sub-Committee noted as above.

Action: SLDC, Assam & M/s GE.

(k) UPS Tripping.

The UPS system which is a part of SCADA/EMS has tripped at multiple instances in recent past. Recently fault in the UPS system has been observed on 25.08.2023,

19.07.2023, 18.05.2023. There might be some issue with the UPS system. Regarding this M/S GE T&D Ind. Ltd. has been requested to investigate the issue and submit a detailed report with reason for the occurrences of the fault along with mitigation plan to prevent such occurrence in future. But, M/S GE T&D Ind. Ltd. has not submitted the same.

Deliberation of the sub-Committee:

SLDC Assam informed the forum that M/s GE has identified the issue and has requested for simultaneous shutdown of both the ACDB. The forum requested M/s GE to consider working under partial SD of the ACDB. M/s GE assured to come up with a plan in the next meeting.

The Sub-Committee noted as above.

Action: SLDC, Assam & M/s GE.

(l) EMS/DTS.

A 2 days training on EMS and DTS has been organised by M/S GE T&D Ind. Ltd. on 15.06.2023 and 16.06.2023. The training has been very helpful. SLDC, AEGCL would like to highly appreciate the training arranged by M/S GE T&D Ind. Ltd. The scope for improvement in the database has been pointed out by the instructor for improved result. However, the SLDC team has a little to no experience with the database of EMS/DTS. So, we are unable to mitigate some errors in the database. So, RPC, RLDC, M/S GE T&D Ind. Ltd. may extend their view in this matter.

Deliberation of the sub-Committee:

After detailed deliberation the forum noted that although EMS/DTS training has been imparted by M/s GE, Database training is yet to be done. The forum requested NERLDC to extend assistance whenever possible. The forum requested both M/s GE and AEGCL to have a separate meeting to address the concern.

The Sub-Committee noted as above.

Action: SLDC Assam, M/s GE & NERLDC.

(m) Delay in submission of Audit Report.

The cyber security audit of SCADA/EMS was performed in Feb'23 by M/s GE T&D India Ltd. The final report was received on 17.08.2023. Justification regarding vulnerabilities which had not been closed was requested from M/s GE T&D India Ltd on 29.08.2023. The same is yet to be received.

Deliberation of the sub-Committee:

SLDC Assam informed the forum that the audit report is not in line with actual system. The forum advised M/s GE to produce the audit report as per actual to SLDC Assam at the earliest. GE stated that all reports has been submitted to all states however Assam has raised that Audit report is not in line with the actual system for that GE assured that they will be having separate meeting with Assam to close.

The Sub-Committee noted as above.

Action: SLDC, Assam & M/s GE.

A.12 <u>Concerned regarding shifting of SLDC Arunachal Pradesh from Old building to new building.</u>

It is learnt that SLDC Arunachal Pradesh has completed its new control centre building, which is nearby to exiting SLDC building (Chimpu S/s). However, following are concerns from NERLDC:

a. Plan for shifting of SCADA/EMS system from old building to new building.
b. Plan for shifting VoIP exchange also.
c. Plan for shifting of various communication links of Comprehensive-AP, ULDC and Powertel links (fibre & FOTE) to new building.

In 25th NETeST meeting, DoP, Arunachal Pradesh informed that the discussion is being held with M/s GE T&D for shifting the SCADA/EMS system from old premises to new premises. NERLDC emphasized that along with SCADA/EMS, plan for shifting of VoIP exchange and communication links (POWERTEL, ULDC and Comprehensive-AP) should also be prepared well in advance. Member Secretary, NERPC advised DoP, Arunachal Pradesh to plan the activities with minimal outage. DoP, Arunachal Pradesh informed the forum that the matter is in initial discussion phase and further brainstorming would be done on it before presenting it to the forum.

<u>Deliberation of the sub-Committee:</u>

SLDC Arunachal Pradesh informed the forum that the discussion is being held with M/s GE T&D for shifting the SCADA/EMS system from old premises to new premises & accordingly Techno-commercial offer was sought, which is yet to be furnish by M/s GE. M/s GE agreed to expedite the matter & requested SLDC Arunachal Pradesh to forward the mail to sales team of M/s GE T&D once. GE has reminded on the same email for DoP-AP confirmation with copy to NERPC for information.

The Sub-Committee noted as above.

Action: SLDC, Arunachal Pradesh & M/s GE.

A.13 <u>UFR Mapping of Arunachal Pradesh</u>

SLDC Arunachal Pradesh has been requesting GE T&D India Ltd since August 2022 for mapping of existing UFRs of Arunachal Pradesh vide our letter No. SE/SO&PSC/W-30/ 20232-23/879-83, dated 25/08/2023. Many reminders were served in between through email and phone calls. As per clause 6.5 of the Price break-up of the AMC including manpower and spares, they are required to provide Integration of bays in RTUs including supply of MFT, CMRS etc at mutually agreed price as per AMC. UFR mapping is still pending as no one from GE has been deputed for the work. GE T&D India Pvt. Ltd may give dates for deputing man power for UFR Mapping.

<u>Deliberation of the sub-Committee:</u>

M/s GE requested SLDC, Arunachal Pradesh to complete the cable laying and upon intimation, supply of MFT, CMRS & its integration of bays in RTUs shall be taken up with M/s GE separately.

The Sub-Committee noted as above.

Action: SLDC, Arunachal Pradesh & M/s GE.

A.14 <u>Restoration of OPGW owned by Manipur</u>

It has been noticed that seven stations i.e., 400 kV Thoubal, 132 kV Chandel, 132 Kv Churachandpur, 132 kV Hundung, 132 kV Kakching, 132 kV Kongba and 132 kV Yiangangpokpi of Manipur are not reporting due to outage of following OPGW links:

a) 132 kV Churachandpur – Ningthoukhong since 08th June 2023
b) 132 kV Yurembam (Imphal) – Yiangangpokpi since 16th September 2023

Manipur is requested to restore the OPGW for the mentioned links at the earliest.

<u>Deliberation of the sub-Committee:</u>

NERPC informed the forum that SLDC Manipur has submitted the following via email:

a) OPGW restoration of 132 kV Churachandpur – Ningthoukhong could not be carried out due to prevailing law and order issues in the state. State could not convey the date for restoration.
b) 132 kV Yurembam (Imphal) – Yiangangpokpi: Due to DC charger issue at Yiangangpokpi, FOTE is not powered up. The issue will be rectified by 14th October 2023.

The Sub-Committee noted as above.

Action: SLDC, Manipur.

A.15 <u>Laying of new OPGW on existing MePTCL transmission lines by replacing the old ULDC fibers</u>

During the Special NETeST Sub Group Meeting held on 31st May, 2023, CTU had informed the forum that as per latest recommendation by CEA, the first right to lay new OPGW in existing transmission lines is with the owner of the line itself. However, should the owner refuse this right, then CTU may give the work to other TSPs.

MePTCL was advised to put up the matter as an agenda item in the next NETeST meeting for laying new OPGW by replacing the old ULDC fibers as they have completed its useful life (15 years as per CERC tariff order).

<u>Deliberation of the sub-Committee:</u>

MePTCL informed the forum that they desire to BOO (Build – Own – Operate) the OPGW in their Transmission lines. POWERGRID – ULDC informed the forum that NEHU – Khlehriat link has been laid in ULDC Phase 1. They are also laying a 12F link from T23 of Nehu – Khlehriat to NERLDC. POWERGRID – ULDC also informed that under MW vacation project, a 7.532KM 24F NEHU – T25 link was laid; whereas T25-Mawlyndep – Mustem – Khlehriat link was to done under State reliable scheme. However, as MePTCL has desired to BOO these links, POWERGRID is ready to handover these link to MePTCL on a mutually agreeable date provided maintenance of these links are also undertaken by MePTCL. POWERGRID also informed that due to system constraint, if required, the 7.532KM NEHU – T25 link can be decaped subject to TCC/RPC approval. CTU also informed the forum that the ownership and maintenance accountability of these links has to be established before such proposed transfer. The forum noted as these are policy matters which warrants further detailed deliberation, the forum decided to conduct a separate meeting for the same.

The Sub-Committee noted as above.

Action: POWERGRID-ULDC, MePTCL, CTU & NERPC

A.16 <u>Request for details of payments arising from telecom business towards reduction in POC charges /transmission charges for Meghalaya through utilization of the ULDC OPGW link.</u>

During the Special NETeST Sub Group Meeting held on 31st May, 2023, MePTCL had requested POWERGRID for providing the details of payments arising from telecom business towards reduction in POC charges / transmission charges for Meghalaya through utilization of the ULDC OPGW link. NERTS mentioned that the details would be requested from POWERGRID Corporate office and would be furnished to MePTCL. However, till date, the details are yet to be received.

Deliberation of the sub-Committee:

POWERGRID – ULDC agreed to update the same before the next meeting.

The Sub-Committee noted as above.

Action: POWERGRID-ULDC

A.17 Request for consideration for enhancement of fiber pairs for NEHU-Mawlyndep-Mustem-Khliehriat link up to tower location 25 covered under MW Vacation project.

During the Special NETeST Sub Group Meeting held on 31st May, 2023, MePTCL enquired if the NEHU-Mawlyndep-Mustem-Khliehriat link up to tower location 25 covered under MW Vacation project can be enhanced to 24 pairs (i.e. 48 Fibers) with 12 pairs (i.e. 24 Fibers) exclusively for MW Vacation project and 12 pairs (i.e. 24 Fibers) under MePTCL to cater to its requirements. The members had taken note of the request and accordingly, a separate meeting on this aspect had been convened subsequently. However, due to bad communication network encountered by MePTCL during the said meeting, no discussion could be taken up. As such, a request is once again made for a separate meeting with CTU/POWERGRID to discuss on the above request.

Deliberation of the sub-Committee:

Agenda clubbed & discussed with Agenda A.15

The Sub-Committee noted as above.

A.18 Planning for Transition from SDH-based technology to MPLS-based technology in Communication System of Power Sector

In the 25th NETeST meeting, CTUIL made a brief presentation on MPLS through VC to the forum. After detailed deliberation, the forum decided the all SLDCs shall study the pros & cons for implementing the MPLS technology in its state grid and update the forum in the next NETeST meeting.

Meanwhile, in minutes of 13th NPC meeting held on 5th July 2023 (refer https://cea.nic.in/wpcontent/uploads/nat_power_com/2023/08/Minutes_of_the_13th_Meeting_of_NPC_held_on_05.07.2023_at_Kolkata.pdf), it had been stated to form a Joint Committee (JC) to discuss and recommend upon the MPLS technology for power sector. Some of the major points of 13th NPC meeting related to Joint Committee are as follows –

- Project Monitoring Group of PSDF has already been approved implementation of MPLS TP in place of SDH for Kerala and Tamil Nadu.
- CEA Technical Standards for Communication provides no limitations on usage of MPLS technology in power sector.
- CTUIL and STUs to ascertain the performance of MPLS-TP and IP-MPLS vis-à-vis SDH, particularly in respect of tele-protection requirement.
- Pilot project may be taken up for recommended technology.
- Deploying hybrid FOTE (SDH cum MPLS technology) can also be explored. The same has been incorporated by TANTRANSCO in its "Reliable communication scheme" tender at 38 nos. 230 KV sub stations.
- A draft framework for introduction of MPLS technology in ISTS Communication system may be provided by CTUIL.

At present, no representation is there from NER-States in the aforementioned Joint Committee; however, NERPC and NERLDC are part of it. As various DPRs are getting prepared by NER-states for 90% PSDF funding under State-Reliable communication schemes; hence, members may discuss about whether to include this technology for adoption at this stage or not.

CTUIL is requested to give a brief presentation on the roadmap for implementation of MPLS in PAN India.

Deliberation of the sub-Committee:

CTUIL gave a brief presentation (attached as **Annexure A18(a)** & **Annexure A18(b)**) on MPLS technology and explained the relevant facts associated with it. It was also conveyed that the matter of introducing MPLS in power sector is in a very initial stage and as per instructions from NPC, a joint committee is working on it with representation from NER side through NERPC and NERLDC.

AEGCL requested for its participation in Joint Committee and CTUIL conveyed that it is the member coordinator for the Joint Committee and a nomination request can be given by AEGCL to NPC with copy to CTUIL and NERPC.

NERLDC mentioned that if MPLS technology is getting explored and still some STM-4 to STM-16 replacement is pending, then the same may be put on hold to avoid unnecessary expenditure on old technology. CTUIL conveyed that the existing SDH-based projects need not be put on hold as MPLS is under discussion phase at present with submission of Joint Committee report expected by 31st December 2023. Further, it will be put up in NPC and as per feasibility, it need approval from CERC also before adoption in power sector as per Communication Regulations 2017. Moreover, the SDH-based equipment which have not completed its 15 years of life and functioning properly may not get replaced easily; hence, compatibility of SDH-based equipment with MPLS-based equipment will be ensured with OEMs. Suitability of MPLS-IP Vs MPLS-TP is still not analyzed and the same will be done by Joint Committee by discussions with associated manufacturers.

The matter was deliberated and it was decided that the MPLS technology must be explored to find out associated benefits as well as challenges for depicting its suitability for adoption. The forum requested CTUIL to consider following points for discussion in upcoming Joint Committee meeting on MPLS –

- SDH is a proven and stable technology with 30-40 manufacturers available at present; so, there is very less chance of getting obsolete.
- It should not be a cartel of Router manufacturers to push MPLS in order to make SDH OEMs out of business.
- Packet switching with labels generally involves more latency and on PAN-India data transfer basis it will be even more; hence, its suitability to be re-checked in that manner also.
- In ULDC purposes, dynamic routing in MPLS-IP is not required as our requirements are not as traffic oriented as compared to Telecom players. Static routing through user-defined path is sufficient.
- MPLS-TP has a latency of around 0.02ms as compared to 0.06ms in SDH, but in this routing is static and user-defined.
- Cost of MPLS compared with that of SDH based technology.

CTUIL suggested that most of the technical issues as mentioned above have been already discussed in 1st JC meeting on MPLS held on 19.09.2023. CTUIL further requested the forum to put the agenda for the points that need further deliberation, in upcoming meeting of JC members.

The Sub-Committee noted as above.

Action: CTU, AEGCL, NERLDC & NERPC

A.19 Congestion in ISTS communication network:

The communication networks have STM16 link capacity at most of the places, however few links having STM4 or lesser capacity. There may be few links /nodes the capacity of whom may have been utilized more than 75 percent. The detail of such nodes/links may be intimated by POWERGRID/ Grid-India which are having congestion in terms of traffic/bandwidth so that planning for capacity enhancement of the node/link may be done.

This agenda was deliberated in 25th NETeST meeting held on 25.05.2023 wherein the forum noted the same and advised POWERGRID to identify and regularly update the forum if the capacity of any node/link has been utilized by more than 75%.

POWERGRID may update the links which has been utilized more than 75% capacity.

Deliberation of the sub-Committee:

POWERGRID – ULDC informed the forum that there is no links which has been utilized more than 75% capacity. SLDC ASSAM informed that in order to attain the congestion free network all nodes in the network needs to update to STM-16.

The Sub-Committee noted as above.

Action: CTU

A.20 Compliance for Resource disjoint as per CEA manual of communication planning for power system operation dtd 31.03.2022:

As per CEA manual of communication planning for power system operation dtd 31.03.2022, to ensure redundancy with route diversity, the working path and protection path should be resource disjoint. There may exist Single Points of Failure (SPOF) in network where multiple links are aggregating to single node and failure of such node may result in failure of multiple nodes and thus the Grid visibility. Such nodes in ISTS communication network may be identified and intimated by POWERGID/Grid-India which are SPOF. The redundancy and resource disjoint of such links to be further ensured considering their criticality in system.

This agenda was deliberated in 25th NETeST meeting held on 25.05.2023 wherein the forum advised CTUIL to inform the critical node identified by PGCIL/CTU to the forum.

CTU has identified few SPOF nodes such as Bongaigaon, Melriat, Imphal and Dimapur. POWERGRID may confirm status of redundant FOTE and Power Supply at these nodes.

Further, any other SPOF nodes may be suggested by members.

Deliberation of the sub-Committee:

POWERGRID informed that 1 no. FOTE & 1 no. Power Supply is available at Bongaigaon, Melriat, Imphal and Dimapur. However redundant FOTE and Power Supply at Melriat & Imphal may not be useful as the exiting network utilization is around 10% and 20% respectively. After detailed deliberation, the forum opined that due to space/cost, FOTE level redundancy is not recommended. The forum requested CTU to identify to alternate links/route to these SPOF.

The Sub-Committee noted as above.

Action: CTU

A.21 Additional FOTE at AGC locations

Additional FOTE at all AGC operated generating stations in North Eastern region is required in view of resource disjoint and criticality of AGC operation for grid operation purpose as failure of single equipment may lead to disruption in AGC operation. Further, at many locations redundant ethernet port are not available as per NLDC requirement. The NLDC requirement is as follows:

- 1+1 Ethernet port for main NLDC
- 1+1 Ethernet ports are for backup NLDC

This is to be deliberated for additional FOTE and ports/cards at AGC locations.

Following AGC Locations may be considered for additional FOTE:

a) Kopili – AGC under implementation
b) Khandong – AGC under implementation
c) Kopili Stage 2 – AGC under implementation
d) Kathalguri – AGC under implementation
e) Doyang HEP – AGC under implementation

Deliberations in 4th CPM: GRID-INDIA informed the forum that five nos. of new AGC stations as stated above are planned for implementing the AGC in NE Region as per CERC order and these stations shall be operational for AGC in next three to four months tentatively. Accordingly, FOTE redundancy may also be planned.

POWERGRID shared the FOTE equipment requirement for redundancy as follows via email dated-04/08/23 as below:

- **Kopili** – No
- **Khandong** -No
- **Kopili stage 2** -No (In the said meeting, it is informed that Kopili stage 2 and Khandong are in same premises. Therefore, Kopili stage 2 is considered as Khandong).
- **Kathalguri** – No (At present only 1 SDH is PRESENT. However, 1 no. is upcoming under Kathalguri – Namsai (NERXV)
- **Doyang** – Yes

Accordingly, one FOTE for Doyang-HEP is required for AGC operation.

Deliberation of the sub-Committee:

NERLDC informed the forum that as per CERC Ancillary Regulation, 2022 Subhansiri (Upcoming NHPC Plant), Kameng (NEEPCO) and Palatana (OTPC) also qualifies for AGC implementation. Thus, additional FOTE should be considered for Subhanshiri (Upcoming NHPC Plant), Kameng (NEEPCO), Palatana (OTPC) and Doyang-HEP.

The Sub-Committee noted as above.

Action: CTU

A.22 Connectivity of STU node on fibre in view of AMR.

The meter readings from several locations (mostly STU nodes) (list of location shall be provided by Grid-India) in each region are intermittent and having communication issues as the meters at the state nodes are not having secure & reliable communication links and are operational on public domain communication links like GPRS. It is proposed to provide the connectivity of such nodes on captive OPGW network for receiving the data successfully for AMR purpose.

Grid-India has identified a list of such nodes (list attached as **Annexure A.22**) for each region.

The line length (for the STU nodes as listed in **Annexure A.22**) from STU node to nearest ISTS node may be provided by Grid-India/STU/State constituent along with line name, line ownership so as to prepare a scheme for OPGW laying. Based on the inputs received, the scheme shall be made and put up for approval in NCT.

Deliberations in 4th CPM: CTU explained the requirement of connectivity of STU node with ISTS node on fiber for data reliability for AMR (Automated Meter Reading). POWERGRID informed that for Roing and Namsai stations, Roing - Teju, Teju - Namsai and Namsai - Pasighat are connected on OPGW links. POWERGRID informed that Ziro - Pasighat section shall be completed by Dec'23. POWERGRID also informed that a direct link Kathalgudi - Namsai is also being implemented under TBCB by POWERGRID. Grid-India told that recently OPGW is laid under NERPSIP and OPGW is available on Roing(PG) – Chapakhowa – Rupai – Tinsukia - Mariani(Assam) - Mariani(PG) which can be utilised for the Roing – Teju - Namsai connectivity. POWERGRID told that they will check the said connectivity with their ULDC team and shall try to implement it. In case, POWERGRID faces any issue while implementing the connectivity, it shall put up the agenda in forthcoming NETeST and CTU-CPM meetings.

Grid-India/STU/State constituent to provide input along with line name, line ownership so as to prepare a scheme for OPGW laying as listed in **Annexure A.22.**

Deliberation of the sub-Committee:

After detailed deliberation, the forum requested constituents to provide requisite data to CTUIL so as to prepare a scheme for OPGW laying as listed in **Annexure A.22.**

The Sub-Committee noted as above.

Action: STUs

A.23 Dual reporting of RTU, PMU, VOIP, AGC etc applications on dual channel to RLDC and Back up RLDC

Presently, all the data channels and voice channels are reporting in main and backup mode with a main channel to RLDC and protection channel to Backup RLDC. It is suggested by ERLDC & WRLDC that for increase of redundancy in the system both main and protection channels should report to RLDCs as well as back up to RLDCs in dual mode considering the criticality of real grid operations by the ERLDC.

For discussing the same meetings were held among POWERGRID, Grid-India, CTU and CEA on dated 09/05/23 and 27/06/23. Now, as per discussion in meeting, POWERGRID has to provide the region wise data of additional requirement for equipment/card/port etc in respective FOTE/Gateway/RTU for the implementation of dual redundancy within 21 days.

POWERGRID has submitted the requirement of 3 nos. of FOTE for NTPC BgTPP,Ziro and Loktak as per **Annexure A.23(attached).** However, for Loktak and NTPC BgTPP, FOTE has already been approved by NERPC under redundant FOTE for AGC locations scheme. Hence, only one FOTE for Ziro is required.

For SAS/RTU requirement POWERGRID has to submit the data.

POWERGRID is requested to provide the remaining data.

Deliberations in the 4th CPM: POWERGRID has submitted the requirement of three equipment and one ethernet card for dual redundancy purpose. The list provided from POWERGRID is enclosed for reference. However, this data is only related to FOTE & ethernet cards. Regarding the expansion SAS gateways/ RTUs ports, POWERGRID stated that they are compiling this data as SAS gateways upgradation which are upgradable and SAS gateway for replacement which are not upgradable. Similarly, new procurement of RTUs shall be done where the RTU have lived their life and addition procurement of RTUs where the RTU ports are insufficient. In case malfunctioning occurs in SAS gateways with expansion of ports, as suggested in another region, POWERGRID shall discuss with OEM to resolve the same. POWERGRID to submit the requisite data within a week.

POWERGRID may submit the remaining data along with cost estimate.

Deliberation of the sub-Committee:

After detailed deliberation, the forum requested POWERGRID to furnish the data.

The Sub-Committee noted as above.

Action: POWERGRID.

A.24 Replacement of FO link for "NERLDC Shillong – NEHU", "132 kV Kahilipara – Sarusajai" and "132 kV Kahilipara – Umiam Stg. III – Umiam Stg. I – NEHU".

Grid-India stated that in the 23rd TCC and NERPC meeting, TCC forum recommended for replacement of OPGW with 24 Fiber for NERLDC Shillong – NEHU", "132 kV Kahilipara – Sarusajai" and "132 kV Kahilipara – Umiam Stg. III – Umiam Stg. I – NEHU" after RPC and NCT approval. This proposal for replacement shall be substantiated with test report of fiber healthiness. But test report is not available with Meghalaya SLDC as the links have not been handed over to them by POWERGRID. POWERGRID stated that automatic handing over of the link ownership takes place after completion of fifteen years.

Further deliberations were held regarding ownership and maintenance of the said links.

CTUIL stated that since these links are being used for ISTS data & voice communication and this communication shall be kept intact. In view of this CTU requested POWERGRID to clarify the entity who is maintaining the above said lines.

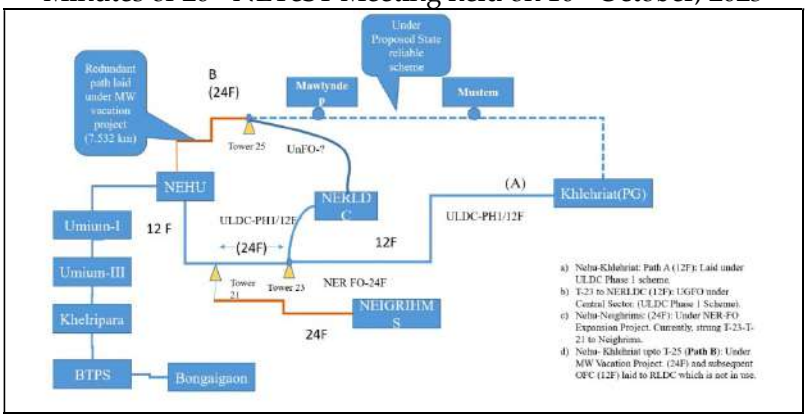
Deliberations in 4th CPM: POWERGRID told that this link contains critical ISTS data and this is the only path for NERLDC connectivity with only 12 Fibers. POWERGRID shared the connectivity diagram of NERLDC (as shown in figure below) and explained the criticality of these links. POWERGRID told that if Meghalaya is ready to maintain and takeover the link they have no issue in handing over these links.

However, GRID-INDIA informed that one of the above links i.e 132 kV Kahilipara – Sarusajai section belongs to Assam which is not vital for NERLDC connectivity and replacement of OPGW on this link shall be considered separately in consultation with Assam. Further, GRID-INDIA stated that 132kV NEHU-Umium-I-Umium -III is critical for Grid operation as most of the NERLDC data and AGC data is being routed through this path. In view of this, GRID-INDIA requested CTU for approval for laying of OPGW on these lines to be obtained from NCT. CTU suggested OPGW replacement on all these links may be carried out by single party considering reliability of backbone connectivity to NERLDC. CTU clarified that for approval of OPGW replacement on these lines under ISTS scheme from NCT, the replacement of OPGW shall be substantiated with test report of fiber healthiness which was asked for in the 23rd TCC and NERPC meeting also.

POWERGRID also intimated that Meghalaya is also implementing OPGW on Khleiriat-NEHU section which provides path redundancy for NERLDC. CTU suggested POWERGRID to check whether 48 Fibers can be laid on the "NERLDC Shillong – NEHU" and "132 kV Kahilipara – Umiam Stg. III – Umiam Stg. I – NEHU" paths so that fibers can be shared for ISTS and STU purposes. CTU requested POWERGRID to provide test-report of fiber healthiness of these links so that further review/approval in NETeST/TCC/NERPC & subsequently NCT may be taken up.

Accordingly, following issues need to be deliberated:

a) POWERGRID to provide test-report of fiber healthiness of above-mentioned links.
b) Whether OPGW on "NERLDC Shillong – NEHU" and "132 kV Kahilipara – Umiam Stg. III – Umiam Stg. I – NEHU" lines to be laid under ISTS by POWERGRID considering the importance of these links for GRID data.
c) Ownership and maintenance for OPGW on above mentioned lines to be clarified.



Connectivity diagram of NERLDC

Deliberation of the sub-Committee:

Agenda clubbed & discussed with Agenda A.15

The Sub-Committee noted as above.

A.25 Signing of LOA for Extension of AMC of SCADA-EMS system:

The AMC of the existing SCADA-EMS system for Meghalaya & Tripura has expired on 31st March 2023. However, GE is yet to sign the LOA which incorporates the GST related amendment made by POWERGRID. In the 25th NETeST meeting, M/s GE had agreed to sign the LOA extension. However, the AMC is yet to be signed for Meghalaya & Tripura. The status of AMC is as summarized below:

SN	Constituents	2 Years AMC Signed	6 Years AMC end date
1	Assam	YES	11-11-2022
2	Meghalaya	NO	31-03-2023
3	Tripura	NO	31-03-2023
4	Manipur		07-11-2023
5	NERLDC		31-01-2024
6	Mizoram		26-04-2024
7	Nagaland		15-01-2025
8	Arunachal Pradesh		28-02-2025

Deliberation of the sub-Committee:

Agenda clubbed & discussed with Agenda A.11 (c)

The Sub-Committee noted as above.

A.26 Outstanding AMC charges of SCADA-EMS:

M/s GE has informed that ₹ 2,03,72,680.38 is pending as outstanding AMC charges of the existing SCADA-EMS system for NER constituents, summarized as follows:

SN	Constituents	Period	Outstanding Amount
1	Manipur	Y5Q1, Y5Q2, Y5Q3, Y5Q4, Y6Q1, Y6Q2	₹ 66,99,025.07
2	Tripura	Y6Q1, Y6Q2, Y6Q3, Y6Q4	₹ 45,05,884.13
3	Mizoram	Y5Q3, Y5Q4, Y6Q1	₹ 34,45,714.35

4	Nagaland	Y5Q1, Y5Q2	₹ 22,97,142.89
5	Assam	Y7Q1, Y7Q2	₹ 22,86,742.69
6	Meghalaya	Y6Q4	₹ 11,38,171.25
Total			₹ 2,03,72,680.38

In the special meeting held on 30-08-2023, SLDCs assured that the payment shall be cleared after the issuance of the amended LOA signing with the states. The forum had advised POWERGRID to prioritize and issue the amended GST calculation at the earliest.

Deliberation of the sub-Committee:

SLDCs to release payment immediately of which GST bills are already submitted and pending for payment. It was agreed to have separate meeting for GST amendment.

The Sub-Committee noted as above.

Action: All state utilities, POWERGRID, M/s GE & NERPC.

A.27 Customer to maintain environmental condition for healthy and longer life of installed HW including APS/VPS:

SLDCs been notified regarding Server/Control/APS room dust free & temperature environment not being maintained as required for healthy and longer life of installed HW including APS/VPS. In case of TSECL SLDC, Server room AC is not working. At SLDC ASSAM, ACDB wiring IS to be reviewed by APS OEM for which shutdown is requested.

Deliberation of the sub-Committee:

The forum noted the same and requested all the SLDCs to ensure and maintain environmental condition for healthy and longer life of installed HW including APS/VPS

The Sub-Committee noted as above.

Action: All SLDCs

A.28 Customer to prepare Database & Display, GE may assist.

SLDC's primary responsibility is to build and maintain database, displays and reports while GE remain available for providing technical assistance. To prepare Database and displays, training was provided during main project execution to every individual SLDC persons, however SLDCs asks GE to prepare Database and displays which is additional activity for GE. If required, SLDCs may send enquiry for additional training on Database & display to GE.

Deliberation of the sub-Committee:

After detailed deliberation the forum noted that Database training is yet to be imparted. SLDCs may discuss separately with M/s GE for Database & display training if they need.

The Sub-Committee noted as above.

Action: All SLDCs & M/s GE

A.29 Recovery of Unified Real Time Dynamic State Measurement" (URTDSM) project phase-II

CERC vide their order in Sept'2013 accorded In-Principle approval for implementation of URTDSM project. Further, vide order in Sept'2016 advised to take up Phase-2 after receiving feedback from POSOCO on Phase-I performance. POWERGRID implemented URTDSM Project Phase-I project with 1419 PMUs and 32 PDCs.

After feedback from POSOSCO in March'21, in the 10th NPC Meeting held in April 2021, a Sub-Committee was constituted under the chairmanship of Member Secretary, WRPC with representatives from POSOCO, CTU, POWERGRID, all RPCs/NPC to finalize the philosophy of PMU locations, new analytics, and requirement of up gradation of Control Centre under URTDSM project phase-II.

The report submitted by the sub-committee was discussed in the 12th NPC meeting held on 17.10.2022. In this meeting, Chairperson CEA suggested that the report be reviewed by all the RPCs for their comments and suggestions. Accordingly, a meeting was held on 15.12.2022 to review the report.

In the 13th NPC meeting held on 05.07.2023, The subcommittee report was accepted and POWERGRID was entrusted to prepare the DPR of URTDSM Phase-II. PSDF funding for URTDSM project phase-II may also be sought subsequently. RPCs were requested to provide full cooperation in preparation of DPR. (MoM attached herewith).

Vide POWERGRID letter ref. CC-GA&C-URTDSM-Phase-II-PMUs, dated 21.07.2023, all constituents were requested to provide inputs for estimating the quantity of PMUs for preparation of DPR for URTDSM Phase-II Project (Letter attached as **Annexure A29(a)**). Reminder was sent on 31.07.2023 via email.

Further, vide letter dated 17.08.2023, All RPCs were requested to issue necessary instructions to get the PMU requirement data (Letter attached as **Annexure A29(b)**).

In the **North-Eastern Region**, till now, PMU quantity requirement is received from NERLDC, Assam and Arunachal Pradesh only. Remaining States are yet to submit their requirement.

List of PMUs given by NERLDC is attached herewith.

NER States are requested to check the same and submit the PMU requirement in the respective states (other than central sector portion) **as per the philosophy finalized by subcommittee for finalization of DPR of URTDSM Project- II**

Deliberation of the sub-Committee:

POWERGRID – ULDC has shared as list of proposed PMU locations along with other relevant details (Letter attached as **Annexure A29(c)**). SLDCs/States were requested to update the same.

The Sub-Committee noted as above.

Action: All SLDCs.

A.30 UNMS:

For installation of UNMS equipment, required space has been allotted by TSECL at Tripura SLDC Control room by rearranging the existing equipment in the panel & server room on urgent basis for immediate commissioning along with supply as there is severe space constraints. This has been agreed by the Sterlite before delivery of materials.

However, Sterlite has dumped in insecure way the supplied UNMS materials in the middle of the panel room which is causing inconvenience to carry out day to day maintenance activities by TSECL & Powergrid Telecom.

In the 25th NETeST meeting POWERGRID informed that hardware/furniture has been supplied at site & installation team along with the project in charge shall be deployed at site by 1st week of June, 2023. However, commissioning activities are pending from Powergrid side and equipments are lying idle.

Deliberation of the sub-Committee:

PGCIL informed that work has already been completed in last month. The forum noted the absence of representative from SLDC, Tripura.

The Sub-Committee noted as above.

A.31 Revival of Non-reporting GPRS based Telemetry link:

Delay in the commissioning of OPGW communication links under NERPSIP is hampering real-time telemetry data availability.

Nodal Powergrid is requested to take up the matter with PMAS (Supplier, Installation & commissioning) agency for revival of Non-reporting RTU stations under the GPRS

based RTU data telemetry scheme as the OPGW communication links under NERPSIP is getting much delayed. This is very essential to increase the telemetry data availability of Tripura.

In the 25th NETeST meeting the forum requested POWERGRID to take up the issue with the vendor.

Deliberation of the sub-Committee:

The forum noted the absence of representative from SLDC, Tripura.

The Sub-Committee noted as above.

A.32 Establishment of redundant fibre path between NERLDC and NEHU for reliability of power system communication link till RLDC.

On 05-01-2023 and 06-01-2023, there were two incident of fibre cut between NERLDC and NEHU, during the incident all communications links, such as internet, all ULDC links of ICCP, URTDSM, VOIP, RTUs and all POWERTEL links catering the functionality of NERLDC real time system were affected. Consequently, NERLDC control room was not having any data of grid station which led RLDC to operate grid blindly. Due to outage of this link SLDC and NLDC were also not able to receive data from NERLDC. This 24 core fibre currently runs partially as OPGW on 132 kV NEHU-Kheliriat line and partially as UGFO cable. The fibre is under the ownership of POWERTEL & ULDC has been allotted some pair of fibres from it.

Considering the critical functions of LDCs, it is requested to ULDC-POWERGRID to lay 24 core FIBRE between NERLDC Shillong and NEHU, which should be in physically different path to that of POWERTEL fibre and complete ownership of new fibre should be with ULDC-POWERGRID.

During 24th NETeST Meeting, the forum requested NERTS to include this link in the reliable communication project as this is a very important link in the ULDC network under the head of central sector links. Further, Member Secretary, NERPC suggested the forum to carry out a separate meeting between MePTCL, POWERGRID-ULDC, POWERTEL, NERLDC and NERPC to discuss the issues raised by MePTCL regarding Powertel link.

During 25th NETeST meeting, as per request of the forum ULDC-POWERGRID agreed to lay 24 core UG FIBRE between NERLDC Shillong and 132kV NEHU-Kheliriat line- I Tower no.25 under Reliable Communication Scheme.

Deliberation of the sub-Committee:

Agenda clubbed & discussed with Agenda A.15

The Sub-Committee noted as above.

A.33 <u>Deployment of new Remote Terminal Units (RTUs) in selected substations of NER</u>

The Detailed Project Reports (DPRs) for deployment of RTUs in selected stations under ownership of state-utilities in NER were submitted for PSDF funding. The cost-details in respective DPRs are – Arunachal Pradesh: ₹ 34.55 Crores; Assam: ₹ 9.104 Crores; Manipur: ₹ 0.828 Crores; Meghalaya: ₹ 5.517 Crores; Mizoram: ₹ 3.862 Crores; Nagaland: ₹ 12.139 Crores.

SLDCs were requested to provide inputs such as requirements of MDEM, OLTC Transducers, Analog/Digital Cards, Multifunction transducers, Time Synchronization Units, DC to AC Convertors, etc. so that the quantity in BoQ can be finalized and budgetary quotation can be taken based on it. A template for populating these inputs was shared with SLDCs on 24th February 2022. All state-utilities are requested to populate the data in the shared template so that BoQ and Cost-Estimate can be prepared for the DPR.

In 74th Techno-Economic Sub-Group Meeting held on 17th March 2023, various queries were raised on the DPRs and it was recorded in MoM that – ***"It was decided that the observations of TESG may be communicated to the entities for the proposals (382 to 387) and will be examined after receipt of the complete inputs. TESG also suggested entities not to include 33/11 kV substation and under construction Substation in the scope of work. Entities agreed for the same. NLDC is requested to communicate the above decision to the entities."***

State-Utilities may please confirm whether the reply to queries of TESG has been submitted from their side and in case of any issues, the same may be discussed in NETeST forum, if required.

An email dated 24-Feb-2022 was initially sent to all state utilities along with a template to fill the station-wise details required for RTUs. A reminder e-mail from NERLDC side was shared on 16-May-2023 to al state-utilities but till date, only some details from Meghalaya-SLDC (20th May 2022), Manipur-SLDC (07th November 2022), Nagaland-SLDC (10th November 2022) and Mizoram-SLDC (14th November 2022) have been received. Further, it is requested from all state to fill up details in coordination with Station In-Charges.

<u>Deliberation of the sub-Committee:</u>

The forum noted that PSDF's Techno economic Sub Group (TESG) has raised queries on the DPRs of RTUs submitted by SLDCs in NER for PSDF funding. In this regard, replies are yet to be filed by SLDCs. The matter was further deliberated and it was decided with consent of all present state-utilities members that current DPRs will be taken back by SLDCs. Subsequently, SLDCs will review the list of stations again (66kV level and above) for RTUs deployment and merge respective DPR under its "State Reliable Communication Scheme" (which can include OPGW, End Equipment, RTUs & Any other associated equipment required for communication) for 90% PSDF funding. Balance 10% funding will be from state-utility side.

The Sub-Committee noted as above.

Action: All SLDCs & NERLDC.

A.34 Restoration of Channel 1 of PLCC for 400 kV Silchar-Palatana 1 line at Palatana end by PGCIL.

400kV Line 1 tripped on 26.05.23 due to Phase B to Earth and line tripped on Z-II protection, however fault was cleared within 350 ms and AR should have been attempted on sensing carrier signal from SILCHAR, before tripping on Z-II protection. No AR attempt was observed. Further, No carrier signal was received at OTPC end as a result no carrier aided tripping/No AR attempt was made.

To check healthiness of 400kV Line 1 carrier signals, opportunity shutdown of 400kV Line 1 on 15.06.23 was utilized & OTPC with POWERGRID, Silchar checked healthiness of PLCC system of 400kV Line 1 at both ends.

The Areva Make PLCC Panel for CH 1, Silchar-Palatana Line 1 was checked visually. There is no alarm present & power supply is healthy. But all the counters are showing as "0" for both Receive and Send Signals. Subsequently, Level measurement was done on 20.07.2023 and readings attached. PGCIL was to take action regarding rectification of 400kV Palatana-Silchar Line 1 PLCC Channel 1.

Deliberation of the sub-Committee:

After detailed deliberation, the forum requested POWERGRID ULDC/AM to look into the matter.

The Sub-Committee noted as above.

Action: POWERGRID.

A.35 SAMAST Review

M/s PwC & M/s Genus will present a brief overview and work progress of the on-going SAMAST project. However, certain issues are highlighted below for further

deliberation.

State	M/s PwC	M/s Genus
Assam	• Pending payments related to milestone#2 invoice	• Release pending 10% payment: work completed in Assam and Meghalaya and have received approval to go live. release of the remaining 10% balance payment is requested. • Extension: TE for Assam has been approved until March 2024, similar extension process for Meghalaya is requested. • Balance Meter Scope: request to Provide balance location regarding the scope of balance meter installation/ shutdown in both Assam and Meghalaya.
Meghalaya		
Arunachal Pradesh	• Milestone # 1 pending payment Status of first installment of PSDF fund transfer • Readiness of the datacenter site • Revised timeline for completion of the project	• Balance Meter Scope: We have installed 45 out of the 55 meters as per the project requirements. We request information about the location and necessary arrangements for the remaining 10 meters. • Data Center Readiness: We are still awaiting confirmation of data center readiness and prerequisites for deployment. • Time Extension: In order to complete our work, we request a time extension until December 2023.
Manipur	• Pending payment of milestone# 2 and milestone#3 • Timeline for meter data availability for completion of SAT • Revised timeline for completion of the project	• Time Extension: Due to ongoing law and order issues, work in Manipur has been halted for the past five months. We kindly request a time extension until March 2024, to complete the work.
Mizoram	• Pending payment of milestone# 2 and milestone#3 • Timeline for meter data availability for completion of SAT • Revised timeline for completion of the project	• SSL Certificate: There is an issue with the SSL certificate in Mizoram that needs to be resolved. • Time Extension: In order to complete our work, we request a time extension until December 2023.
Nagaland	• Pending payment of milestone#2 and milestone#3 • Go-live date for the project	• Go Live: We have successfully completed all installation and communication work in Nagaland. We kindly request to provide the authorization to go live. • Time Extension: Due to unforeseen circumstances, we require an extension

		until December 2023.
Tripura	• Pending payment of milestone # 3 • Timeline for initiation of MDM and Energy Accounting SAT (at least 50%-meter data for SAT of MDM and EA) • Revised timeline for completion of the project	

Deliberation of the sub-Committee:

M/s PwC has submitted the following:

States	**Milestone**	**Payment Pending (incl tax)**	**Aging as on 11 Oct 2023**	**Remarks**
Assam	Milestone 2	₹ 1,17,36,880	577 days	AEGCL has received the 60% fund from PSDF in July 2023
	Milestone 5	₹ 53,10,000	43 days	Final 10% fund yet to be requested from PSDF
Meghalaya	Milestone 5	₹ 53,10,000	41 days	Final 10% fund yet to be requested from PSDF
Arunachal Pradesh	Milestone 1	₹ 53,10,000	443 days	PSDF 1st installment pending
Manipur	Milestone 2	₹ 1,59,30,000	203 days	PSDF 60% (3rd installment) pending
	Milestone 3	₹ 58,45,671	274 days	PSDF 60% (3rd installment) pending
Mizoram	Milestone 2	₹ 1,59,30,000	198 days	PSDF 60% (3rd installment) pending
	Milestone 3	₹ 53,55,694	274 days	PSDF 60% (3rd installment) pending pending
Nagaland	Milestone 2	₹ 1,59,30,000	155 days	PSDF 60% (3rd installment) pending
	Milestone 3	₹ 53,55,694	236 days	PSDF 60% (3rd installment) pending
Tripura	Milestone 3	₹ 1,59,30,000	155 days	PSDF 20% (2nd installment) pending

M/s Genus has submitted the following:

- Long Due Payment. First 30% advance release of Arunachal and 20% Advance Release of Tripura.
- Software for NERPC II - The software will be supplied by M/s PWC without any financial implication on M/s Genus.
- Arunachal Pradesh - One DCU requirement. DCUs has been installed as per the list of substations provided by Arunachal. Now for one new substation, another DCU is required. There is no provision for quantity escalation in the contract, hence M/s Genus is unable to supply this extra DCU.

NERLDC informed that Follow-up with SLDCs as well as PSDF secretariat is required for ensuring timely release of sanctioned funds. Contact details of Officials in PSDF Secretariat at NLDC are mentioned below:

- Sh. S. Dambhare (Gen. Manager, PSDF-NLDC); 9599119849; suhasd@gridindia.in
- Sh. T. Bheemesh (Manager, PSDF-NLDC); 9599118541; tbheemesh@grid-india.in
- PSDF Secretariat General E-mail IDs: psdf@grid-india.in; nldc.psdf2020@gmail.com

The Sub-Committee noted as above.
Action: All SLDCs.

B. ITEMS FOR STATUS

B.1 Project status of NERPSIP and Arunachal Pradesh Comprehensive Scheme:

POWERGRID is implementing two number of projects as follows –

a) **North Eastern Region Power System Improvement Project (NERPSIP)** for six (06) States (i.e. Assam, Manipur, Meghalaya, Mizoram, Tripura, and Nagaland) for strengthening of the Intra-State Transmission and Distribution Systems.

b) Comprehensive Scheme for strengthening of Transmission & Distribution in Arunachal Pradesh

Deliberation of the sub-Committee:

After detailed deliberation, the forum referred the agenda to the special meeting to be held on 13-10-2023

The Sub-Committee noted as above.

Action: NERPSIP & Comprehensive Arunachal teams of POWERGRID.

B.2 Status of FO works under different projects.

Status as updated in the 26th NETeST meeting:

SN.	Link name	Utilities	As per 26th NETeST
I. Fiber Optic Expansion Projects			
Meghalaya State Sector			
1	132kV NEHU - NEIGRIMS	POWERGRID-NERTS	MS, NERPC suggested to carry out a separate meeting probable next week between NERPC, NERLDC, SLDC Meghalaya, POWERGRID ULDC & POWERTEL to discuss the matter.
Central Sector			
2	400kV Bongaigaon (PG) - 220kV Salakati - 220kV BTPS	POWERGRID-NERTS	• Work is under progress and expected to complete by November 2023.
3	400kV Mirza (Azara) – Byrnihat		
4	400kV Silchar – Palatana		• Stringing completed. • Unhealthy stretch of 25-30 KM requires replacement. • Due to contractual issue, new tender is being floated. Status is to be updated in the 27th NETeST meeting.

SN.	Link name	Utilities	As per 26th NETeST
Manipur State Sector			
5	132kV Imphal (State) – Karong	MSPCL and POWERGRID	▪ MSPCL informed that diversion work is not completed due to RoW issue in the line. MSPCL requested NERTS to lay the OPGW on the existing line and gave permission to carry out the work. ▪ NERTS informed that work has already been completed up to the diversion portion. ▪ Target date for completion of link is **September -2023.**

The Sub-Committee noted as above.

Action: SLDC, Meghalaya, POWERTEL, POWERGRID, NERLDC & NERPC

B.3 Status and details of OPGW projects approved in 17th TCC/RPC meeting:

A. Additional Communication Scheme: Status as per 26th NETeST meeting (attached as **Annexure B3_A**).

The Sub-Committee noted as above.

Action: SLDC, Meghalaya, POWERTEL, POWERGRID, NERLDC & NERPC

B. Reliable Communication Scheme:

a. Replacement of existing fibre: Status as per 26th NETeST is attached as Annexure-***B3_B***.

The Sub-Committee noted as above.

Action: SLDC, Meghalaya, POWERTEL, POWERGRID, NERLDC & NERPC

b. Fibre on new lines: Status as per 26th NETeST is attached as Annexure-***B3_B***.

The Sub-Committee noted as above.

Action: POWERGRID.

B.4 Selected cases of Sub-stations for rectification of corresponding data/communication related issues:

Status as per 25th NETeST.

Utility	Station	Requirement	Status as per 25th NETeST
NEEPCO	Ranganadi HEP	Second Channel via Pare-Chimpu	• NERLDC will share IP parameters to RHEP for early execution of the work. • NEEPCO has taken up the matter with OEM

NERLDC & NEEPCO may update the status

Deliberation of the sub-Committee:

NEEPCO has informed NERLDC has share IP parameters and the same has been shared with OEM, M/s GE. M/s GE shall visit site during the lean hydro season.

The Sub-Committee noted as above.

Action: NEEPCO

B.5 Integration of Dikshi HEP real time data and pending Voice communication:

M/s Devi Energies had earlier informed that due to bandwidth and some technical limitations in VSAT link availed by it, the alternate arrangement for PLCC system has been made which will have provision for speech/data/protection. It was mentioned that installation and commissioning of PLCC will be completed by May 2021.

As per 21st NETeST meeting, NERPC informed the forum that M/s Devi Energies has committed vide e-mail that it will complete the associated works by January-2022. Further, the forum decided that if M/s Devi Energies are not able to complete the work by January-2022, then DoP-Arunachal Pradesh should take strong action against M/s Devi Energies which may include restricting their generation till works are completed.

As per 22nd NETeST meeting, M/s Devi Energies intimated to the forum through e-mail that all associated works will be completed by June 2022.

As per 23rd NETeST meeting, DoP-Arunachal Pradesh informed that PLCC panel at Khupi for the erstwhile 132kV Balipara – Khupi will be shifted to Tenga and one (1) out of the two (2) new panels at Tenga will be shifted to Khupi. Thereafter, PLCC for 132kV Balipara-Tenga and 132kV Tenga-Khupi shall be operational. It was assured that the above works along with data reporting to respective SCADA system shall be completed by Aug'22.

During 24th NETeST meeting, forum requested DoP, Ar. Pradesh to take up the issue with M/s Devi energy and resolve at the earliest as this is very long pending issue.

During 25th NETeST meeting, DoP, Arunachal Pradesh informed that Devi Energies Pvt. Ltd. has purchased PLCC panel for locations Dikhsi, Khupi and Balipara, which are delivered at sites but these PLCC panels are not compatible with PLCC panels present in Khupi and Balipara. Therefore, integration is held up at sites. The forum requested DoP, Arunachal Pradesh to resolve the matter bilaterally with M/s Devi Energies.

Deliberation of the sub-Committee:

The matter could not be updated as Devi Energy was not present in the meeting.

The Sub-Committee noted as above.

Action: Devi Energies and Arunachal Pradesh-SLDC.

B.6 Automatic Generation Control (AGC) in Indian Grid

Station Nam	Background	Status as per 25th NETeST Meeting
BgTPP	Unit-2 needs to be integrated.	Configuration done in all units.
AGBPP (Kathalguri)	OEM visits was envisaged as per following – • Some units are of Mitsubishi make which require team from Japan to visit plant. • Other units are of GE-make and BHEL-make	**Four number of Mitsubishi-make GTs:** • NEEPCO informed the forum that Mitsubishi has submitted the offer for necessary works. NEEPCO has also issued LC to M/s Mitsubishi, which was expired and NEEPCO will extend the LC. Once Mitsubishi confirms the same, they will visit plant to carry out the work. Target for the same will be shared accordingly. **Two number of BHEL & GE-make GTs:** • NEEPCO informed the forum that software and hardware related work of DCS are completed. • Technical specification (TS) for RTU of AGC is under preparation and it will be put under procurement once TS is prepared. • **Target date:** March 2024.
Doyang		• NEEPCO informed that technical

		specification is under preparation for AGC implementation along with SCADA upgrade of station.
Kopili Stage -I	25 MW	▪ AGC is installed at the plant. All software and hardware works are also completed. AGC can be taken into service after all small issues get resolved for re-commissioning. ▪ Action: NEEPCO may update the status.
Kopili	100W	▪ Under renovation AGC system is also getting installed. ▪ One Machine is expected to come into service by July 2023 ▪ Second Machine is expected to come into service by August 2023 ▪ Action: NEEPCO may update the status.
Khandong	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	▪ Action: NEEPCO may update the status.
Kameng	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	▪ Action: NEEPCO may update the status.
Ranganadi (Panyor)	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	▪ Action: NEEPCO may update the status.
Pare	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in	▪ Action: NEEPCO may update the status.

	AGC.	
RC Nagar	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	▪ Action: NEEPCO may update the status.
Palatana	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	▪ **Action:** OTPC may update the status.

Deliberation of the sub-Committee:

Status as updated in the 26th NETeST Meeting

Station Nam	**Background**	**Status as per 26th NETeST Meeting**
BgTPP	Unit-2 needs to be integrated.	Configuration done in all units.
AGBPP (Kathalguri)	OEM visits was envisaged as per following – • Some units are of Mitsubishi make which require team from Japan to visit plant. • Other units are of GE-make and BHEL-make	**Four number of Mitsubishi-make GTs:** • NEEPCO informed the forum that Mitsubishi has submitted the offer for necessary works. NEEPCO has also issued LC to M/s Mitsubishi, which was expired and NEEPCO will extend the LC. Once Mitsubishi confirms the same, they will visit plant to carry out the work. Target for the same will be shared accordingly. **Two number of BHEL & GE-make GTs:** • NEEPCO informed the forum that software and hardware related work of DCS are completed. • Technical specification (TS) for RTU of AGC is under preparation and it will be put under procurement once TS is prepared. • **Target date:** March 2024. • **Mitsubishi Units:** Mitsubishi informed that they will only report site once AGC

		panel for BHEL-GE make GTs are successfully commissioned. • **Two number of BHEL & GE-make GTs:** Technical specification (TS) for RTU of AGC RTU prepared. Tender to be floated within Dec'23.
Doyang		• NEEPCO informed that technical specification is under preparation for AGC implementation along with SCADA upgrade of station. • Preparation of Technical Specification SCADA & AGC is under process. Once completed shall be floated for tendering.
Kopili Stage -I	25 MW	• AGC is installed at the plant. All software and hardware works are also completed. AGC can be taken into service after all small issues get resolved for re-commissioning. • NEEPCO informed that presently the Unit is constantly operating and feeding water to Kopili Power Station. Further to implement AGC coordination with NLDC, RLDC and OEM i.e EDN Bangalore will be required.
Kopili	100W	• Under renovation AGC system is also getting installed. • One Machine is expected to come into service by July 2023 • Second Machine is expected to come into service by August 2023 • Station commissioning will be completed in the month of March'24. AGC shall be implemented after that only.
Khandong	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in	• Plant will be commissioned on July'25. AGC will be commissioned after that only.

	AGC.	
Kameng	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	• In ROR Plant AGC implementation is not possible.
Ranganadi (Panyor)	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	• In ROR Plant AGC implementation is not possible.
Pare	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	• In ROR Plant AGC implementation is not possible.
RC Nagar	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	• Unit size is very small.
Palatana	As per new Ancillary Services Regulation 2022, all ISGS plant will be participating in AGC.	• OTPC requested NERLDC to provide sample DPR, scope of work and other necessary details

The Sub-Committee noted as above.

Action: NEEPCO, OTPC & NERLDC

B.7 <u>Pending issues of State Utilities of NER:</u>

The presentation on telemetry status for the month of September 2023 is attached as **Annexure B7.**

The utility-wise discussion points for telemetry issues are listed in table below.

Utility	**Pending issues**	**Remarks**

Utility	Pending issues	Remarks
Assam	SAS upgradation related works may be updated.	• NERLDC will share the format for compiling the data. • Assam-SLDC will submit the status by June'23 to NERPC and NERLDC. • **Assam-SLDC is requested to provide revise status.**
Tripura	Dhalabil, Dharmanagar	• TSECL requested PGCIL to extend support for restoration of systems over GPRS. NERTS agreed for the same. • Reporting Local RTU = 01 • Reporting under NERFO = 10 • Reporting under NERPSIP = 03 • Yet to report under NERPSIP = 10 (Kamalpur, Satchand, Ambassa, Dharmanagar, Gamaitilla, Belonia, Gournagar, Bagafa, Jirania, Sabroom) • TSECL also requested NERPSIP to complete the links at the earliest.
	Ambassa	
	Sabroom, Satchand	
	13 stations not covered under NER-FO expansion project	
Manipur	Churachandpur, Kongba and Kakching	• MSPCL informed that work is under progress to resolve the issues but the same is hampered due to law-and-order issue in the state. Work will be completed in due time. • **Action:** MSPCL may update the status.
	Elangkhangpokpi, Thanlon, 132kV Thoubal	• MSPCL has proposed the purchase of RTUs under PSDF. • **Action:** MSPCL may update the status.
Nagaland	Kiphire	• Meluri-Kohima line is still under diversion due to road construction work. PLCC is restored, DoP will visit the station to restore the data at the earliest. • **Action:** DoP-Nagaland may update the status.
Mizoram	Luangmual	• PE&D-Mizoram informed that survey for restoration of isolator data has been done and proposal to restore the data will be submitted sooner. • **Action:** DoP-Mizoram may update the status.
	Zuangtui	
	Kolasib	
Arunachal Pradesh	VSAT installation and other issues	**UPS installation for VSAT equipment:** • Purchase order for procurement of UPS has been placed for following locations: Along, Daporijo, Deomali and Pasighat. Same will be installed in due time.

Utility	Pending issues	Remarks
		Long outage of VSAT nodes: • Khupi, Deomali and Bhalukpong are not reporting since last three months. **Non-reporting RTU of Basar:** • 132 kV Basar is not reporting after its FTC since July-2023. **RTU failure at Daporijo:** • DoP, Arunachal Pradesh informed that joint visit with M/s GE is completed at 132 kV Daporijo S/s to investigate the extent of damage to RTU after fire incident. M/s GE is yet to submit the budgetary offer. • M/s GE T&D asked DoP-AR to confirm on submission of Techno-commercial offer. Accordingly, work will be started. • DCPS failure at 132 kV Daporijo S/s: In 25th NETeST meeting, DoP, Arunachal Pradesh informed that they are procuring the DCPS system for the substation. **Power Supply issue at Pasighat:** • 48V to 110V DC Converter is faulty, same has been purchased and issue will be resolved within June'23. DoP, Arunachal is formulating the proposal to buy UPS for each station to cater for the power supply to VSAT equipment. **Action:** DoP-Arunachal Pradesh may update the status.
Meghalaya	Non reporting of stations	• 132 kV Nongstoin, 132 kV Ampati and Ganol SHEP are not reporting. • 220 kV Mawngap is reporting inconsistently.

Deliberation of the sub-Committee:

Status as updated in the 26th NETeST Meeting

Utility	Pending issues	Remarks
Assam	SAS upgradation related works may be updated.	• All SAS upgradation works completed. Telemetry for SAS 132KV Rangia GSS needs some rectification. The same shall be attended shortly.
Tripura	Dhalabil, Ambassa Sabroom, Satchand	• TSECL requested PGCIL to extend support for restoration of systems over GPRS. NERTS agreed for the same.

Utility	Pending issues	Remarks
	13 stations not covered under NER-FO expansion project	• TSECL also requested NERPSIP to complete the links at the earliest. Only Dhalabil reporting.
Manipur	Churachandpur, Kongba and Kakching	• MSPCL informed that work is under progress to resolve the issues but the same is hampered due to law-and-order issue in the state. Work will be completed in due time.
	Elangkhangpokpi, Thanlon, 132kV Thoubal	• MSPCL has proposed the purchase of RTUs under PSDF.
Nagaland	Kiphire	• Meluri-Kohima line is still under diversion due to road construction work. PLCC is restored, DoP will visit the station to restore the data at the earliest.
Mizoram	Luangmual Zuangtui Kolasib	• PE&D-Mizoram informed that survey for restoration of isolator data has been done and proposal to restore the data will be submitted sooner.
Arunachal Pradesh	VSAT installation and other issues	**UPS installation for VSAT equipment:** • Purchase order for procurement of UPS has been placed for following locations: Along, Daporijo, Deomali and Pasighat. Same will be installed in due time. **RTU failure at Daporijo:** • DoP, Arunachal Pradesh informed that joint visit with M/s GE is completed at 132 kV Daporijo S/s to investigate the extent of damage to RTU after fire incident. M/s GE is yet to submit the budgetary offer. • M/s GE T&D asked DoP-AR to confirm on submission of Techno-commercial offer. Accordingly, work will be started. **Power Supply issue at Pasighat:** • 48V to 110V DC Converter is faulty, same has been purchased and issue shall be resolved soon.

The Sub-Committee noted as above.

Action: All SLDCs, NERLDC & NERPC.

B.8 Feasibility to connect Lekhi Substation over Fiber-Optic Network:

POWERGRID-NERTS had earlier requested the forum to divert material of 132kV Surjamani Nagar (TSECL) - Monarchak (NEEPCO) or 132kV Rokhia (GBPP) - Surjamani Nagar (TSECL) to Lekhi station, but NERPC informed that proposal may be

kept on hold as NERPC will take up the matter with TSECL for completion of the above-mentioned links.

As per 22nd NETeST meeting, it was decided that due to delay in line construction of 132kV SM Nagar-Rokhia D/C and 132kV SM Nagar – Monarchak, the OPGW laying activities will be deleted from NER-Fiber Optic Expansion project scope and will be included in NER Reliable communication scheme after getting request-in-writing from TSECL. Thus, end equipment (i.e. FOTE) of 132kV Rokhia station (TSECL) will be diverted to 132kV Lekhi station for terminating the fiber-optic at 132kV Lekhi station subject to confirmation of NERPSIP as equipment are under its ownership.

As per 23rd NETeST meeting, TSECL informed the forum that FOTE installed during NER Fiber-Optic expansion at 132 kV Rokhia is being used for Rokhia – Udaipur direction; thus, FOTE installed at Rokhia cannot be shifted. NERLDC affirmed that FOTE installed under NER Fiber-Optic expansion project is not being used yet and can be shifted to Lekhi sub-station. As new FOTE will be installed during NER reliable communication scheme project. TSECL informed that they will confirm the shifting of Monarchak FOTE to forum by July'22.

During 24th NETeST meeting, PDH equipment is installed already at Lekhi S/s. SDH equipment will also be installed which will be diverted from Monarchak.

During 25th NETeST meeting, POWERGRID informed the forum that SDH equipment has been diverted from Monarchak and the same shall be installed by 15th June, 2023. POWERGRID requested DoP, Arunachal Pradesh to provide space for installation & they have agreed to provide the same. POWERGRID also informed that due to DCPS issue, presently they were using DC convertor. DoP, Arunachal Pradesh agreed to look into the matter.

Deliberation of the sub-Committee:

POWERGRID-ULDC informed the forum that new SDH is proposed under NER Reliable communication scheme.

The Sub-Committee noted as above.

Action: DoP, Arunachal Pradesh & POWERGRID

B.9 Integration of INDIGRID owned OPGW with ULDC network:

Under NER strengthening scheme, Indigrid (erstwhile Sterlite) has constructed following lines along with OPGW –

1. **132 kV R C Nagar – PK Bari (TSECL) D/c:** Will provide additional path between Agartala and PK Bari

2. **400 kV Silchar – Misa D/c:** Will provide additional link between south NER and North NER.
3. **132 kV BNC – Chimpu D/c:** Will provide additional path between Arunachal Pradesh and rest of NER.
4. **132 kV PK Bari (TSECL) – PK Bari (IGT):** Will provide secondary path for Indigrid Stations.

Feasibility to connect the above links with existing ULDC network needs to be explored for which it was requested to POWERGRID-NERTS and Indigrid to explore the possibility of utilization of the link as alternate path.

The status as per 25th NETeST meeting is given in *table* below.

Sl. No.	Description	As per 25th NETeST Meeting
1.	132 kV RC Nagar – PK Bari (TSECL)	▪ Indigrid has integrated the link over GE equipment between PK Bari and RC Nagar. Further, at RC Nagar one attempt was made to integrate ULDC equipment (ECI make) with GE FOTE which was not successful. ▪ PGCIL informed that support of GE engineer is required to take second attempt in which Fibcom equipment will be integrated with GE. ▪ Indigrid and PGCIL are requested to take up the matter and close the matter at earliest.
2.	132 kV PK Bari (TSECL) - PK Bari (IGT)	▪ Link depend on integration of ULDC equipment with GE as described in Sl. No. 1

Deliberation of the sub-Committee:

INDIGRID informed the forum that all the work has been completed. NERLDC also confirmed the same.

The Sub-Committee noted as above.

B.10 Non-reporting of telemetry data of APGCL owned generating stations:

The status of telemetry data of generating stations owned by Assam Power Generation Corporation Limited is summarised in the *table* given below.

Sl. No.	Name of Generating Station	Status of Telemetry data	Remarks
1.	NRPP (Namrup Replacement Power Project)	• All digital and analog data are not reporting for GTG.	For GTG all digital and analog data are not reporting because

Sl. No.	Name of Generating Station	Status of Telemetry data	Remarks
			of the BCU (Bay Control Unit) of GTG bay is not Functioning. It would be attended in next cool shutdown of GTG. Procurement of a new BCU for GTG Bay has already been Initiated. Expected completion on December 2022. **Action:** APGCL and SLDC-Assam may update the status
2.	NTPS (Namrup Thermal Power Station)	• All digital data (CB and Isolators) of units are not reporting reporting wrong status.	**Action:** APGCL and SLDC-Assam may update the status
		• Analog data of Unit 6 is not reporting.	Unit is under shut-down from 22-06-2022. Hence, analog data is not reporting. **Action:** APGCL and SLDC-Assam may update the status.
3.	Langpi Hydro Station	• CB associated with units are not reporting wrong status. • Analog data of unit-2 are not reporting. • CB of SST is reporting wrong value. • Isolators of Bus coupler and Sarusajai line 1 are not reporting. • Analog data of transmission lines and SST are not reporting.	Telemetry work will be completed after completion of the major overhauling work of #2. Target date is 15th May, 2023. **Action:** APGCL and SLDC-Assam may update the status.

In 25th NETeST meeting, SLDC-Assam informed that APGCL is restoring the analog data in phase-1 and will restore digital data in next phase.

Deliberation of the sub-Committee:

The matter could not be updated as APGCL was not present in the meeting.

Action: APGCL.

C. ANY OTHER ITEM:

C.1 AMC of ADMS:

2nd subgroup meeting for procurement of collective AMC of ADMS for NER States was held on 22/08/2023 in Guwahati and the decision taken is reproduced below:

"*... the forum unanimously agreed that availing AMC services from original vendor would ensure smooth and efficient operation & maintenance of the ADMS considering the proprietary nature of the work. It will also save time and energy as opposed to a cumbersome and long tendering process. Hence the forum unanimously decided to consider AMC to Original vendor subject to reduced and competitive/reasonable rate. The forum further decided that States will take approval of the revised offer from their respective management and intimate NERPC so that collective AMC for all the States can be facilitated.*"

In the meeting, other issues including Terms & Conditions for the AMC were also discussed and based on the discussion, the final draft terms & conditions has been circulated by NERPC by email dated 03/10/2023 to all subgroup members for comments and observations (**Annexure-C.1**).

States are requested to intimate the status of their administrative approval for AMC of ADMS. Further, the Terms & Conditions for AMC may also be finalized.

Deliberation of the sub-Committee:

NERPC informed that States may give comments & observation if any on the circulated T&C for the AMC. Forum requested all States to expedite approval from their respective administrative authority so that the AMC for ADMS can be procured on time.

C.2 Hardware model change for Arunachal Pradesh:

M/s PwC informed the forum that as more than 3 years has elapsed bid date & receiving the confirmation from Department of Power, Govt of Arunachal Pradesh. The virtualization server model and database server model offered by Dell (R740) has migrated to R750 and they are no longer offering the second-generation Intel Xeon 5220/5222 processor specified in the tender. The storage NAS NX3240 model proposed in the bid has been discontinued by the OEM. So, in the interest of the project it is proposed to deliver the server model HP DL380 Gen 10 (specification attached as Annexure C.2(a)) and the storage NAS HPE 1660 (specification attached as Annexure C.2(b)).

Deliberation of the sub-Committee:

After detailed deliberation, with the consent of SLDC Arunachal Pradesh, the forum approved the technical changes without any additional financial implication.

The Sub-Committee noted as above.

C.3 Implementation of software modules in NERPC 2-meter installation tender (Elogbook, control room management and Outage management):

Deliberation of the sub-Committee:

After detailed deliberation, it was decided that, the scope for NERPC 2-meter installation will be similar to NERPC 1 project for Assam and Meghalaya.

The Sub-Committee noted as above.

C.4 Procedure on Outage Planning for Communication System:

Regulation 10 of Technical Standards for Communication System in Power System Operations Regulations, 2020 states, "*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*". Accordingly, draft SOP on "Procedure on Outage Planning for Communication System" has been prepared.

In 25th NETeST, the forum agreed for shutdown discussion of communication system along with OCC meeting with respect to the procedure detailed in "Procedure on Outage Planning for Communication System" prepared by NERPC.

At Item E.5 of minutes of 24th TCC/RPC meeting, the procedure was approved/noted by the NERPC forum.

Deliberation of the sub-Committee:

NERLDC informed the forum that even though the procedure is approved by the TCC/RPC forum; it is yet to be followed by utilities. NERPC informed that all the planned outage of communication system will be taken up in sync with Transmission system on monthly basis. NERPC requested all utilities to strictly follow the procedure.

The Sub-Committee noted as above.

Action: All state utilities, ISTS/ISGS Licensee, NERLDC & NERPC.

Date and Venue of next NETeST Meeting

It is proposed to hold the 27th NETeST meeting of NERPC in the month of January 2024. The date & exact venue will be intimated in due course.

Annexure-I

List of Participants in the 26th NETeST Meeting held on 10.10.2023

SN	Name & Designation	Organization	Contact No.
	No Representative	Manipur	
	No Representative	Tripura	
	No Representative	Nagaland	
1	Sh. N.Perme, SE	Ar. Pradesh	-
2	Sh. Abhishek Kalita, DM, AEGCL	Assam	8486213068
3	Sh. Arup Sarmah, AGM, AEGCL	Assam	9707854367
4	Sh. Rupjyoti Das, DM, AEGCL	Assam	9435097009
5	Sh. Nilotpal Bhattacharjee, AGM, AEGCL	Assam	-
6	Sh. C.W.Chen, AEE (C&C)	Meghalaya	9863093311
7	Sh. Y.Iakai, AEE, SLDC	Meghalaya	9402133552
8	Sh. S.W.Khyriem, AEE (CSD)	Meghalaya	8787346704
9	Sh. R.Lalchawisanga, SDO (TC)	Mizoram	7640954240
10	Sh. Amaresh Mallick, CGM(I/c)	NERLDC	9436302720
11	Sh. Gargi Dutta, Chief Manager (Logistics)	NERLDC	9436335231
12	Sh. Sugandh Prasad Barnwal, Sr.GM (Logistics)	NERLDC	9433041812
13	Sh. Paominlal Doungel, Engr (Logistics)	NERLDC	8575778425
14	Sh. Royal Sutnga, Engr (Logistics)	NERLDC	8794107475
15	Sh. Sakaldeep, Asst. Manager (Logistics)	NERLDC	9774528218
16	Sh. Akhil Singhal, Dy. General Manager (Logistics)	NERLDC	9650598187
17	Sh. Kamlesh Baishya, Asst. Mgr (ULDC)	PGCIL	9859723132
18	Sh. Rajendra Dubey, Sr. GM	PGCIL	-
19	Sh. Prasanta Kumar Das, DGM, Comp.Scheme	PGCIL	9436700728
20	Sh. Amit Kr.Verma, Chief Manager, NERPSIP	PGCIL	8894701248
21	Sh. Pranjal Das, AM, NERPSIP	PGCIL	8473811643
22	Sh. Mitangshu Saha, Assistant Manager	OTPC	7085310211
23	Sh. Kaushal Suman, Manager, CTUIL	CTUIL	7042396702
24	Sh. Manoj Gupta	GE, NOIDA	9958095172
25	Sh. Saptarshi Deb, Mgr	GENUS	8420472769
26	Sh. Somajit Mohanty	GENUS	9717688470
27	Sh. Anup Kr. Deb	GENUS	7005723719
28	Sh. Manash Mahanta, Manager	PWC	9954089172
29	Sh. Gourab Bhowmik, Consultant	PWC	6295302377
30	Sh. K.B.Jagtap, Member Secretary	NERPC	9436163419
31	Sh. S.M.Aimol, Director	NERPC	8974002106
32	Sh. Shaishav Ranjan, DD	NERPC	8787892650
33	Sh. Rajib Das, AD-I	NERPC	9954947474

Nomination of Nodal Officers from NERLDC State Utilities – ULDC Phase III (as on 25th Oct'23)

Sl. No.	Name of Power Utility / Organization	Name of Nominated Nodal Officer	Designation	Contact Number	Email ID	Date of receipt of nomination	Meeting Status	MoM Status	Tech Spec Status	BOQ Status	Remarks	Back-up Location
1	Arunachal Pradesh SLDC, Itanagar	Sh. Gyati Atto	Executive Engineer, SLDC	8974351527	eesldcitaap@gmail.com	03rd August 2023	Initial Meeting done on **06th & 07th Sep'23** at Itanagar.	Signed.	Shared for information.	Partially filled and rest under internal review.	Met CE Transmission during the initial meeting.	**Locations:** Namsai, Roing or Pasighat (Not finalized yet)
2	Assam SLDC, Guwahati	Mr. Ashutosh Bhattacharjee	DGM (Logistics),SLDC	9954106916	ashutosh.bhattacharjee@gmail.com; dgmlogistic.sldc@aegcl.co.in	12th September 2023	Initial Meeting done on **14th & 21st Jul'23** at Guwahati.	Signed.	Shared for information.	Under internal discussion process.		**Location 1:** Samaguri **Location 2:** Jorhat (Not finalized yet)
3	Manipur SLDC, Imphal	Ms. Steffi Okram	Manager-SO, SLDC	8974724715	steffiokram@gmail.com	13th July 2023	Initial meeting in online mode done on 6th October 2023.	Signed.	Shared for information.	Under internal discussion process.		**Location 1:** Thoubal
4	Meghalaya SLDC, Shillong	Sh. David J. Lyngdoh; Sh. Y. Iakai	SE-I, MePTCL; AEE (SLDC)	09774285158; 09402133552	david.jeremy6@gmail.com; iakaiyomon@gmail.com	28th September 2023	Initial meeting done on **09th August 2023 & 31st Aug'23.**	Draft prepared and shared for signing.	Shared for information.	Partially filled and rest under internal review.		**Location 1:** Mawphlang **Location 2:** Killing (Not finalized yet)
5	Mizoram SLDC, Aizawl	Sh. H. Lalruatkima	Sr. Executive Engineer, SLDC	9862925462	sldc_mizoram@rediffmail.com	10th July 2023	Initial meetings for BoQ & Technical Specifications done on **16th & 17th Aug'23** at Aizawl.	Signed.	Shared for information.	Partially filled and rest under internal review.	Met Engineer-in-Chief (P&ED-Mizoram) during the Initial Meeting.	**Location 1:** Kolasib **Location 2:** Serchhip (Not finalized yet)
6	Nagaland SLDC, Dimapur	Sh. Rukongutuo Suohu	Superintending Engineer & Head of SLDC	8575000014	rokosuohu@gmail.com	13th July 2023.	Initial meeting done on **31st Aug'23 and 1st Sep'23** at Dimapur.	Draft prepared and shared for signing.	Shared for information.	Partially filled and rest under internal review.	Met Engineer-in-Chief (DoP-Nagaland) and Chief Engineer (Transmission) during the Initial Meeting.	**Location 1:** Zhadima **Location 2:** Kohima (Not finalized yet)
7	Tripura SLDC, Agartala	Sh. Anil Debbarma	Dy. GM & Head of SLDC	9612589250; 9436137225	anildebbarma123@gmail.com	10th August 2023	Initial Meeting done on **13th & 14th Sept'23** at Agartala.	Draft prepared and shared for signing.	Shared for information.	Partially filled and rest under internal review.	Met MD-TSECL and GM-Transmission (TPTL) during the Initial Meeting.	**Location 1:** P.K. Bari

- NER SLDCs have requested for including the **"Video Conferencing (VC) Systems"** and **"Existing RTUs maintenance"** in their BoQ as the same has also been **included in most of the BoQ in bidding documents of ER-ULDC & NR-ULDC** tenders. NERPC is also likely to request for a **"VC system"** under NERLDC BoQ.

Hardware Healthiness Daily Report

Sl. No.	Servers	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	SCADA /EMS Server	DS	2		
2	Identity Server(ID1 & ID2)	ID	2		
3	DTS Server(DT1)	DT	1		
4	CFE Server(FE1 & FE2)	FE	2		
5	ICCP Server(IC1 & IC2)	IC	2		
6	DDS Server(DD1)	DD	1		
7	Centralised Management Server	CM	1		
8	ISR Server(IS1 and IS2)	IS	2		
9	NMS Server(NS1 & NS2)	NS	2		
10	SAN Management Server(SS1 & SS2)	SS	2		
11	SAN Box(SB1 &SB2)	SB	2		
12	NAS Box(NB1 & NB2)	NB	1		
13	Data Replica Server(RD1 & RD2)	RD	2		
14	Web Server	WB	2		
15	Terminal Server	TL	6		

Sl. No.	Switch	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	CFE LAN	CW	2		
2	ICCP LAN	PW	2		
3	Internal DMZ LAN	IW	2		
4	SAN /NAS LAN	BW	2		
5	Server Mnt. Console LAN	MW	2		
6	Data LAN	RW	1		
7	External DMZ LAN	EW	2		

Sl. No.	Routers	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	RTU Router	RR	2		
2	ICCP Router	IR	2		
3	DDS Router	DR	1		
4	ISP Router	SR	1		

Sl. No.	Firewall	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	Internal Firewall	IF	2		
2	External Firewall	EF	2		

Sl. No.	Consoles	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	Operator Console	OC	7		
2	UPS Console	UC	1		
3	Training Console	TC	2		
4	KVM Switch	KW	2		
5	Server Management Console(SC1)	SC	1		
6	Development Console	DC	1		

Sl. No.	Display	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	GPS Clock	CK	1		
2	Time Display	TD	1		
3	Day Display	YD	1		
4	Frequency Display	FD	1		
5	ABT Display	AD	1		

Sl. No.	Printers	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	Multi-functional printer		2		

Sl. No.	VPS	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	based)(8*3)		32		
2	VPS Controller		1		

Sl. No.	Auxillary Power Supply	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	40 kVA (32kW at 0.8 pf) UPS running in parallel		2		
2	VRLA type Battery banks for above UPS (each bank of 76.8 kVAH)		2		
3	Input ACDB (150kVA rating)		1		
4	Output ACDB (100kVA rating)		1		
5	125 kVA DG set		1		
6	80 kVA isolation XFMR		1		

Sl. No.	Video Calling System	Nomenclature	Quantity	Healthy (Yes/No)	Remarks
1	2X2 video wall				
2	Microphone				
3	Camera				
4	VC Remote				

RLDC/SLDC Representative

GE Representative

Software Healthiness Daily Report

Sl. No.	Switch	Healthy (Yes/No)	Remarks
1	SCADA		
2	ICCP Communication		
3	CFE Communication		
4	SOE Viewer		
5	Dispatcher Training Simulator (DTS)		
6	eDNA Trends		
7	Network Management System		
8	Data Historian Software (eDNA)		
9	Data Historian Software (HDR)		
10	Software for SAN and NAS		
11	Report development and Generation		
12	EMS Functions		
13	Web Server Application		
14	Host based IDS for all machines in External DMZ zone		
15	Software for Data Replica server		
16	Software for Centralised Management		
17	Software for Web Server		
18	Anti Virus Software for all machines		
19	External Firewall License		
20	Intermal Firewall License		
21	Servers windows license		
22	Operating console license		

RLDC/SLDC Representative

GE Representative

CYBER SECURITY MEASURES IMPLEMENTATION STATUS FOR NER SLDCs (AS ON 30.09.2023)

SN	Cyber Security Measures	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura
1	Preparation and approval of Cyber Crisis Management Plan (CCMP) for SLDCs	Final CCMP approved by CERT-In. Rev-1 to be issued after incorporation of the comments from CERT-GO.	Final CCMP approved by CERT-In. 3rd Revised version of CCMP issued on 14-09-22 and approved by CERT-In.	Final CCMP approved by CERT-In.	Final CCMP approved by CERT-In. Revision under process.	Final CCMP approved by CERT-In. Revision under process.	Final CCMP approved by CERT-In.	Final CCMP approved by CERT-In.
2	Implementation status of Information Security Management System (ISMS) i.e., ISO 27001 and certification audit for ISO-27001	Contract awarded to a Certifying Agency. Visit planned in the 2nd week of August.	Implemented. Assam SLDC has received certification for ISMS (ISO 27001: 2013) on **09.07.22**. **1st Surveillance Audit** has been carried out in **4th July'23**. Report received and **Certificate of First Surveillance Audit** received on **08.07.2023**.	**LOA issued** to CDAC, Hyderabad on 3rd Nov'21 for Implementation of ISMS (ISO-27001). Work is going on for implementation of ISMS	Implemented. Meghalaya SLDC has received certification for **ISMS (ISO 27001: 2013)** on 08.07.22**. 1st Surveillance Audit** has been carried out in **June'23.** Reports on Internal Assessment and External Assessment audit awaited.	Letter of Intend (LoI) issued on 28/08/2023.	Implemented. Nagaland SLDC has received certification for **ISMS (ISO 27001: 2013)** on **01.06.23.**	Contract has been awarded to Certifying Agency and implementation is in progress. 50% work completed.
3	Status of VA-PT on OT systems	Done for FY 22-23.	Done for FY 22-23.	Done for FY 23-24.	Done for FY 22-23.	Done for FY 23-24.	Done for FY 22-23.	Done for FY 23-24.
	i) Date of Last VA-PT (OT):	24/03/2023- 28/03/2023	17/02/2023 - 21/02/2023	03/04/2023-05/04/2023	09/03/2023- 13/03/2023	04/04/2023- 11/04/2023	20/03/2023- 22/03/2023	19/04/2023- 20/04/2023.
	Submission of latest VA-PT report carried out on OT systems of SLDC for onward submission to MoP		Reports received; under discussion with GE; yet to be shared with MoP			Report not received yet	Reports received and attached (attachment missed in the mail, requested to send again) for onward submission to MoP.	Latest report Submitted to CISO NERLDC
	ii) Due date for Next Audit / Plan for next audit (OT) :	24-03-2024	17-02-2024	03-04-2024	Jan-March 2024	04-04-2024	20-03-2024	19-04-2024
4	Status of VA-PT on IT systems (**to be done once in every six months**)	No IT infrastructure is present in the SLDC. Shall be carried out after implementation of SAMAST and the related IT infrastructure.	Last VAPT completed on **22.02.2023**; reports received. Next VAPT is being planned to be carried out shortly.	Phase -1 of VAPT for IT systems has been completed. Phase-2 was scheduled in June'23; which is still pending due to prevailing situation of unrest in Manipur.	Last VAPT completed in **March-2023**. Reports received and compliance is in process. *(A separate VAPT by CDAC for IT in addition to OT is being envisaged and would be put up to the management for approval)*	Letter of Intend (LoI) issued on 28/08/2023.	VAPT on IT systems done from 24 Aug 2023 to 28 Aug 2023.	Last VAPT completed in **March-2023**; Reports awaited from CDAC

CYBER SECURITY MEASURES IMPLEMENTATION STATUS FOR NER SLDCs (AS ON 30.09.2023)

SN	Cyber Security Measures	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura
5	Notification of identified systems at SLDCs as Critical Information Infrastructure (CII)	Final revised CII document has been submitted to NCIIPC after incorporation of comments on 19.05.2023.	**Identified Systems of SLDC, Assam had been declared as CII by NCIIPC on 10.06.2022.** Notification of CII as **Protected Systems** has been issued by State Govt. **on 11.08.2023**.	Final revised CII document has been submitted to NCIIPC after incorporation of comments on **20.02.2023. Latest clarifications sent to NCIIPC thru' email on 21.07.23.**	**Identified Systems of SLDC, Meghalaya had been declared as CII by NCIIPC on 31.12.2021.** Notification of CII as **Protected Systems** has been issued by State Govt. **on 18.04.2022**.	Final revised CII document had been submitted on **06.06.2022. Forwarded by East Zone and presently under approval at NCIIPC head office in New Delhi.**	**Identified Systems of SLDC, Nagaland had been declared as CII by NCIIPC on 31.12.21.** Notification of CII as **Protected Systems** still pending with the State Govt.	The CII is yet to be approved by NCIIPC. Submitted on 30.09.2023 through email to coord.east@nciipc.gov.in
6	Date of last Risk Assessment by NCIIPC (once in every 2 years):	Not done	Not done	Not done	Not done	Not done	Not done	Not done
7	Compliance of advisories from CERT-In, NCIIPC & other statutory agencies.	Being complied for OT	Being complied	Being complied	Being complied	Being complied	Being complied	Being complied
i	To be updated in Portal for monthly complaince by 10th of every month.	Not updated in the portal	Being Updated in Portal	Being Updated in Portal	Being Updated in Portal	Being Updated in Portal	Being Updated in Portal	Being Updated in Portal
ii	For CERT-In weekly advisories to be complied within 5 days: To be uploaded in the portal after completion.	Being Updated in Portal	Being Updated in Portal	Being Updated in Portal	Being Updated in Portal	Being Updated in Portal	Being Updated in Portal	Being Updated in Portal
ii	Compliance of advisories from Cyber Swachhta Kendra (CSK)	Being Resolved. No new alerts.	Being Resolved. No new alerts.	Being Resolved. No new alerts.	Being Resolved. No new alerts.	Being Resolved. No new alerts.	Being Resolved. No new alerts.	Being Resolved. No new alerts.
8	Compliance of Recommendations of CERT-GO as per SLDC Maturity Model assessment:							
9	Status of Nomination of CISO:	Done	Done	Done	Done	Done	Done	Done
	Alternate CISO (if any):	Nomination of new Alt. CISO is in progress.	Yes	Yes	Yes	Yes	Yes	Yes
10	Cyber Security Certification: (Training attended)	No	Yes. Basic level training and certification on Cyber Security for Power Sector Professionals completed by officials (**2 Officials**) of IT/SCADA department.	Yes. (**2 Officials**)	Yes. (**10 officials** undergone Basic level certification course from NPTI)	Yes (**1 Official** trained in Two Weeks Basic Level Training and Certification Program on Cyber Security)	1 Official trained for Basic Level Certification Course in Sep 2023.	Yes. **1 Official** (Attended by Alternate CISO)
11	IT - OT Integration:	Not present	Present between SAMAST and SCADA	Not present	Not present	Not present	Not present	Not present
12	SOC Implementation status:		Under discussion with Management for consent.		Under discussion with Management. *(However, main concerns are regarding AMC funding and manpower.)*	Under cosideration	Discussed and to consider provided AMC is 100% Funded.	

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. 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 half yearly basis. The detailed report shall be submitted by 15th October for the period April-September and by 15th April for the period October-March 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 half yearly reports, to RPC Secretariat and RLDC, by 15th October for the period April-September and by 15th April for the period October-March of the respective year.
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 to Regulation 13 (iii) of Central Electricity Regulatory Commission (Communication System for inter-State Transmission of electricity) Regulations, 2017. 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 forthe 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 sub-group on priority within the stipulated time period.
10. The sub-group shall also identify the nodes for physical inspection based on the scrutiny of the information.
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 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. The Scope of the physical verification shall include but not limited to thefollowing:
    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 thenodes 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.

17. 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.
18. Communication Audit Checklist points are given in **Annexure-II** and the same are to be thoroughly verified by the Audit team.
19. Expenses towards Lodging, Boarding & Transportation 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.

20. 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

21. RPC secretariat, Communication Sub Group, RLDC and SLDC would monitor the compliance of audit observations as applicable. The Audit outcome and the compliance of Audit recommendations shall be put up to TeST Sub-committee, TCC and RPC for deliberations and further monitoring.
22. 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.

***

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			

8		
9		
10		
11		
12		
13		
14		
15		
16		
17		

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) KHz	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			

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. 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

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 testand 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 Systemshall be available with 1 Common DC Distribution board/ Panels with incoming MCB, coupler MCB , out doing MCBsetc 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 shallbe 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			


WELCOME

Joint-Committee to discuss and recommend on the introduction of MPLS technology in ISTS Communication System

Welcome committee members on the 1st meeting on 19.09.2023

Major Milestones

Activity	Date
Joint- Committee formation Date	24.08.2023
Members Nominated Date*	14.09.2023
Tentative Committee Report (Expected)	31.12.2023

* Nominations from CSPTCL & ERPC yet to be received

TOR of Committee

- Study the feasibility/relevance of SDH technology in upcoming years
- Identify all activities required for transition from SDH to MPLS
- Assess the requirements of communication system for Power Sector Grid Management.
- To roll out methodology for implementation of MPLS in ISTS communication system, if required
- Dovetailing the MPLS network with the legacy SDH network of ISTS and interfacing STU networks, if required
- Formulate the broad specification of MPLS in ISTS communication system, if required
- Any other suggestions/recommendations on related matters.

Agenda Points for First Meeting

- Constraints of the existing SDH based system
- Inputs from the STUs on MPLS network implemented
- Inputs from POWERGRID on POC conducted
- Tele-Protection feasibility over MPLS
- Feasibility of different power system applications over MPLS
- Any other point

Adoption of New Technologies

- **Regulation**
- As per clause 22 of CEA (Technical Standards for Communication System in Power System Operations) Regulations 2020
- *Adoption of new technologies. Plan shall be made for introduction and adoption of new technologies, with the approval of the appropriate Commission or as per the regulations or pursuant to the reforms programme of the appropriate Government.*

Power System Applications/Requirements:

1. SCADA
2. PMU to PDC
3. Tele protection
4. Telecontrol
5. AGC
6. Voice (VoIP)
7. Automated Metering Application (Upcoming)
8. Video conferencing
9. ICCP (between control canters)
10. PDC to PDC
11. Supervision of communications System (NMS/UNMS)
12. Video Surveillance
13. Data Sync between MCC & BCC

Committee Roadmap

Step 1

Assessment of present ISTS communication network

Step 2

Meeting with MPLS OEMs/ Service Providers

Step 3

Deliberation & Finalization of functional requirements of ISTS network for POC of IP/TP MPLS

Step 4

Review of POC, Deliberation & Finalization of Broad Specifications

Step 5

Roll out plan

Step 6

Preparation, Deliberation and Finalization of report

Annexure A18(b)

Introduction of MPLS Technology in Indian Power Sector

Why migrate from SDH?

- End of life of SDH technology, will be obsolete soon, (Last development- 2000).
- SDH is having fixed bandwidth channels for various communication applications and not as per use.
- Bandwidth efficiency is not as high as MPLS.
- SDH OEMs are advising to go for new technologies as globally chip production of SDH equipment is reduced and thus maintenance of SDH equipment is getting difficult.
- Trend in technology change, Globally Power Utilities are migrating from conventional SDH (circuit switching) to MPLS (Packet Switch Network) such as Energinet Denmark, ORES UK, Austin Energy USA etc.
- A platform needed for growth using flexible protocols to support future applications.
- High demand IP packet based applications.

Why go for MPLS?

- Adaptability of Multiple protocol applications obviate the use of protocol converters.
- MPLS is Packet Switch Network technology, no reservation of data bandwidth (BW), high BW efficiency.
- QoS based services.
- Long term availability of spares as new technology.
- Various Class of Service available for different applications data.
- Different services can be mapped in different VPNs through single physical port.
- Supports both L2 and L3 network.
- Higher Cyber Security due to use of VPN, easy deployment of Firewall.

Table: Comparison of Various Technologies

Factors	SDH	IP-MPLS	TP-MPLS
Channel routing	Static user defined	Dynamic network defined	Static user defined
Channel directions	Bidirectional (same To-Fro paths)	Unidirectional (different To-Fro paths)	Bidirectional (same To-Fro paths)
Channel Supervision	End to end	Link wise	End to end
Data channel	Deterministic	Non-deterministic (without special measures)	Nearly deterministic (if network planned properly)
NMS & Control Panel	Same	Different	Same
Resilience (Protection mechanism switching)	<50ms	>50ms	<50ms
Latency	0.06ms	> 0.06 ms	0.02ms
Bandwidth efficiency	Fixed BW	Efficient	Efficient
CoS choice	same class of service,	Multiple Choice for different application	Pre defined choice can be made for different application.
QoS	Determined by BER	Determined by Packet loss	Determined by Packet loss

Present ISTS Communication Network

- Approx 65000 Km of OPGW.
- Approx 750 ISTS Nodes.
- SDH based network – Capacity STM-1 / 4/ 16.
- As per CERC Tariff Regulation, life of SDH equipment is 15 Yrs.

Present Power System Applications

i. SCADA
ii. PMU
iii. Tele protection
iv. Telecontrol
v. AGC
vi. Voice
vii. Automated Metering Application
viii. Video conferencing
ix. ICCP (between control centers)
x. Station to PDC
xi. PDC to PDC
xii. Supervision of communications System
xiii. Video Surveillance
xiv. Data Sync between MCC & BCC

Options of Migration to MPLS:

- New Nodes / replacement of SDH nodes completing its useful life to be provided with suitable MPLS equipment at the node, intervening path and respective RLDC.
- Integration of MPLS equipment with the existing SDH system at nodes and respective RLDC .
- 2 technologies are available MPLS TP / IP.

Challenges in Migration to MPLS:

- Adopting MPLS TP / IP / Hybrid wrt ISTS System functional requirements esp. latency.
- Dovetailing of MPLS-TP/IP with legacy SDH network at full existing capacity.
- Seamless integration of MPLS with its various technologies viz TP / IP/ Hybrid.
- Optimization of existing repeaters (Locations) for the MPLS Network. MPLS network may require more repeaters as compared to legacy SDH network and may not be able to support single hop of upto 200-225 km.
- Latency of MPLS network needs to be designed for meeting the voice & data communication as per CEA Technical Standards 2020.
- MPLS may not support as many directions as supported in SDH network.
- Compatibility of different MPLS networks for providing centralized supervision.

Adoption of New Technologies

Regulation

As per clause 22 of CEA (Technical Standards for Communication System in Power System Operations) Regulations 2020

Adoption of new technologies. Plan shall be made for introduction and adoption of new technologies, with the approval of the appropriate Commission or as per the regulations or pursuant to the reforms programme of the appropriate Government.

Thank You

Sl. No.	Region	Utility	Substation/Generating plant	Nos. of meters	Fiber Optic Comunication available at substation (Yes-Dual Path; Yes-Single Path/ NA)	Remarks, if any	Automatic Meter Reading (AMR) Data Available (Yes/ No)	AMR Communication through Fiber Optic/ GPRS/ NA	Remark	Nearest ISTS node	Name of line available with voltage level between ISTS and STU node	Distance between ISTS and STU node (line length)	Ownership of line
4	North East	NEEPCO	Kameng	13	*NA*	Single path via Balipara is in progress. Second path via Khupi-Tenga-Balipara is under progress.	No	*NA*					
5	North East	NEEPCO	Khandong	18	NA	Path cannot be determined as plant is under rennovation after flooding incident	No	NA	***2 nos. of meters added***				
6	North East	NEEPCO	Kopili	15	*NA*	Path cannot be determined as plant is under rennovation after flooding incident	No	*NA*					
7	North East	NEEPCO	Kopili-2	4	*NA*	Path cannot be determined as plant is under rennovation after flooding incident	No	*NA*					
14	North East	Arunachal Pradesh	Deomali	1	*NA*	Single path via Kathalguri is in progress.	No	*NA*					
16	North East	Arunachal Pradesh	Tenga	2	*NA*	--	No	*NA*					
19	North East	Assam	Umrangshu	2	*NA*	--	No	*NA*					
20	North East	Assam	Pavoi	2	*NA*	--	No	*NA*					
22	North East	Assam	Karimganj	2	*NA*	Single path via Badarpur/Kumarghat is in progress.	No	*NA*					
23	North East	Assam	Haflong	1	*NA*	--	No	*NA*					
27	North East	Assam	Dullavcherra	1	*NA*	--	No	*NA*					
30	North East	Assam	Bokajan	1	*NA*	--	No	*NA*					
36	North East	Assam	Hailakandi	2	*NA*	--	No	*NA*					
37	North East	Assam	Golaghat	1	*NA*	--	No	*NA*					
41	North East	Manipur	Karong	1	*NA*	--	No	*NA*					
45	North East	Manipur	Tipaimukh	2	*NA*		No	NA	***New entry***				
51	North East	Meghalaya	Byrnihat	4	*NA*	--	No	*NA*					
63	North East	Tripura	Dharmanagar	1	*NA*	--	No	*NA*					
65	North East	Tripura	Ambassa	1	*NA*	--	No	*NA*					
82	North East	POWERGRID	Namsai	3	*NA*	VSAT Available	No	*NA*					
83	North East	POWERGRID	Roing	2	*NA*	VSAT Available	No	*NA*					

Summary					
		Required no. of Ethernet card (Minimum 8 port)	Required no. of SDH with minimum 8 no. of ethernet port	Required no. of Ethernet card (Minimum 2 port) in the existing RTU	Required no. of Ethernet card (Minimum 2 port) in existing SAS/Gateway#
NR		33	46		
NER		1	3		
WR	**WR1**	11	5		
	WR2	15	0	1	38
SR	**SR1**	8	1	8	26
	SR2	31	1	13	50
ER		Data shall be shared later.	Data shall be shared later.		
Total		**99**	**56**	**22**	**114**
Note:					

1.The existing GATEWAYs have already reached maximum ports utilization. Addition of additional ports will require upgradation of software / firmware and licences if any required

2.Also, the gateways may hang due to increase in number of ports.

Availablity of additional requirement of RTU/SAS/SDH/ethernet port at substation for dual redundancy of channels at Main and Back up RLDC										
				Required no. of ethernet port **addtionally*** service wise						
Region	**Name of Substation**	**RTU/SAS**		**2 no. for SCADA Service**	**1 no. for PMU**	**1 no. for VOIP**	**2 no. for AGC**	**If No, Please mention requirement of SDH/Ethernet card**	Required no. of Ethernet card (Minimum 8 port)	Required no. of SDH with minimum 8 no. of ethernet port
		Are 4 no. of ethernet port available in existing RTU/SAS?	**If no, please mention requirement of RTU/SAS/Ethernet card.**							
NER	Aizawl	Yes /No		YES	NA	YES	NA			
	Agartala (RC Nagar)			YES	NA	YES	NA			
	Badarpur			YES	NA	YES	NA			
	Balipara			YES	YES	YES	NA			
	BNC HVDC			YES	YES	YES	NA			
	Bongaigaon			YES	YES	YES	NA			
	NTPC BgTPP			YES	NA	YES	NO	1. Additional card required in existing SDH. 2. Backup SDH is also required.	1	1
	Dimapur			YES	YES	YES	NA			
	Doyang			YES	NA	YES	NA			
	Haflong			YES	NA	YES	NA			
	Imphal			YES	NA	YES	NA			
	Itanagar (Nirjuli)			YES	NA	YES	NA			
	Jiribam			YES	NA	YES	NA			
	Kathalguri			YES	NA	YES	YES			
	Khandong			YES	NA	YES	YES			
	Khleiriat			YES	NA	YES	NA			
	Kameng			YES	NA	YES	NA	DATA & Voice currently on PLCC		
	Kumarghat			YES	NA	YES	NA			
	Loktak			YES	NA	YES	YES	Backup SDH is required.		1
	Mariani			YES	YES	YES	NA			
	Melriat			YES	NA	YES	NA			
	Misa			YES	YES	YES	NA			
	Mokokchung			YES	NA	YES	NA			
	Namsai			NO	NA	NO	NA	Link is through VSAT.VOIP & redundant path for data will be available after completion of OPGW work.		
	New Kohima							Not under POWERGRID scope		
	Palatana			YES	NA	YES	NA			
	Pare			YES	NA	YES	NA			
	PK Bari							Not under POWERGRID scope		
	Ranaganadi			YES	YES	YES	NA			
	Roing			NO	NA	NO	NA	Link is through VSAT.VOIP & redundant path for data will be available after completion of OPGW work.		
	Salakati			YES	YES	YES	NA			
	Silchar			YES	YES	YES	NA			
	SM Nagar							Not under POWERGRID scope		
	Tezu			YES	NA	YES	NA	Link is through VSAT.VOIP & redundant path for data will be available after completion of OPGW work.		
	Ziro			YES	NA	YES	NA	Backup SDH is required.		1
								Total	1	3

Availability of additional requirement of SDH/ethernet port at Control Centre for dual redundancy of channels at Main and Back up RLDC

Required no. of ethernet port addtionally* service wise

Name of Control centre	2 no. for SCADA Service	1 no. for PMU	1 no. for VOIP	2 no. for AGC	2 no. for ICCP	1 no. for PDC	If No, Please mention requirement of SDH/Ethernet card	Please mention BW congestion in the link till control centre, if any	Required no. of Ethernet card (Minimum 8 port)	Required no. of SDH with minimum 8 no. of ethernet port
Main RLDC	Yes	Yes	Yes	Yes	Yes	Yes			0	0
Back up RLDC	Yes	Yes	Yes	Yes	Yes	Yes			0	0
Main SLDC	NA	NA	NA	NA	NA	NA				
Back up SLDC	NA	NA	NA	NA	NA	NA				
							Total		0	0

* Additionally required ethernet port over and above existing capacity.

Annexure A29(a)

पावरग्रिड POWERGRID
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

Ref: CC-GA&C-URTDSM-Phase-II-PMUs **21st July'2023**

To
(As per Distribution List)

Subject: - Unified Real Time Dynamic State Measurement System (URTDSM) Phase-II Project

Dear Sir/Madam,

In the 13th NPC meeting held on 05.07.2023 at Kolkata, POWERGRID is entrusted to prepare a Detailed Project Report (DPR) for "Unified Real Time Dynamic State Measurement" (URTDSM) Phase-II Project within 3 months. This project shall cover installation of PMUs, new analytics, and up gradation of Control Centers.

The placement of PMUs under Phase-II shall be as per the recommendation of the Sub-committee brought out in report dated 14.10.2022. In addition to the existing substations, it is proposed to consider the PMU requirements for upcoming substations in the time frame of next 3 years (by Dec 2026). Also, the availability of existing FO communication network or the network under planning shall be required (either existing or coming up within 3 years).

In view of the above, it is requested to provide the number of PMUs required in each State & Region (SLDC wise/entity wise/Substation wise) as per the PMU placement criteria at **Annexure-I**, within **two weeks**, by 04.08.2023.

Thanking You.

Yours faithfully,

सुनीता

Dr Sunita Chohan
(Chief General Manager, GA&C)

Distribution List:

1. Executive Directors - NLDC, 5 RLDCs of GRID-INDIA
2. Chief Engineers of State Load Dispatch Centers (SLDCs) in all Regions

Copy for kind information to:

3. Ms. Rishika Sharan, Chief Engineer & Member Secretary, National Power Committee, CEA, New Delhi
4. Member Secretary – NRPC/ERPC/NERPC/SRPC/WRPC
5. Executive Director, GA&C Dept, POWERGRID.

Annexure-I

S No	Minimum Criteria of PMU Locations for URTDSM Phase-II
1	At one end of all 400 kV and above transmission lines
2	At the HV side of all ICTs connected to 220 kV and above
3	On HV side of coupling transformer of SVC/STATCOM for measurement of HV Bus voltage and current of coupling transformer
4	At one end of line wherever FSC/ TCSC are installed.
5	On HV side of converter transformers for measuring HVAC bus voltage and current of converter transformer on each converter station.
6	On both ends of Inter-regional and trans-national tie lines and on boundary buses for such lines
7	At the Generating Transformers (GTs) at LV side (having HV side of 220kV and above) of the Generating units with capacity above 200 MW for Thermal units, 50 MW for Hydro units and 100 MW for Gas units.
8	On all 220kV substations for measuring voltage of 220 kV bus and current of two lines/transformer catering to load centers.
9	All 132 kV and above ISTS lines in NER & Sikkim and important load centers
10	At RE developer end of the evacuating line connecting the Renewable Energy Pooling Stations (PS) to point of interconnection with the grid of 50MW and above.
11	Islanding, Separating & Restoration Points- At one end of line which is connected to black start stations along with circuit breaker status via synchro phasors.
12	Fiber Optic should be covered under Phase – II for all the above locations of the URTDSM project.
13	At all ICTs, Bus reactors, Switchable line reactors of critical substations.

पावरग्रिड POWERGRID
पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

Ref: CC-GA&C-URTDSM-Phase-II-PMUs

17th Aug'2023

To
Member Secretary – All Regional Power Committees
(As per Distribution List)

Subject: - Unified Real Time Dynamic State Measurement System (URTDSM) Phase-II Project – Inputs for DPR

Dear Sir/Madam,

As you are aware, POWERGRID has been entrusted to prepare the DPR for URTDSM Phase-II project in the 13th NPC meeting held on 05.07.2023. The DPR is to be prepared within 3 months.
We have vide our letter ref. CC-GA&C-URTDSM-Phase-II-PMUs, dated 21.07.2023, requested the various constituents to provide inputs for estimating the quantity of PMUs for preparation of DPR for URTDSM Phase-II Project.

The letter was addressed to all SLDCs/RLDCs/NLDC in each State/Region. So far, the inputs have been received from 7 out of 34 SLDCs/RLDCs across India. The details of Constituents from whom the inputs have been received is attached at **Annexure-I**.

It is requested to issue necessary instructions to all the SLDCs/RLDCs in respective regions, to submit the PMU quantity for preparation of DPR for URTDSM Phase-II.

Thanking You.

Yours faithfully,

Dr Sunita Chohan
(Chief General Manager, GA&C)

Distribution List:

1. Member Secretary – NRPC/ERPC/NERPC/SRPC/WRPC

Copy for kind information to:

2. Ms. Rishika Sharan, Chief Engineer & Member Secretary, National Power Committee, CEA, New Delhi
3. Executive Director, GA&C Dept, POWERGRID.

Annexure-I

URTDSM Phase-II PMU Quantity Requirement status			
S No	**State**	**PMU Quantity requirement submission status**	**Submitted vide Letter/Email on**
Northern Region			
1	UP (UPPTCL)	Yes	03.08.2023
2	Rajasthan (RVPNL)		
3	HP (HPSLDC)		
4	Uttarakhand (PTCUL)		
5	Haryana (HVPNL)		
6	Delhi (DTL)		
7	J&K (JKPTCL)	Yes	04.08.2023
8	Punjab (PSTCL)		
9	BBMB		
10	NRLDC (Grid-India)		
Southern Region			
1	Andhra Pradesh (APTRANSCO)		
2	Telangana (TSTRANSCO)		
3	Karnataka (KPTCL)	Yes	04.08.2023
4	Tamil Nadu (TANTRANSCO)		
5	Kerala (KSEB)	Yes	11.08.2023
6	SRLDC (Grid-India)	Yes	03.08.2023
Western Region			
1	Maharashtra (MSETCL)		
2	MP (MPPTCL)		
3	Chhattisgarh (CSPTCL)		
4	Gujarat (GETCO)	Yes	02.08.2023
5	WRLDC (Grid-India)		
Eastern Region			
1	West Bengal (WBSETCL)		
2	DVC		
3	Orissa (OPTCL)		
4	Bihar (BSPTCL)		
5	Jharkhand (JUVNL)		
6	Sikkim (Energy & Power Dept)		
7	ERLDC (Grid-India)		
North Eastern Region			
1	Arunachal Pradesh	Yes	04.08.2023
2	Assam		
3	Tripura		
4	Meghalaya		
5	Nagaland		
6	NERLDC (Grid-India)		

Annexure A29(c)

LIST OF PMU Installed in NER

Sl No	SUB-STATION	Total No. of PMUS	Project/ Owner	Make	NO.OF PHYSICAL PMU in particular project	NO.OF vPMU	NO.OF used PMU	Available PMUs	Feeder Name
1	SALAKATI (PG)	3	URTDSM-1	GE	3	6	5	1	1. 220kV BUS 1 2. 220kV BUS 2 3. Alipuduar 1 4. Alipuduar 2 5. BTPS 1
2	KOPILI (NEEPCO)	2	URTDSM-1	GE	2	4	3	1	1. 220kV BUS 1 2. 220kV BUS 2 3. 220kV MISA 3
3	RANGANADI (PG)	1	URTDSM-1	GE	1	2	2	0	1. 400kV BNC-1 2. 400kV BNC-2
4	BALIPARA(PG)	6	URTDSM-1	GE	6	12	12	0	1. 400kV BUS-1 2. 400kV BUS-2 3. 400kV BNC-1 4. 400kV BNC-2 5. 400kV BNC-3 6. 400kV BNC-4 7. 400kV BONGA-1 8. 400kV BONGA-2 9. 400kV BONGA-3 10. 400kV KAMENG-1 11. 400kV MISA -1 12. 400kV MISA -2
5	BONGAIGAON (PG)	6	URTDSM-1	GE	6	12	12	0	1. 400kV BUS-1 2. 400kV BUS-2 3. 400kV BALIP-1 4. 400kV BALIP-2 5. 400kV BALIP-3 6. 400kV BALIP-4 7. 400kV SILCR-1 8. 400kV SILCR-2 9. 400kV AZARA 10. 400kV KILLI 11. 400kV SILG -1 12. 400kV SILG -2
6	SILCHAR(PG)	8	URTDSM-1	GE	4	8	4	4	1. 400kV PALAT-1 2. 400kV PALAT-2 3. 400kV KILLI 4. 400kV AZARA
			NERSS	GE	4	8	4	4	1. 400 kV MISA 1 2. 400 kV MISA - 2 3. 400 kV PK BARI - 1 4. 400 kV PK BARI - 2

Sl No	SUB-STATION	Total No. of PMUS	Project/ Owner	Make	NO.OF PHYSICAL PMU in particular project	NO.OF vPMU	NO.OF used PMU	Available PMUs	Feeder Name
7	DIMAPUR(PG)	5	URTDSM-1	GE	5	10	9	1	1. 132kV BUS 1 2. 132kV BOKAJAN 3. 132kV DIMAP-1 4. 132kV DOYAN-1 5. 132kV DOYAN-2 6. 132kV IMPHAL-1 7. 132kV KOHIM-1 8. 220kV BUS-1 9. 220kV BUS-2
8	BNC(PG)	5	URTDSM-1	GE	4	8	6	2	1. 400kV BALIP-1 2. 400kV BALIP-2 3. 400kV BALIP-3 4. 400kV BALIP-4 5. 400kV RANGA-1 6. 400kV RANGA-2
			Subhashiri Project	GE	1	2	2	0	1. 400 kV Lower Subhanshiri - 1 2. 400 kV Lower Subhanshiri - 2
9	MISA(PG)	11	URTDSM-1	GE	7	14	13	1	1. 400kV BALIP-1 2. 400kV BALIP-2 3. 220kV SAMAG-1 4. 220kV SAMAG-2 5. 220kV MARIA-1 6. 220kV MARIA-2 7. 220kV KOPILI-1 8. 220kV KOPILI-2 9. 220kV KOPILI-3 10. 220kV DIMAP-1 11. 220kV DIMAP-2 12. 220kV BUS-1 13. 220kV BUS-2
			NERSS	GE	4	8	4	4	1. 400 kV MARIANI - 1 2. 400 kV MARIANI LINE 2 3. 400 kV SILCHAR LINE -1 4. 400 kV SILCHAR LINE 2
10	MARIANI (PG)	7	URTDSM-1	GE	3	6	4	2	1. 220kV KATHAL-1 2. 220kV KATHAL-2 3. 220kV MOKOK-1 4. 220kV MOKOK-2
			NERSS	GE	4	8	4	4	1. 400 kV MISA 1 2. 400 kV MISA - 2 3. 400 kV KOHIMA - 1 4. 400 kV KOHIMA - 2
11	MARIANI (ASSAM)	2	URTDSM-1	GE	2	4	4	0	1. 220kV BUS-1 2. 220kV BUS-2 3. 220kV KATHAL-1 4. 220kV MISA -1
12	SAMAGURI (ASSAM)	4	URTDSM-1	GE	4	8	8	0	1. 220kV BUS-1 2. 220kV BUS-2 3. 220kV JAWHRGR 4. 220kV MARIA-1 5. 220kV MISA-1 6. 220kV MISA-2 7. 220kV SONAB-1 8. 220kV SONAB-2

Sl No	SUB-STATION	Total No. of PMUS	Project/ Owner	Make	NO.OF PHYSICAL PMU in particular project	NO.OF vPMU	NO.OF used PMU	Available PMUs	Feeder Name
13	AGIA (ASSAM)	2	URTDSM-1	GE	2	4	4	0	1. 220kV BUS-1 2. 220kV BUS-2 3. 220kV BOKO-1 4. 220kV BTPS-1
14	TINSUKIA(ASSAM)	2	URTDSM-1	GE	2	4	4	0	1. 220kV BUS-1 2. 220kV BUS-2 3. 220kV KATHAL-1 4. 220kV KATHAL-2
15	NEW KOHIMA (KMTL)	2	KMTL	GE	2	4	4	0	1. 400kV IMPHAL-1 2. 400kV IMPHAL-2 3. 400kV MARIA-1 4. 400kV MARIA-2
16	PKBARI (ST)	6	Indigrid	GE	6	12	6	6	1. 400kV SILCHAR-1 2. 400kV SILCHAR-2 3. 400kV SURAJ-1 4. 400kV SURAJ-2 5. 400kV BUS -1 6. 400kV BUS -2
17	SURAJMANINAGAR (ST)	6	Indigrid	GE	6	12	6	6	1. 400kV PALATANA-1 2. 400kV PALATANA-2 3. 400kV PKBARI-1 4. 400kV PKBARI-2 5. 400kV BUS -1 6. 400kV BUS -2
18	North Lakhimpur	2	Mumbai Urja Marg Project (MUML)/Sterlite Power	Siemens	2	2	2	0	1. 132 kV Pare. 2. 132 kV Nirjuli
19	EXISTING MISA	1	WAMS SEL PILOT Project		1	2	2	0	220kV KOPILI-1 220 Kv Dimapur
20	EXISTING BALIPARA	1	WAMS SEL PILOT Project		1	2	2	0	400kV BNC-1 400 kV Bongaiagoan-1
23	EXISTING IMPHAL	1	WAMS SEL PILOT Project		1	2	2	0	132 kV Loktak 132 kV Ningthoukhong
24	EXISTING BADARPUR	1	WAMS SEL PILOT Project		1	2	2	0	132kV KUMRGHR-1 132 kV Kheliriat
TOTAL NO. OF PMU in NER					84	166	130		

URTDSM Phase- II															
Proposed URTDSM Project Phase - II List of Substations under NER for PMU Placements															
					Phasor Quantities to be measured by th PMUs										
SN	Name of Substation	Voltage Level (kV)	No of Feeders	Name of Feeders	3-Phase Voltage Phasors(Vr, Vy, Vb) and Zero Sequence Voltage (V0)	3-Phase CurrentPhasors (Ir, Iy, Ib) and Zero Sequence Current (I0)	Positive Sequence Voltage and Current	Digital Inputs (Dis)	Frequency	ROCOF	Analog Values (MW & MVAR)	Number of PMUs (Considering Two feeders can be monitored In single physical PMU)	OPGW status	Remarks
				Number of Signals	4	4	2	4	1	1	2	0.5		
1	Pare HEP	132	2	132 kV Pare -Ranganadi S/C line & 132 kV Pare - Nirjuli line	8	8	4	8	2	2	4	1	Available	
2	BNC HVDC Node (Converter Transformer Sides)	400	17	To monitor both the pairs of converter Transformer (Y/Δ & Δ/Y types), 400 kV BNC-Subhansri III & IV,400/132 kV ICT I & II, 132 kV BNC-Pavoi D/C, 50 MVAR Line reactor of 400 kV BNC-Lower subansiri I & II, Filter Bank -I, II,III & 80 MVAR BR-I & II	68	68	34	68	17	17	34	9	Available	
3	NRPP	220	9	220 kV Bus-I & II, 220 kV NRPP - Tinsukia D/C line, 132 kV NRPP - Bordubi, 132 kV NRPP - Sonari, 132 kV NRPP - LTPS line & 220/132 kV ICT-I &II	36	36	18	36	9	9	18	5	Available	
4	Lakwa	132	6	132 kV LTPS - Nazira D/C Line, 132 kV LTPS - Mariani, 132 kV LTPS - Moran, 132 kV LTPS - NRPP and 132 kV LTPS - Sonari Line	24	24	12	24	6	6	12	3	Available	
5	New Umtru	132	2	132 kV New Umtru - Umtru & 132 kV New Umtru - EPIP II line	8	8	4	8	2	2	4	1	Available	
6	Leskha	132	2	132 kV Leshka - Khliehriat D/C Line	8	8	4	8	2	2	4	1	Available	
7	Badarpur (PG)	132	7	132 kV Badarpur - Panchgram Line, 132 kV Badarpur - Khliehriat, 132 kV Badarpur - Jiribam (PG), 132 kV Badarpur - Silchar D/C line, 132 kV Badarpur - Kolasib and 132 kV Badarpur - Kumarghat line	28	28	14	28	7	7	14	4	Available	
8	Loktak	132	4	132 kV Loktak - Ningthoukhong, 132 kV Loktak - Imphal, 132 kV Loktak - Rengpang and 132 kV Loktak - Jiribam (PG) line	16	16	8	16	4	4	8	2	Available	
9	Imphal (PG)	400	12	132 kV Imphal(PG) -Imphal (MSPCL) 1, 2 & 3 lines, 132 kV Imphal - Dimapur, 132 kV Imphal - Ningthoukhong line, 400/132 kV ICT I & II, 125 MVAR Bus recator-I, 63 MVAR Line reactor of 400 kV Silchar-Imphal D/C, 80 MVAR Bus reactor & 20 MVAR Bus reactor	48	48	24	64	12	12	24	6	Available	
10	Tuirial	132	1	132 kV Turial - Kolasib line	4	4	2	4	1	1	2	1	Note available. Work under implementation NER reliable Scheme of PGCIL.	

URTDSM Phase- II														
Proposed URTDSM Project Phase - II List of Substations under NER for PMU Placements														
					Phasor Quantities to be measured by th PMUs									
SN	Name of Substation	Voltage Level (kV)	No of Feeders	Name of Feeders	3-Phase Voltage Phasors(Vr, Vy, Vb) and Zero Sequence Voltage (V0)	3-Phase CurrentPhasors (Ir, Iy, Ib) and Zero Sequence Current (I0)	Positive Sequence Voltage and Current	Digital Inputs (Dis)	Frequency	ROCOF	Analog Values (MW & MVAR)	Number of PMUs (Considering Two feeders can be monitored In single physical PMU)	OPGW status	Remarks
11	SM Nagar	132	9	132 kV SM Nagar - Bodhjungnagar, 132 kV SM Nagar - Agartala D/C line, 132 kV SM Nagar - South Comilla (Bangladesh) D/C line, 132 kV Smnagar Bus-I & II, 132 kV Surajmaninagar-Surajmaninagar(ISTS) & 132 kV Palatana-Surajmaninagar	36	36	18	40	9	9	18	5	Available	Islanding scheme
12	Monarchak	132	2	132 kV Monarchak - Rokhia and 132 kV Monarchak - Udaipur line	8	8	4	8	2	2	4	1	Not available. Proposed under NERPSIP.	
13	Rokhia	132	3	132 kV Rokhia - Monarchak and 132 kV Rokhia - Agartala D/C line	12	12	6	12	3	3	6	2	Available	
14	RC Nagar	132	3	132 kV R C Nagar - Agartala D/C line and 132 kV R C Nagar - Kumarghat Line	12	12	6	12	3	3	6	2	Available	For islanding scheme
15	Doyang HEP	132	4	132 kV Doyang - Dimapur (PG) D/C line, 132 kV Doyang - Mokokchung (DoP, Nagaland) line and 132 kV Doyang -Sanis line	16	16	8	16	4	4	8	2	Available	
16	Aizawl	132	6	132 kV Aizawl - Lungmual, 132 kV Aizawl - Kumarghat, 132 kV Aizawl - Kolasib, 132 kV Aizawl - Tipaimukh (MSPCL), 132 kV Aizawl - Melriat (PG) line & 20 MVAR Bus reactor	24	24	12	20	6	6	12	3	Available	
17	Mariani(PG)	400	11	400/220 kV ICT I and II, 220 kV Bus-I & II, 400 kV Misa-Mariani(PG) D/C, 125 MVAR Bus Reactor-I & II, 125 MVAR BR-I & II and 20 MVAR Bus reactor at Mariani(PG)	44	44	22	48	11	11	22	6	Available	For islanding scheme
18	Silchar	400	18	400/132 kV ICT I, II, III, 132 kV Silchar-Srikona D/C, 132 kV Silchar-Hailakand D/C, 132 kV Silchar-Melriat D/C, 400 kV Silchar-Imphal(PG) D/C, 125 MVAR Bus Recator-I, 63 MVAR Bus reactor- I & II, 50 MVAR L/R 400 kV Palatana-Silchar D/C, 63 MVAR L/R of 400 kV Silchar-Azara & 400 kV Silchar-Killing	72	72	36	72	18	18	36	9	Available	
19	Salakati(PG)	220	8	220 kV Salakati-Bongagaon D/C, 220 kV Salakati-BTPS II line, 220/132 kV ICT I, II & III , 132 kV Salakati-Gelephu(both end) and 132 kV Salakati Bus-1	32	32	16	32	8	8	16	4	Available	

URTDSM Phase- II														
Proposed URTDSM Project Phase - II List of Substations under NER for PMU Placements														
					Phasor Quantities to be measured by th PMUs									
SN	Name of Substation	Voltage Level (kV)	No of Feeders	Name of Feeders	3-Phase Voltage Phasors(Vr, Vy, Vb) and Zero Sequence Voltage (V0)	3-Phase CurrentPhasors (Ir, Iy, Ib) and Zero Sequence Current (I0)	Positive Sequence Voltage and Current	Digital Inputs (Dis)	Frequency	ROCOF	Analog Values (MW & MVAR)	Number of PMUs (Considering Two feeders can be monitored In single physical PMU)	OPGW status	Remarks
20	Misa	400	9	400/220 kV ICT I, II, III, 220 kV Misa-Killing D/C, 80 MVAR Line reactor of 400 kV Silchar-Misa I, 80 MVAR Line reactor of 400 kV Silchar-Misa II, 50 MVAR Bus reactor & 80 MVAR Bus reactor	36	36	18	48	9	9	18	5	Available	
21	Kathalguri	220	5	220 kV Bus-I & II, 220kV Kathalguri-Mariani(old), 220 kV Kathalguri-Deomali & 220 kV AGBPP-Mariani(PG)	20	20	10	20	5	5	10	3	Available	For islanding scheme
22	Kopili	220	2	220/132 kV ICT I and II	8	8	4	8	2	2	4	1	Available	
23	Khandong	132	5	132 kV Khandong-Kopili D/C, 132 kV Khandong-Khleihriat D/C & 132 kV Khandong-Umrangshu line	20	20	10	20	5	5	10	3	Available	
24	Jiribam (PG)	132	3	132 kV Jiribam-Tipaimukh, 132 kV Jiribam-Pailapool, 132 kV Jiribam - Jiribam (PG)	12	12	6	8	3	3	6	2	Available	
25	Haflong	132	2	132 kV Haflong-Jiribam(PG) & 132 kV Haflong-Umrangshu	8	8	4	8	2	2	4	1	Available	
26	Balipara	400	11	220 kV Bus-I & II, 400/220 kV ICT I & II, 220/132 kV ICT I & II, 220 kV Balipara-Sonabil D/C, 125 MVAR Bus reactor & 50 MVAR Line reactor of 400 kV Balipara-Bongaigaon I & II	44	44	22	44	11	11	22	6	Available	
27	BGTPP	400	6	220 kV Bus-I & II,400 kV Bongaigaon-BGTPP D/C & 400/220 kV ICT I & II	24	24	12	24	6	6	12	3	Available	
28	BONGAIGAON (PG)	400	12	220 kV Bus-I & II, 400 kV Bongaigaon-Alipurduar D/C & 400/220 kV ICT I & II, 125 MVAR Bus Reactor-I, 50 MVAR BR-I & II, 80 MVAR BR-I & II and 125 MVAR Bus reactor(upcoming)	48	48	24	48	12	12	24	6	Available	
29	Kameng	400	4	400 kV Kameng-Balipara II, 400/132 kV ICT-I, 132kV Kameng-Khupi & 80 MVAR Bus Reactor	16	16	8	16	4	4	8	2	Available	
30	Ziro	132	2	132 kV Ziro-Daporijo, 20 MVAR Bus Reactor	8	8	4	4	2	2	4	1	Available	
31	Ranganadi	400/132	4	400/132 kV ICT-I & II, 132 kV Ranganadi-Ziro & 80 MVAR Bus Reactor	16	16	8	28	4	4	8	2	Available	
32	Roing	132	3	132 kV Roing-Tezu, 132 kV Roing-Pasighat & 20 MVAR Bus reactor	12	12	6	20	3	3	6	2	Available	Islanding scheme
33	Nirjuli	132	2	132 kV Nirjuli - Lekhi & 132 kV Nirjuli-Gohpur	8	8	4	8	2	2	4	1	Available	
34	Azara	400	13	400/220 kV ICT I & II, 220/132 kV ICT I& II, 220 kV Azara-Sarusazai D/C, 220 kV Azara-Boko, 220 kV Bus-I & II, 220 kV Azara - Sarusajai D/C, 220 kV Azara- Agia & 63 MVAR Bus Reactor	52	52	26	52	13	13	26	7	Available	

URTDSM Phase- II														
Proposed URTDSM Project Phase - II List of Substations under NER for PMU Placements														
					Phasor Quantities to be measured by th PMUs									
SN	Name of Substation	Voltage Level (kV)	No of Feeders	Name of Feeders	3-Phase Voltage Phasors(Vr, Vy, Vb) and Zero Sequence Voltage (V0)	3-Phase CurrentPhasors (Ir, Iy, Ib) and Zero Sequence Current (I0)	Positive Sequence Voltage and Current	Digital Inputs (Dis)	Frequency	ROCOF	Analog Values (MW & MVAR)	Number of PMUs (Considering Two feeders can be monitored In single physical PMU)	OPGW status	Remarks
35	Killing	400	13	400/220 kV ICT I & II, 220/132 kV ICT I& II, 220 kV Killing-Mawngap D/C, 220 kV Bus-I & II,132 kV Killing EPIP-I D/C, 132 kV Killing EPIP-II D/C & 80 MVAR Bus Reactor	52	52	26	56	13	13	26	7	Available	
36	Thoubal	400	4	63 MVAR Bus reactor, 400/220 kV ICT I and 400 Kv Imphal-Thoubal D/C	16	16	8	12	4	4	8	2	Available	
37	Rangia	220	4	220 kV Bus-I & II,220/132 ICT I & II	16	16	8	16	4	4	8	2	Available	
38	Rangia	132	2	132 kV Bus 1 & 132 kV Rangia-Montanga line	8	8	4	8	2	2	4	1	Available	
39	BTPS	220	6	220 kV Bus-I & II,220/132 ICT I & II & 220 kV BTPS-Rangia D/C	24	24	12	32	6	6	12	3	Available	
40	Karbi Langpi	220	4	220 kV Bus-I & II & 220 kV Karbi Langpi - Sarusajai D/c	16	16	8		4	4	8	2		
41	Jawahar Nagar	220	6	220 kV Bus-I & II,220/132 ICT I & II, 220 kV Jawaharnagar-Sarusajai & 220 kV Samaguri-Jawaharnagar	24	24	12	20	6	6	12	3	Available	
42	Boko	220	4	220 kV Bus-I & II,220/132 ICT I & II	16	16	8	16	4	4	8	2	Available	
43	Agia	220	2	220/132 kV ICT-I & II	8	8	4	8	2	2	4	1	Available	
44	Sarusajai	220	6	220 kV Bus-I & II, 220/132 ICT I & II, 220 kV Sarusajai - Langpi D/c	24	24	12	16	6	6	12	3	Available	
45	Sonabil	220	4	220 kV Bus-I & II,220/132 ICT I & II	16	16	8	16	4	4	8	2	Available	
46	Tinsukia	220	4	220/132 ICT I&II, 132 kV Tinsukia-Ledo & 132 kV Tinsukia-Rupai	16	16	8	16	4	4	8	2	Available	For islanding scheme
47	Sonapur	220	6	220 kV Bus-I & II, 220/132 ICT I & II, 220 kV Sonapur-Sarusajai and 220 kV Sonapur-Samaguri	24	24	12	20	6	6	12	3	Available	
48	Samaguri	220	3	220 kV ICT I & II and 220 kV Samaguri-Sonapur	12	12	6	12	3	3	6	2	Available	
49	Dibrugarh	220	4	220 kV Bus-I & II,220/132 ICT I & II	16	16	8	16	4	4	8	2	Available	
50	Deomali	220	2	220 kV Bus-I & II	8	8	4	8	2	2	4	1	Available	
51	Chimpu (Chimpu)	132	5	132 kV Chimpu - Pare, 132 kV Chimpu - Lekhi, 132 kV Chimpu - Ranganadi line, 132 kV Chimpu-BNC & 132 kV Chimpu-Gohpur	20	20	10	20	5	5	10	3	Available	
52	Surajmani Nagar(ST)	400/132	4	400/132kV ICT I & II and 125 MVAR Bus Reactor-I & II	16	16	8	24	4	4	8	2	Available	
53	PKBari(ST)	400/132	4	400/132kV ICT I & II and 125 MVAR Bus Recator-I & II	16	16	8	24	4	4	8	2	Available	
54	Palatana	400/132	3	400/132kV ICT I, II & 80 MVAR Bus reactor	12	12	6	32	3	3	6	2	Available	
55	Kumarghat	132	2	132kV Kumarghat-PK Bari & 20 MVAR BUS Reactor	8	8	4	12	2	2	4	1	Available	

URTDSM Phase- II														
Proposed URTDSM Project Phase - II List of Substations under NER for PMU Placements														
					Phasor Quantities to be measured by th PMUs									
SN	Name of Substation	Voltage Level (kV)	No of Feeders	Name of Feeders	3-Phase Voltage Phasors(Vr, Vy, Vb) and Zero Sequence Voltage (V0)	3-Phase CurrentPhasors (Ir, Iy, Ib) and Zero Sequence Current (I0)	Positive Sequence Voltage and Current	Digital Inputs (Dis)	Frequency	ROCOF	Analog Values (MW & MVAR)	Number of PMUs (Considering Two feeders can be monitored In single physical PMU)	OPGW status	Remarks
56	New Kohima	400/220	7	400/132kV ICT I & II, 220 kV Bus-I & II, 220 kV New kohima - Zahdima and 125 MVAR Bus Reactor-I & II	28	28	14	24	7	7	14	4	Available	
57	Lekhi	132	1	132 kV Lekhi-RHEP	4	4	2	4	1	1	2	1	Available	
58	Mokokchung(PG)	220/132	8	220 kV Bus-I & II, 220/132kV ICT I ,II& III , 220 kV Mokokchung(PG)-Mokokchung D/C & 31.5 MVAR Bus Reactor	32	32	16	40	8	8	16	4	Available	For islanding scheme
59	Dimapur(PG)	220/132	5	132 kV Dimapur - Imphal, 132 kV Dimapur(PG)-Dimapur(NL)-II, 220/132 kV ICT-I,II,III	20	20	10	20	5	5	10	3	Available	For islanding scheme
60	Melriat(PG)	132	4	132 kV Melriat(PG)-Sihhmui D/C, 132 kV Melriat(PG)-Zuangtui & 15 MVAR Bus Reactor	16	16	8	16	4	4	8	2	Available	
61	Khliehriat(PG)	132	2	132 kV Khliehriat(PG)-Khliehriat D/C	8	8	4	8	2	2	4	1	Available	
62	Mariani(AS)	220	5	220/132 kV ICT I & II, 220 kV Mariani(AS)-Amguri, 220 kV Mariani(AS)-Samaguri & 220 kV Mariani(PG)-Mariani(AS)	20	20	10	20	5	5	10	3	Available	For islanding scheme
63	Zahdima(NL)	220	5	220 kV Zahdima - Mokokchung (PG), 220 kV Bus-I & II and 220/132 ICT I & II	20	20	10	16	5	5	10	3	Available	
64	Udaipur	132	1	132 kV Palatana-Udaipur	4	4	2	4	1	1	2	1	Available	For islanding scheme
65	Budhjungnagar	132	1	132 kV Surajmaninagar(ISTS) -Budhjungnagar	4	4	2	4	1	1	2	1	Available	For islanding scheme
66	PK Bari	132	4	132 kV PK Bari(ISTS)-PK Bari, 132 kV PK Bari-Kumarghat, 132 kV PK Bari - RC Nagar D/c	16	16	8	8	4	4	8	2	Available	For islanding scheme
67	Ambassa	132	1	132 kV PK Bari(ISTS)-Ambassa	4	4	2	4	1	1	2	1	Available	For islanding scheme
68	Dharmanagar	132	1	132 kV Dullavchhera-Dharmanagar	4	4	2	4	1	1	2	1	Available	For islanding scheme
69	Bokajan	132	1	132 kV Dimapur(PG)-Bokajan	4	4	2	4	1	1	2	1	Available	For islanding scheme
70	Chapakhowa	132	2	132 kV Roing-Chapakhowa D/C	8	8	4	8	2	2	4	1	Available	For islanding scheme
71	Jorhat	132	1	132 kV Jorhat-Bokakhat	4	4	2	4	1	1	2	1	Available	For islanding scheme
72	Umtru	132	2	132 kV Umtru-Kahelipara D/C	8	8	4	8	2	2	4	1	Available	For islanding scheme
	Amguri(Solar)	220	2	220 kV Bus-I & II	8	8	4	9	2	2	4	1	Available	
73	Tezu	132	2	132 kV Bus -1, 20 MVAR Bus Reactor	8	8	4	4	2	2	4	1	Available	

URTDSM Phase- II															
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SN	Name of Substation	Voltage Level (kV)	No of Feeders	Name of Feeders	Phasor Quantities to be measured by th PMUs									
					3-Phase Voltage Phasors(Vr, Vy, Vb) and Zero Sequence Voltage (V0)	3-Phase CurrentPhasors (Ir, Iy, Ib) and Zero Sequence Current (I0)	Positive Sequence Voltage and Current	Digital Inputs (Dis)	Frequency	ROCOF	Analog Values (MW & MVAR)	Number of PMUs (Considering Two feeders can be monitored In single physical PMU)	OPGW status	Remarks
74	Namsai (Future upgradation)	220/132	6	220 kV Bus-I & II,220 kV Namsai-Kathalguri D/C, 132 kV Namsai-Tezu, 20 MVAR Bus Reactor	24	24	12	20	6	6	12	3	Available	Future Project
75	Rangia	400	4	220 kV Bus-I & II & 400/220kV ICT I & II	16	16	8	32	4	4	8	2	Available	Future Project
76	Sonapur	400	4	220 kV Bus-I & II & 400/220kV ICT I & II	16	16	8	24	4	4	8	2	Available	Future Project
77	Bokajan	400	3	400 kV Bokajan-New Mariani D/C, 400 kV Bokajan-APDCL (RE Solar Park)	12	12	6	20	3	3	6	2	Available	Future Project
78	Nangalbibra	400 (Charged at 220)	8	220 kV bongaigaon-Nangalbibra D/C, 220/132 kV ICT I & II, 220 kV Bus-I & II, 132 kV Nangalbibra-Nangalbibra(MePTCL) D/C	32	32	16	32	8	8	16	4	Available	Future Project
79	Mawngap	220	4	220 kV Bus-I & II,220/132 ICT I & II	16	16	8	16	4	4	8	2	Available	Future Project
80	New Shillong	220	4	220 kV Bus-I & II,220/132 ICT I & II	16	16	8	16	4	4	8	2	Available	Future Project
81	Bihpuria	220	6	220 kV Bus - I & II, 220/132 kV ICT-I & II & 220 kV Sonabil-Bihpuria D/C	24	24	12	24	6	6	12	3	Unknown - Project under designing	Future Project
82	Lower Kopili	220	4	220 kV Bus - I & II, 220/132 kV ICT-I & II	16	16	8	25	4	4	8	2	Unknown - Project under designing	Future Project
83	Sankerdev Nagar	220	4	220 kV Bus - I & II, 220/132 kV ICT-I & II	16	16	8	25	4	4	8	2	Unknown - Project under designing	Future Project
84	Amingaon	220	6	220 kV Bus-I & II,220/132 ICT I & II & 220 kV Amingaon-Rangia D/C	24	24	12	24	6	6	12	3	Available	Future Project
Total			409	Total	1636	1636	818	1731	409	409	818	220		

Note* Respected ED Sir suggested that location at which currently SEL PMUs are located should be replaced with URTDSM, if they were not covered in Phase-1.

Proposed Generation Units for URTDSM Phase - 2 (Above 25 MW)															
sn	Name of Generation Station	Voltage Level (kV) (HV side of GT)	No of unit	Owner	Phasor Quantities to be measured by th PMUs								OPGW status	Remarks
					3-Phase Voltage Phasors(Vr, Vy, Vb) and Zero Sequence Voltage (V0)	3-Phase Current Phasors (Ir, Iy, Ib) and Zero Sequence Current (I0)	Positive Sequence Voltage and Current	Digital Inputs (Dis)	Frequency	ROCOF	Analog Values (MW & MVAR)	Number of PMUs (Considering Two feeders can be monitored In single physical PMU)		
					4	4	2	4	1	1	2	0.5	Available	
1	NRPP	220	2	Assam	8	8	4	8	2	2	4	1	Available	
2	Karbi Langpi	220	2	Assam	8	8	4	8	2	5	4	1	Not available. Proposed under Guwahati Islanding Scheme.	
3	Namrup (NTPS)	132	5	Assam	20	20	10	20	5	4	10	3	Available	
4	Lakwa (LTPS)	132	4	Assam	16	16	8	16	4	7	8	2	Available	
5	LRPP	132	7	Assam	28	28	14	28	7	4	14	4	Available	
6	Umiam Stage I	132	4	Meghalaya	16	16	8	16	4	2	8	2	Available	
7	Umiam Stage II	132	2	Meghalaya	8	8	4	8	2	3	4	1	Available	
8	Umiam Stage III	132	3	Meghalaya	12	12	6	12	3	2	6	2	Available	
9	Umiam Stage IV	132	2	Meghalaya	8	8	4	8	2	3	4	1	Available	
10	MHLEP	132	3	Meghalaya	12	12	6	12	3	2	6	2	Available	
11	New Umtru	132	2	Meghalaya	8	8	4	8	2	2	4	1	Available	
12	Baramura	66	2	Tripura	8	8	4	8	2	3	4	1	Available	
13	Rokhia	66	3	Tripura	12	12	6	12	3	9	6	2	Available	
14	Kathalguri (AGBPP)	220	9	NEEPCO	36	36	18	36	9	4	18	5	Available	
15	Kopili	220	4	NEEPCO	16	16	8	16	4	4	8	2	Available	
16	Kameng	400	4	NEEPCO	16	16	8	16	4	6	8	2	Available	
17	AGTCCPP	132	6	NEEPCO	24	24	12	24	6	3	12	3	Available	
18	Ranaganadi	132	3	NEEPCO	12	12	6	12	3	3	6	2	Available	
19	Doyang	132	3	NEEPCO	12	12	6	12	3	3	6	2	Available	
20	Khandong (Including Kopili Stg -II)	132	3	NEEPCO	12	12	6	12	3	2	6	2	Available	
21	Monarchak	132	2	NEEPCO	8	8	4	8	2	3	4	1	Not available. Proposed under NERPSIP.	
22	Loktak	132	3	NHPC	12	12	6	12	3	8	6	2	Available	
23	Subhansiri (NHPC) (Upcoming)	400	8	NHPC	32	32	16	32	8	3	16	4	Available	
24	BgTPP (NTPC)	400	3	NTPC	12	12	6	12	3	4	6	2	Available	
25	Palatana	400	4	OTPC	16	16	8	16	4	2	8	2	Available	
26	Amguri (Solar)	220	2	Assam	8	8	4	8	2	0	4	1	Available	
27	Bokjan(Upcoming Solar Developed APDCL)	400	0	APDCL	0	0	0	0	0	2	0	0	Unknown.	Project is under designing
28	Lower Kopili (Upcoming)	220	2	APGCL	8	8	4	8	2	97	4	1	Unknown.	Project is under designing
Total			97		388	388	194	388	97	192	194	54		

Annexure B3_A

Additional Communication Scheme (by ULDC-NERTS) approved in 17th TCC/RPC																
					Status as in 26th NETeST Meeting			Status as in 26th NETeST Meeting								
Sl. No.	**Name of the link**	**From (A-end)**	**To (B-end)**	**Length of OPGW**	**Target**	**OPGW Status**	**End Equipment Status**	**OPGW Status**	**Approach cable between Gantry and FODB status (A-end)**	**FOTE Status (A-end)**	**DCPS Status (A-end)**	**Interpatching with existing FOTE A-end (If any)**	**Approach cable between Gantry and FODB status (B-end)**	**FOTE Status (B-end)**	**DCPS Status (B-end)**	**Interpatching with existing FOTE B-end (If any)**
1	132 kV Silchar - Hailakandi (Part of line)	Silchar	Hailakandi	17 KM	Aug-23	Stringing Completed.	Material Delivered	Completed								
2	132 kV Roing – Pasighat	Roing	Pasighat	103 KM	Jan-23	Completed till pile foundation location.	Powered Up	Completed till pile foundation location.	Completed	Completed		NA	Completed	Completed		NA
3	132 kV Roing – Tezu	Roing	Tezu	73 KM	Jan-23	Completed. (73/73) kM	Powered Up	Completed	Completed	Completed		NA	Completed	Completed		NA
4	132 kV Tezu – Namsai	Tezu	Namsai	96 KM	Jan-23	Stringing of 96/96 kM is completed	Powered Up	Completed	Completed	Completed		NA	Completed	Completed		NA
5	132 kV Tuirial – Kolasib	Tuirial	Kolasib	70 KM	Nov-23	Target: November'23. Tower profile detail provided by Mizoram was incorrect. POWERGRID has awarded contract for carrying out the survey.	Material Delivered									
6	400 kV Balipara – Kameng	Balipara	Kameng	75 KM	Jul-23	Completed.	Installed	Completed	Completed	Completed			Completed	Completed		
7	400 kV Bongaigoan – Killing (Brynihat)	Bongaigoan	Killing	200 KM	Sep-23	Stringing of 202/202 km.	Material Delivered	Completed	Completed	Completed			Completed	Completed		
8	400 kV Silchar – Killing (Brynihat)	Silchar	Killing	217 KM	Oct-23	Stringing of 150/216 km is completed	Material Delivered	150/216 kM								

Annexure B3_B

List of Links to be implemented for replacement of old FO under Reliable Communication Scheme in NER region

SN	FROM	TO	KM	26th NETeST	26th NETeST								
	A -end	B- end			OPGW Status	Approach cable between Gantry and FODB (A-end)	FOTE Status at A end	DCPS Status at A end	Interpatching with existing FOTE at A end (if any)	Approach cable between Gantry and FODB (B-end)	FOTE Status at B end	DCPS Status at B end	Interpatching with existing FOTE at B end (if any)
1	NEHU	Shillong UNDER GROUND FO	6.23	Stringing yet to start									
2	Khliehriat(MESEB)	Khliehriat(PGCIL)	7.791	Stringing yet to start									
3	Khliehriat	Khandong(PGCIL)	40.99	Stringing yet to start									
4	Khandong(PGCIL)	Koplili(PGCIL)	11.191	Stringing yet to start									
5	Misa(PGCIL)	Koplili(PGCIL)	73.186	Stringing yet to start									
6	Misa(PGCIL)	Balipara(PGCIL)	94.046	88.9 kMs completed.	Completed	Complete	Complete				Complete		
7	Misa(PGCIL)	Dimapur(PGCIL)	119.192	Stringing yet to start	(43.552/119.192) kM completed		Complete				Complete		
8	Badarpur(PGCIL)	Khliehriat(PGCIL)	73.183	Stringing yet to start									
9	Badarpur(PGCIL)	Kumarghat(PGCIL)	117.519	Stringing yet to start									
10	Agartala Gas(PGCIL)	Kumarghat(PGCIL)	99.817	Stringing yet to start									
11	Agartala(PGCIL)	Agartala Gas(PGCIL)	7.416	Stringing yet to start									
12	Dimapur (PGCIL)	Kohima(PGCIL)	59.8	Stringing yet to start									
13	Kohima(NAG)	Imphal(PGCIL)	105.64	Stringing yet to start									

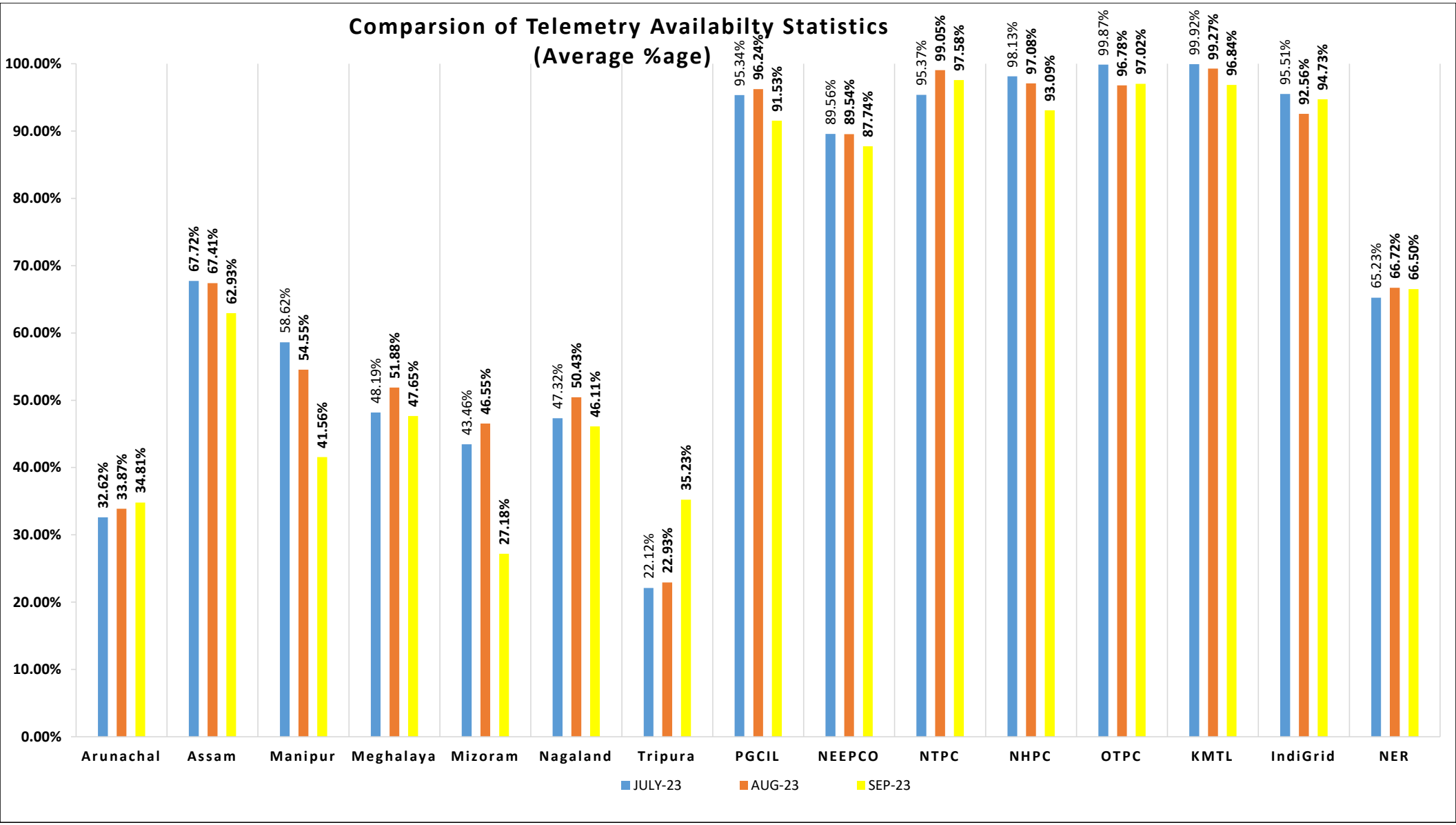
List of Links to be implemented new under Reliable Communication Scheme in NER region

S No	Name of Link	From	To	Length in Kms 17th TCC	26th NETeST	26th NETeST								
						OPGW Status	Approach cable between Gantry and FODB (A-end)	FOTE Status at A end	DCPS Status at A end	Interpatching with existing FOTE at A end (if any)	Approach cable between Gantry and FODB (B-end)	FOTE Status at B end	DCPS Status at B end	Interpatching with existing FOTE at B end (if any)
1	Mariani (new)- Misa II	Mariani (new)	Misa	223	101.158/223 KMs stringing completed	Completed.	Complete	Completed			Completed	Completed		Completed
2	Bongaigaon III (quad)-Balipara	Bongaigaon	Balipara	309	267.684/309 kMs Stringing completed	(268.46) kM completed		Completed				Completed		
4	Misa - Kopli	Misa	kopli	73	73/73 KM Stringing completed	Completed	Completed	Completed		Completed	Completed	Completed		Completed
5	Jiribam - Haflong	Jiribam	Haflong	101	68/101 Stringing completed							Completed		
6	Biswanath Chariali - Biswanath Chariali(Pavoi)	Biswanath Chariali	Pavoi	13	--	Completed	Completed	Completed			Completed	Completed		
7	Kopili Khandong-other circuit	kopili	khandong	0	8.3/12 KM stringing completed	Completed	Completed	Completed			Completed	Completed		
8	Khandong Khliehriat other circuit	khandong	khliehriat	43	--	(19.889/43) km completed		Completed				Completed		
9	Aizawl-Jiribam	Aizawl	Jiribam		--									
10	Other Line Future	CS1	CS2	0										
				1158										

Annexure B7

Telemetry Statistics for the Month of September 2023

Sl. No.	Utility	Average Total Percentage	Instantaneous Maximum of Total percentage	Average Analog Percentage	Average Digital Availability	Average RTU Availability
1	PGCIL	91.53	97.33	91.74	91.43	91.13
2	NEEPCO	87.74	92.56	87.44	87.63	87.51
3	NTPC	97.58	99.9	99.56	97.59	97.21
4	NHPC	93.09	98.25	94.8	92.16	92.29
5	OTPC	97.02	100	97.03	97.01	97.84
6	KMTL	96.84	100	94.64	97.86	97.88
7	IndiGrid	94.73	100	94.69	94.76	94.97
8	Arunachal Pradesh	34.81	53.86	37.71	32.81	32.22
9	Assam	62.93	70.29	62.82	63.01	63.39
10	Manipur	41.56	62.22	46.68	38.5	38.96
11	Meghalaya	47.65	57.17	64.13	35.26	35.76
12	Mizoram	27.18	41.72	44.47	12.84	33.31
13	Nagaland	46.11	56.85	38.53	51.55	45.09
14	Tripura	35.23	40.01	35.39	35.12	34.57
	NER	66.5	70.36	66.98	65.55	65.23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20.00%
10.00%
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34.81%
67.72%
67.41%
62.93%
58.62%
54.55%
41.56%
48.19%
51.88%
47.65%
43.46%
46.55%
27.18%
47.32%
50.43%
46.11%
22.12%
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99.87%
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97.02%
99.92%
99.27%
96.84%
95.51%
92.56%
94.73%
65.23%
66.72%
66.50%
Arunachal
Assam
Manipur
Meghalaya
Mizoram
Nagaland
Tripura
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NEEPCO
NTPC
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KMTL
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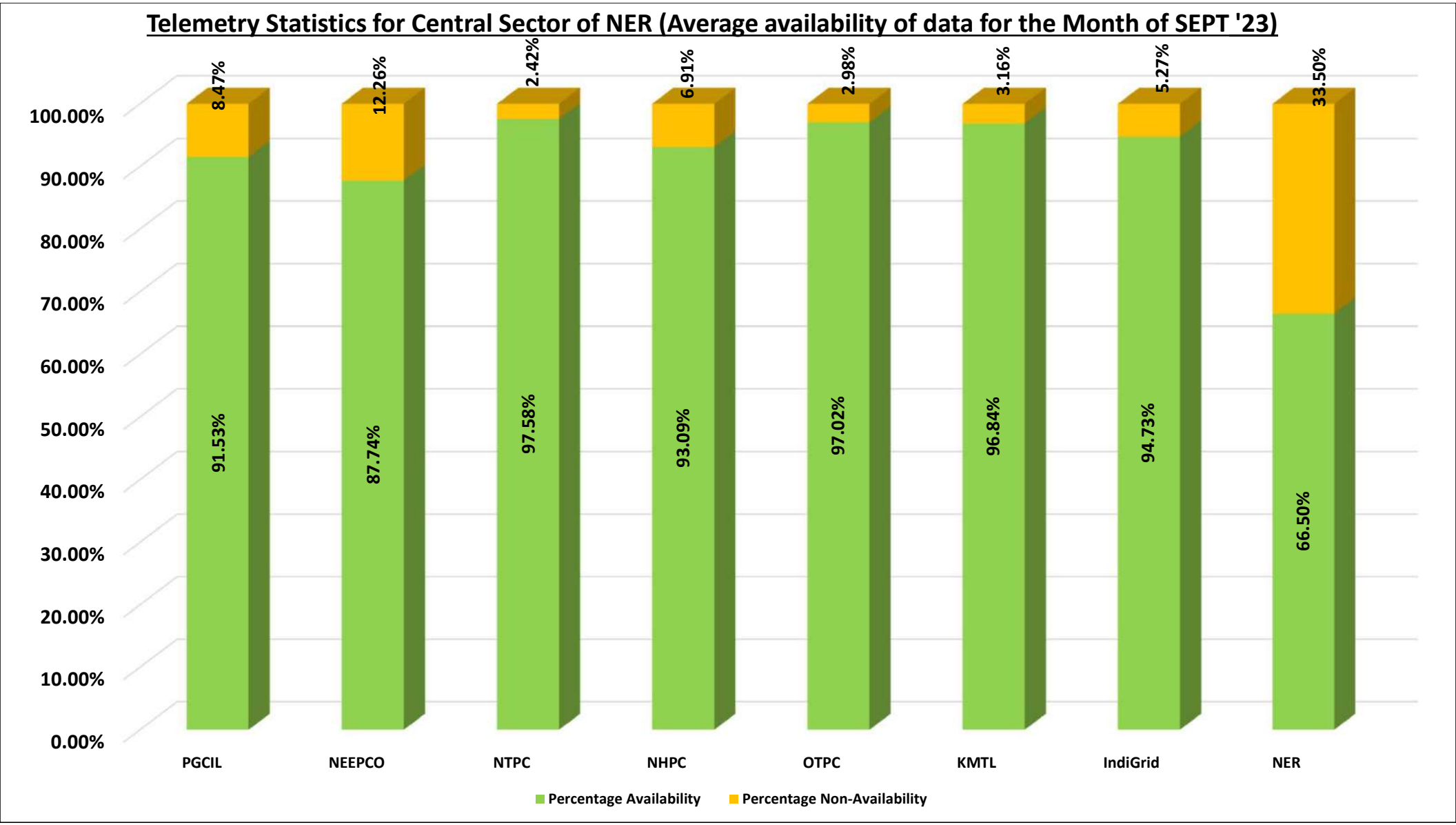
NER
JULY-23
AUG-23
SEP-23


Telemetry Statistics for Central Sector of NER (Average availability of data for the Month of SEPT '23)
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30.00%
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6.91%
2.98%
3.16%
5.27%
33.50%
91.53%
87.74%
97.58%
93.09%
97.02%
96.84%
94.73%
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PGCIL
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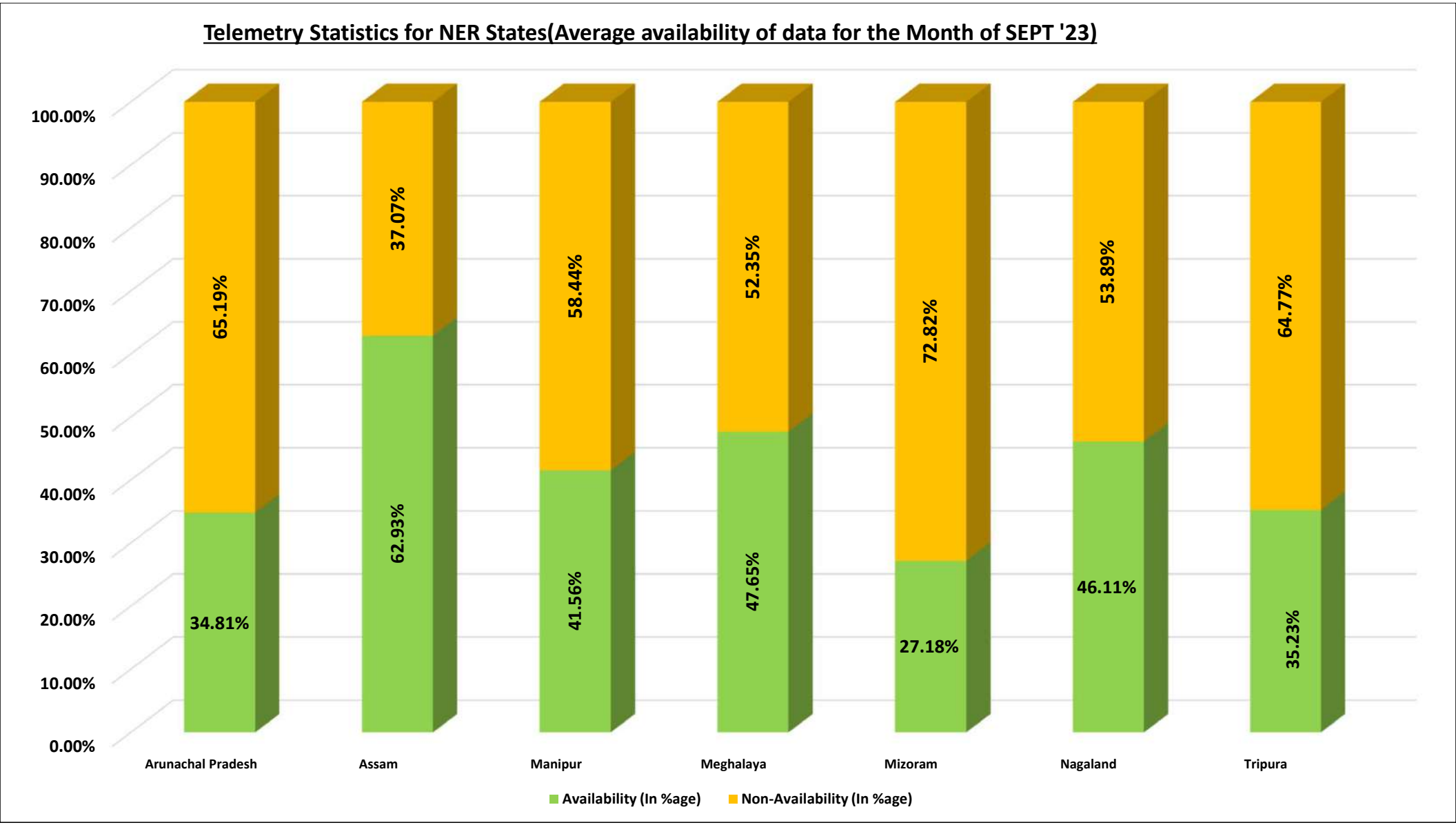
NTPC
NHPC
OTPC
KMTL
IndiGrid
NER
Percentage Availability
Percentage Non-Availability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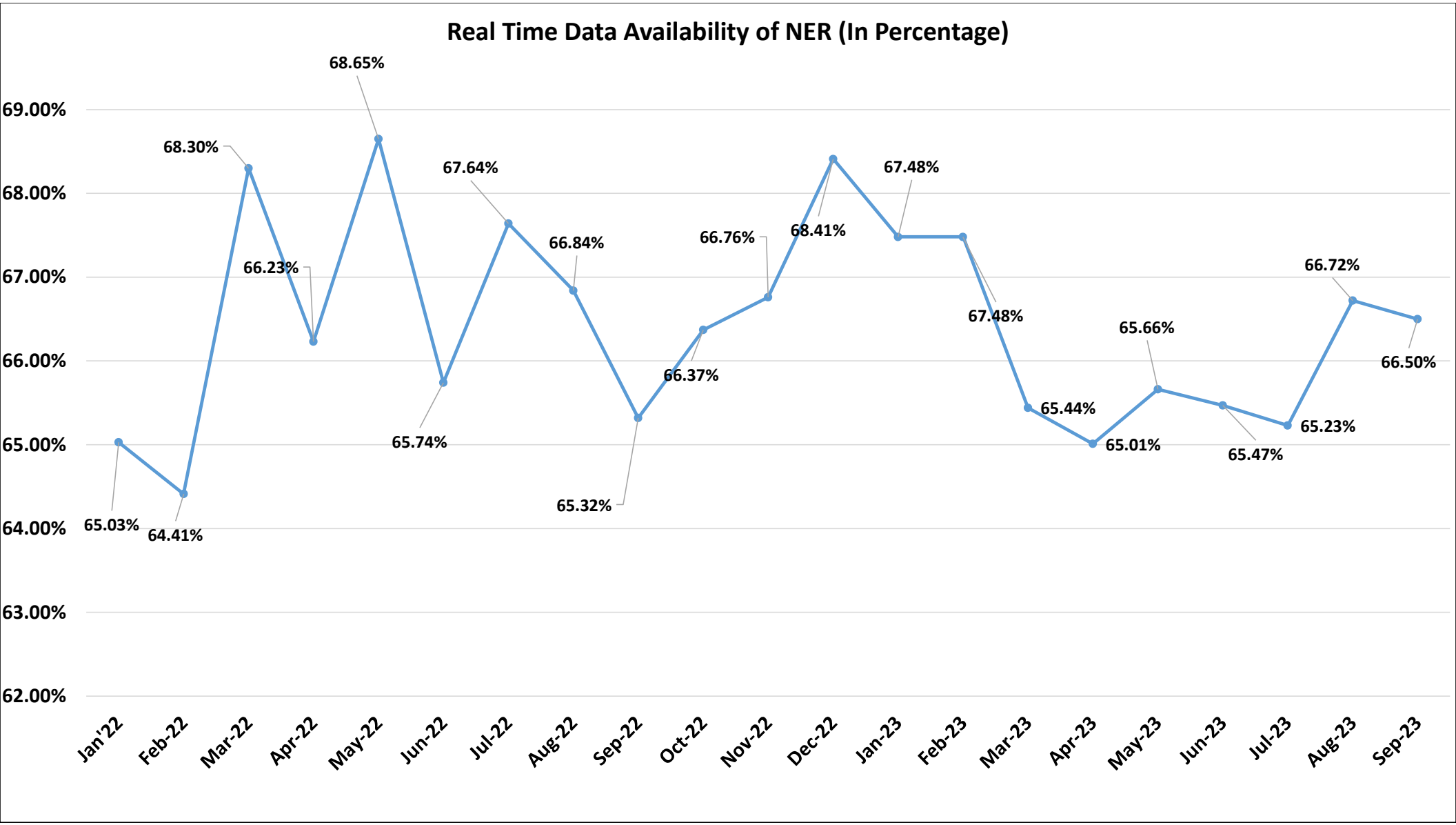
30.00%
20.00%
10.00%
0.00%
65.19%
34.81%
37.07%
62.93%
58.44%
41.56%
52.35%
47.65%
72.82%
27.18%
53.89%
46.11%
64.77%
35.23%
Arunachal Pradesh
Assam
Manipur
Meghalaya
Mizoram
Nagaland
Tripura
Availability (In %age)
Non-Availability (In %age)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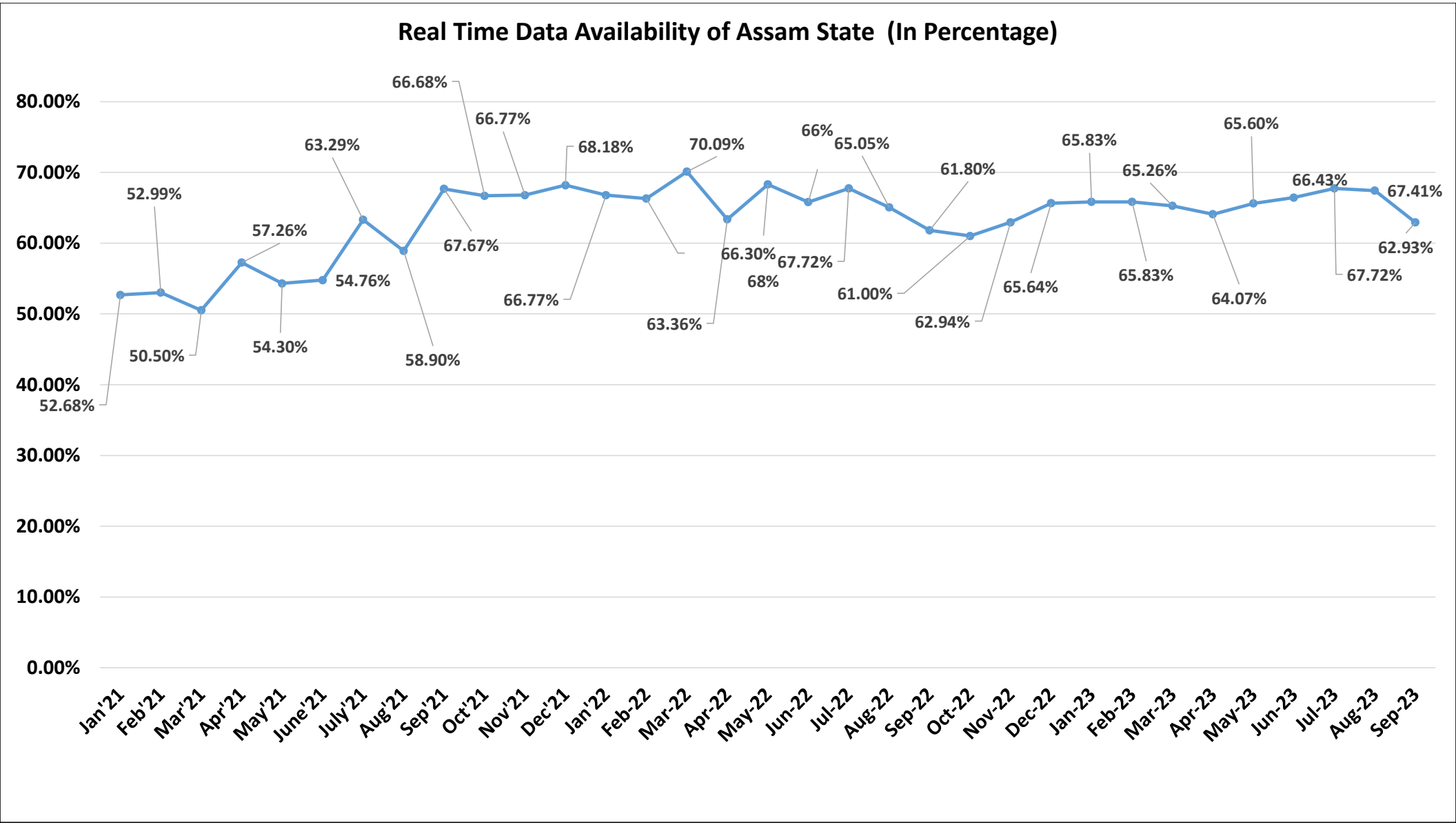
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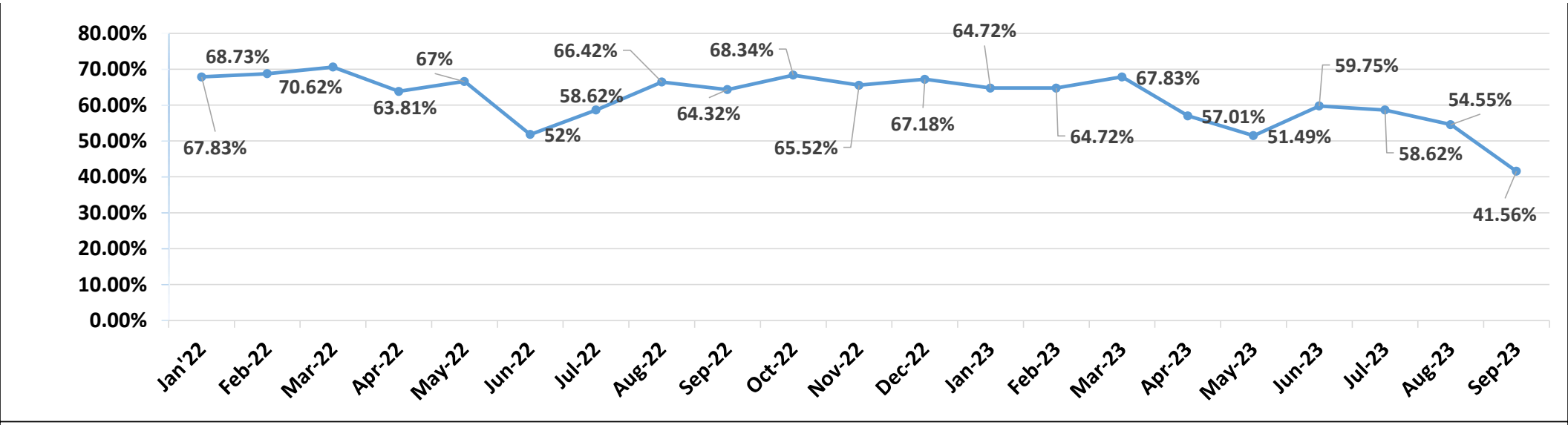
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66.42%
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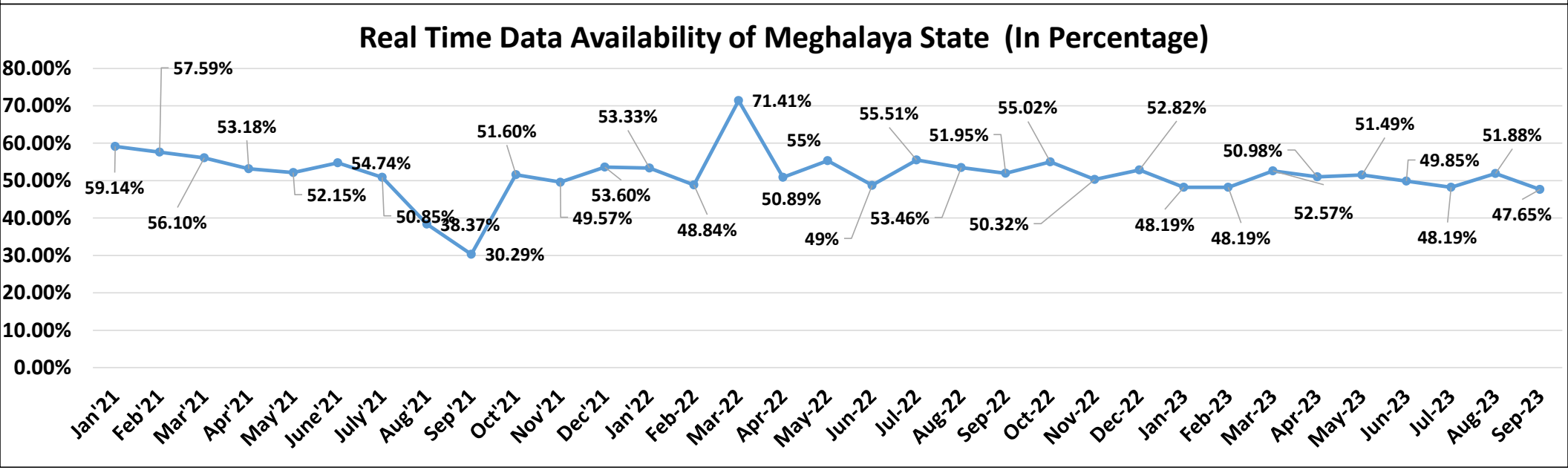
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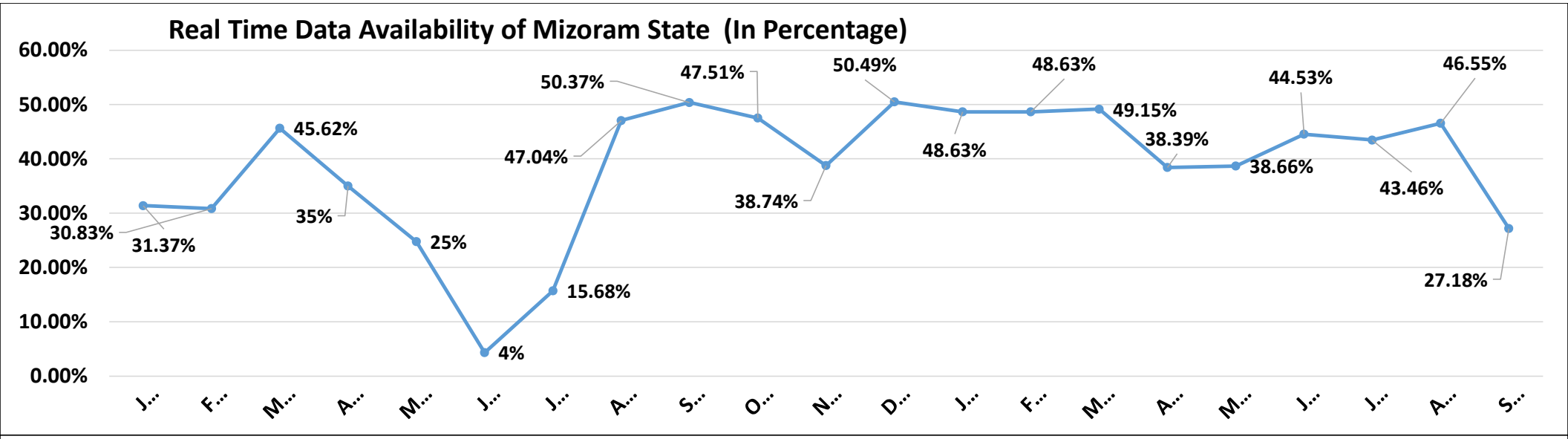
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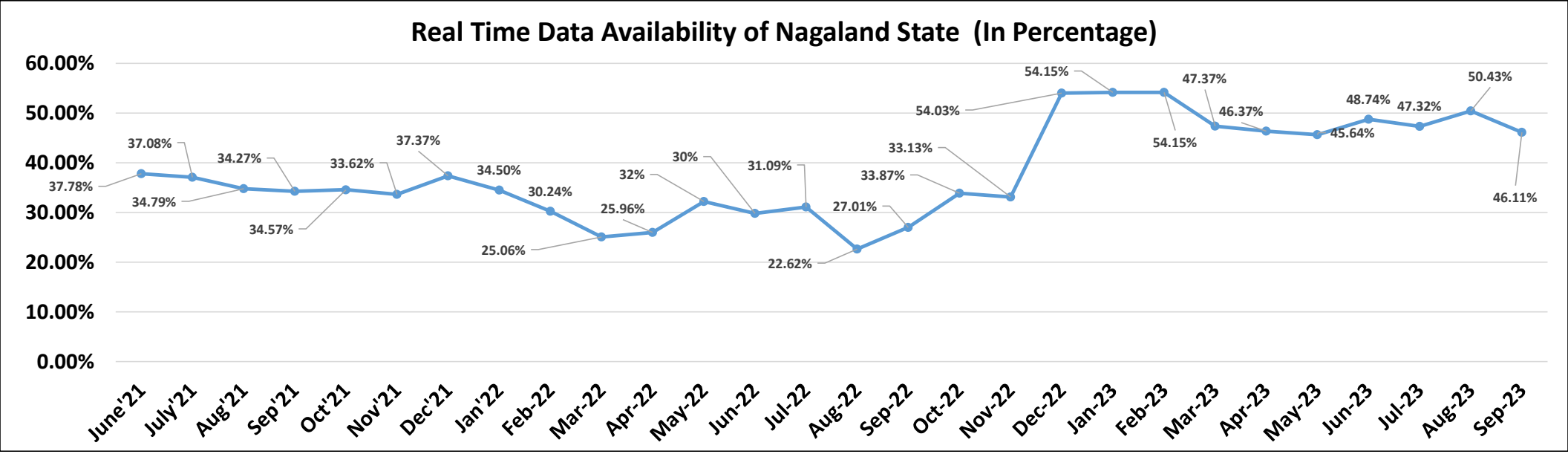
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54.15%
54.15%
47.37%
46.37%
45.64%
48.74%
47.32%
50.43%
46.11%
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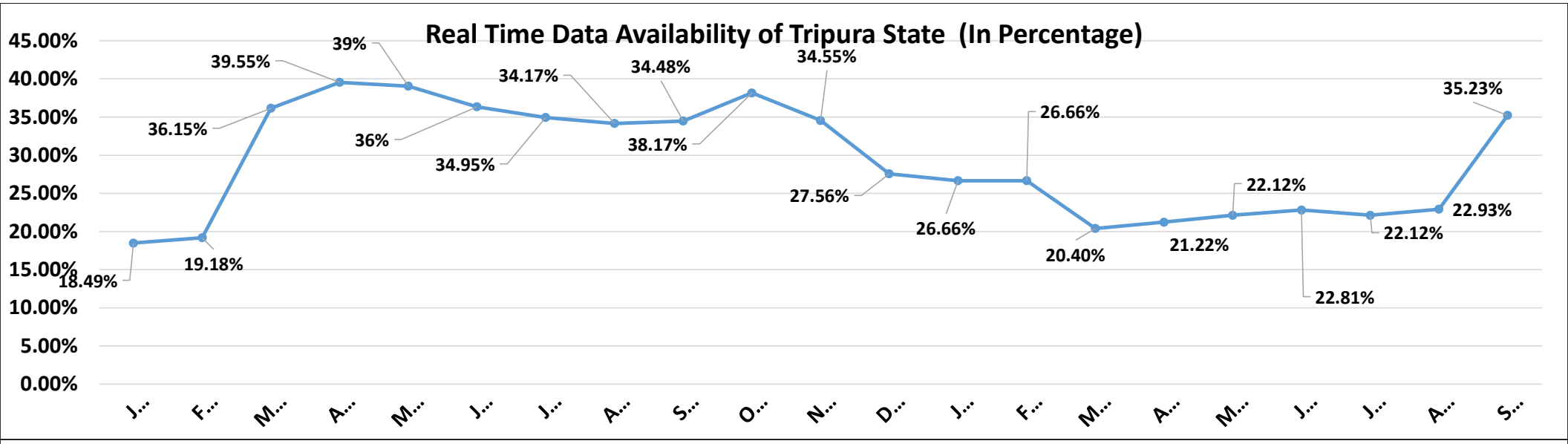
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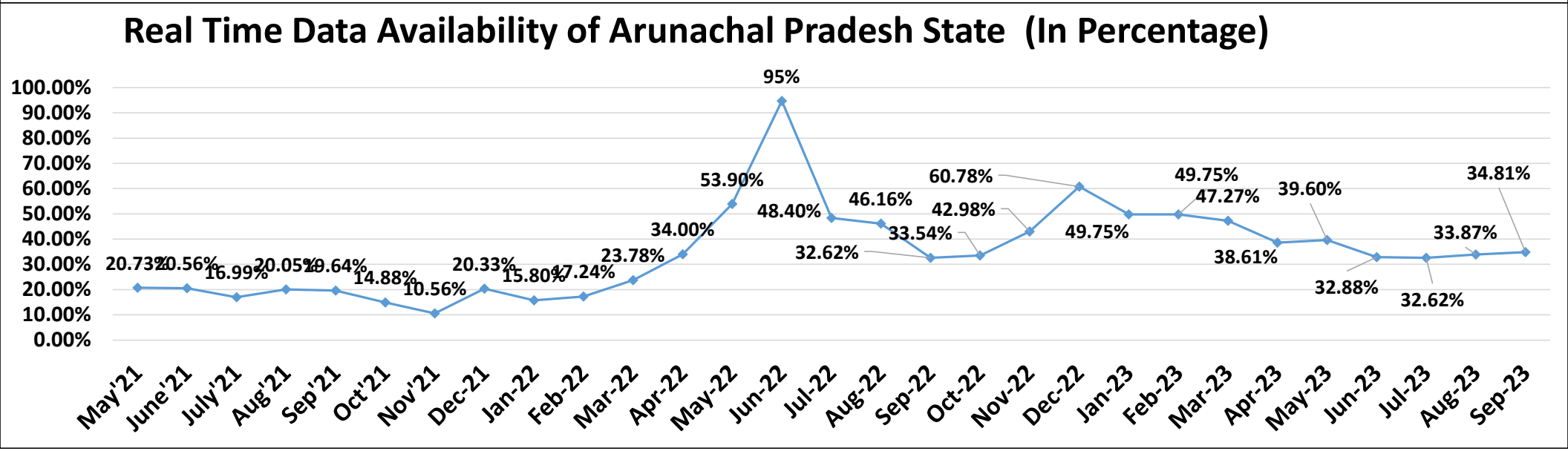
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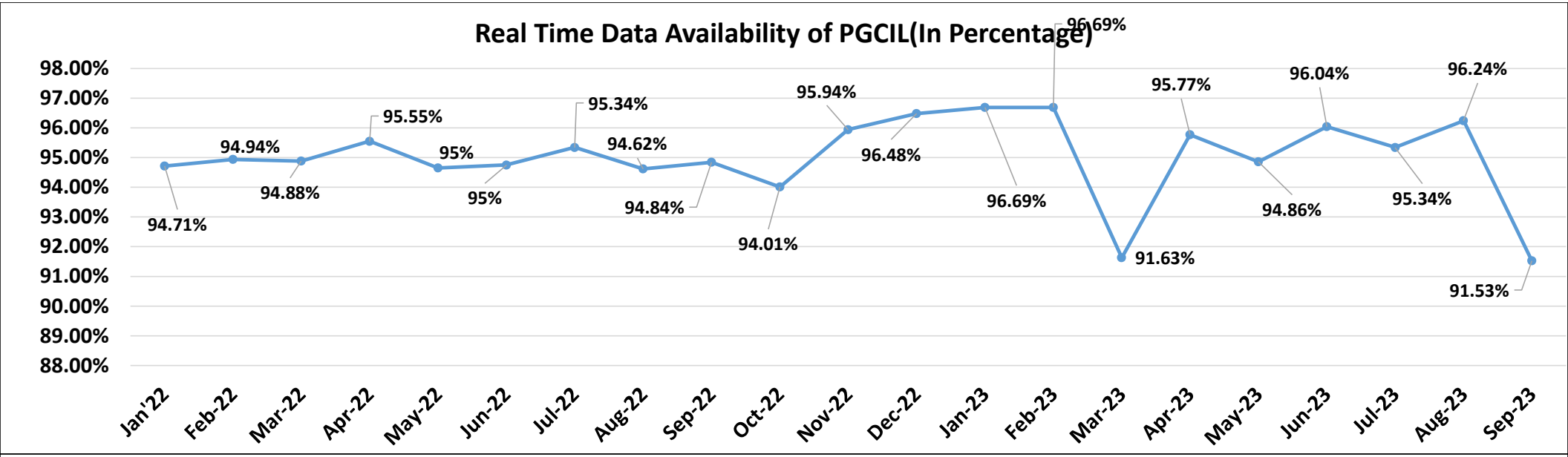
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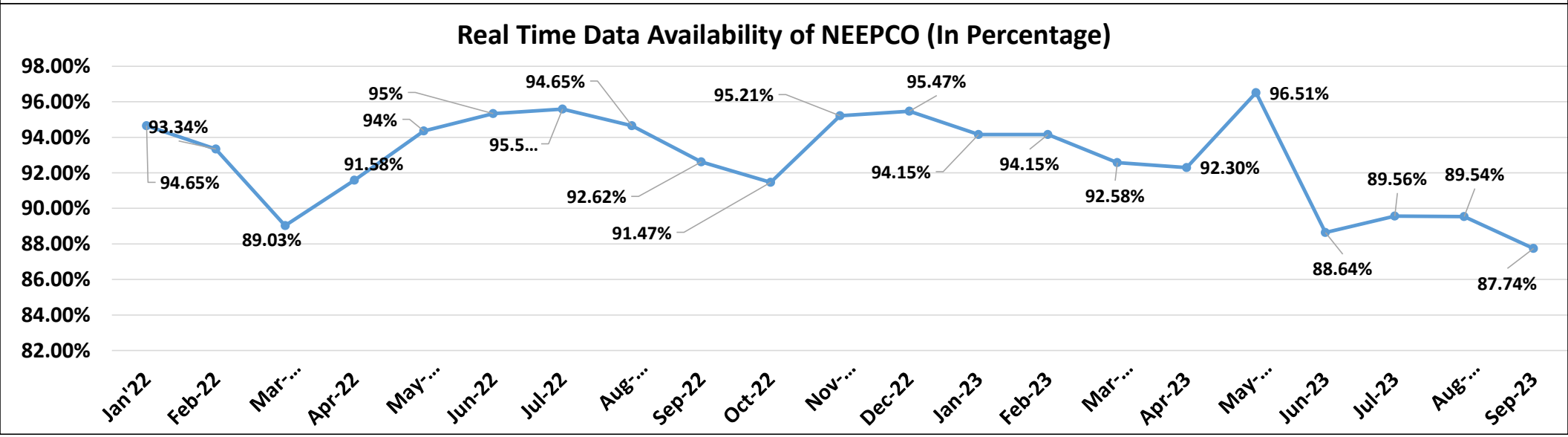
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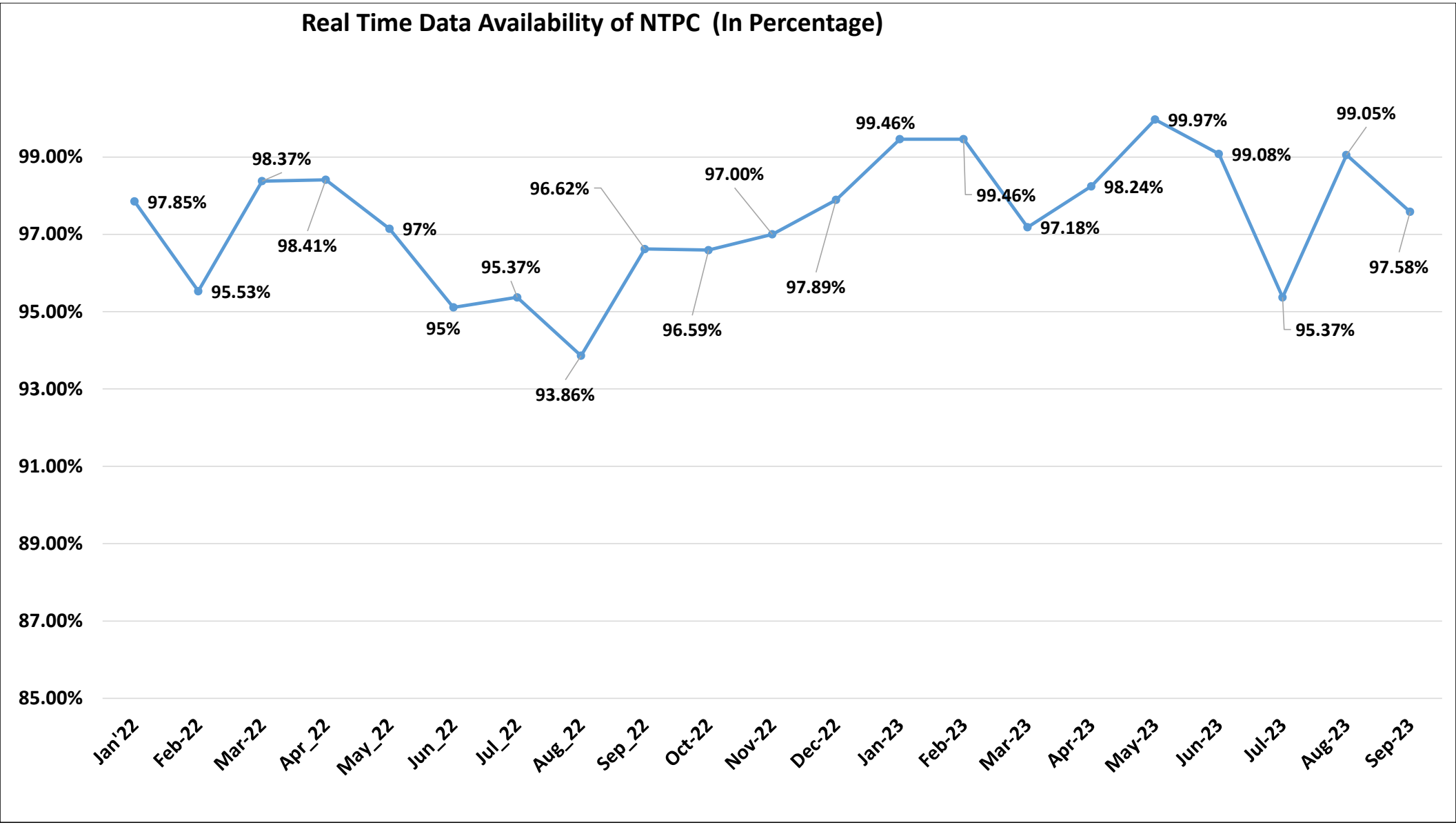
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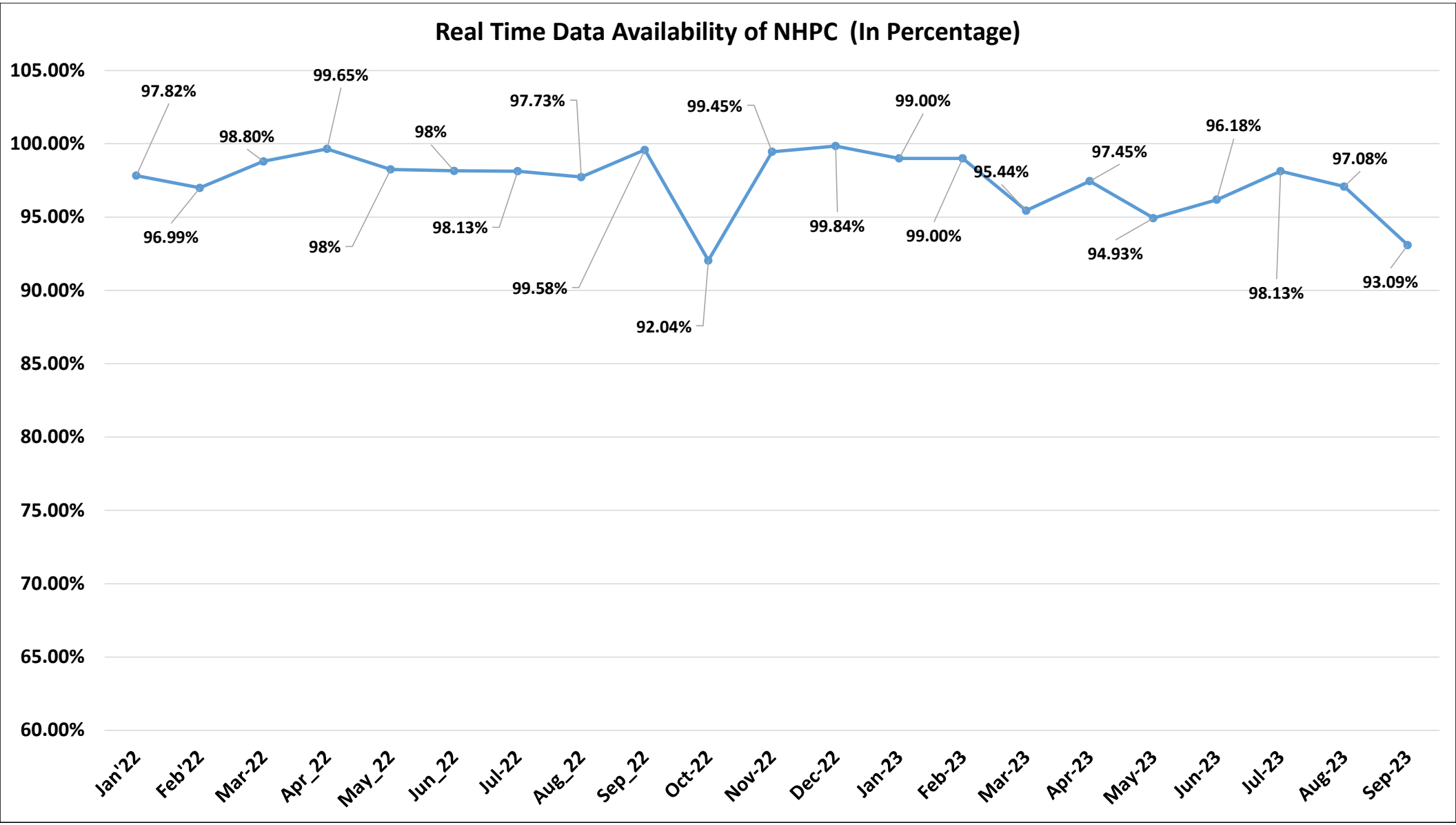
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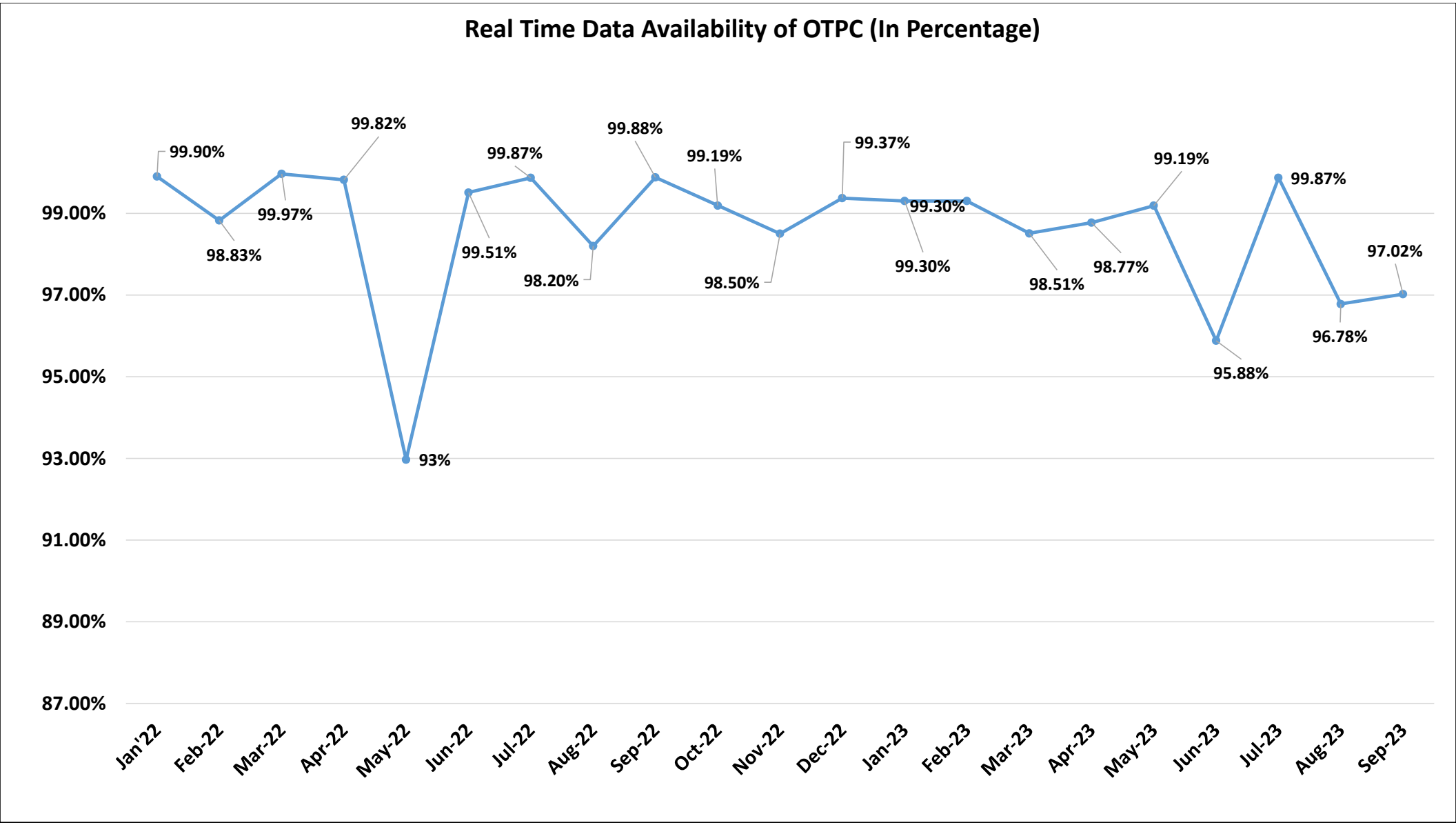
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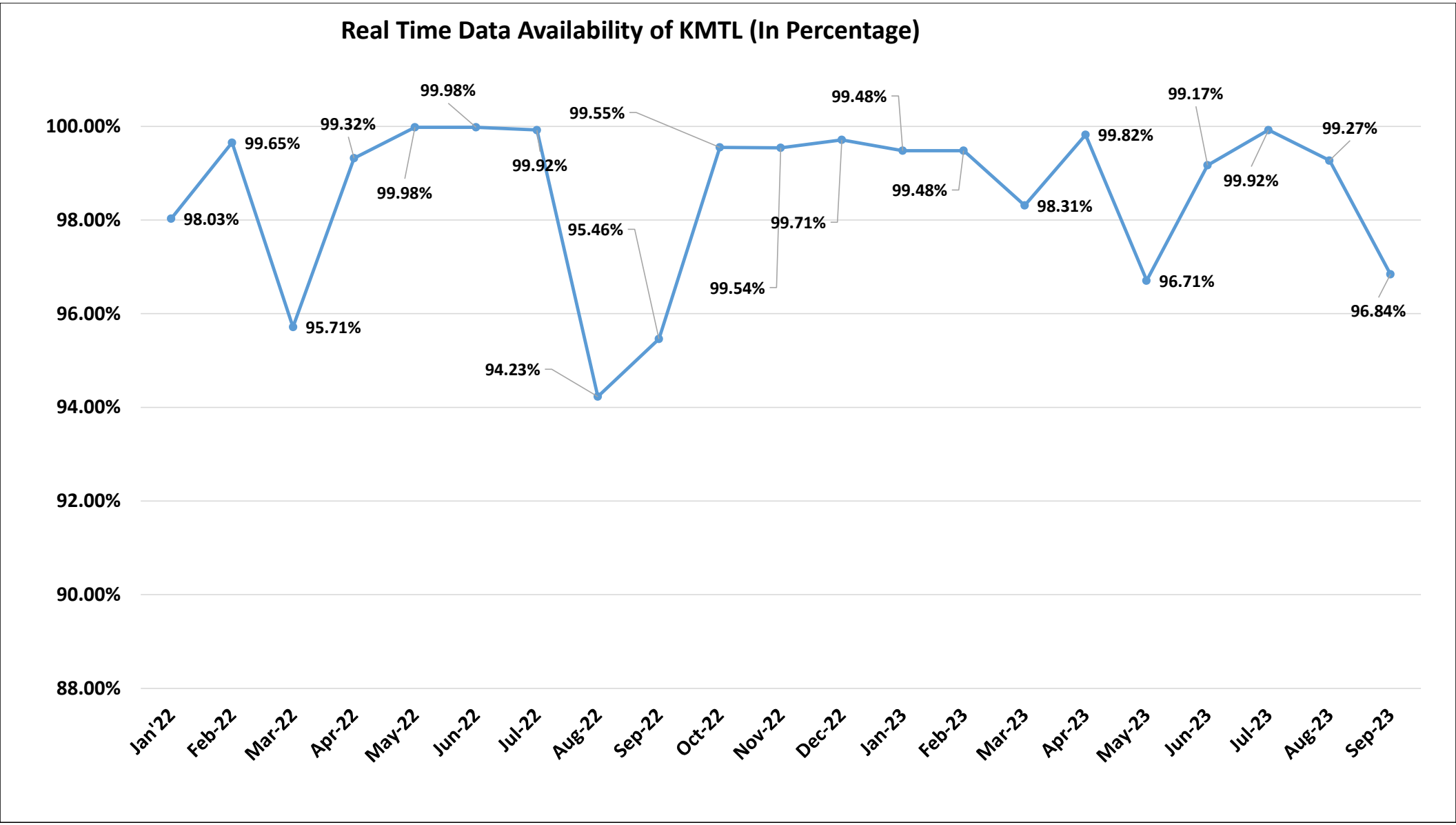
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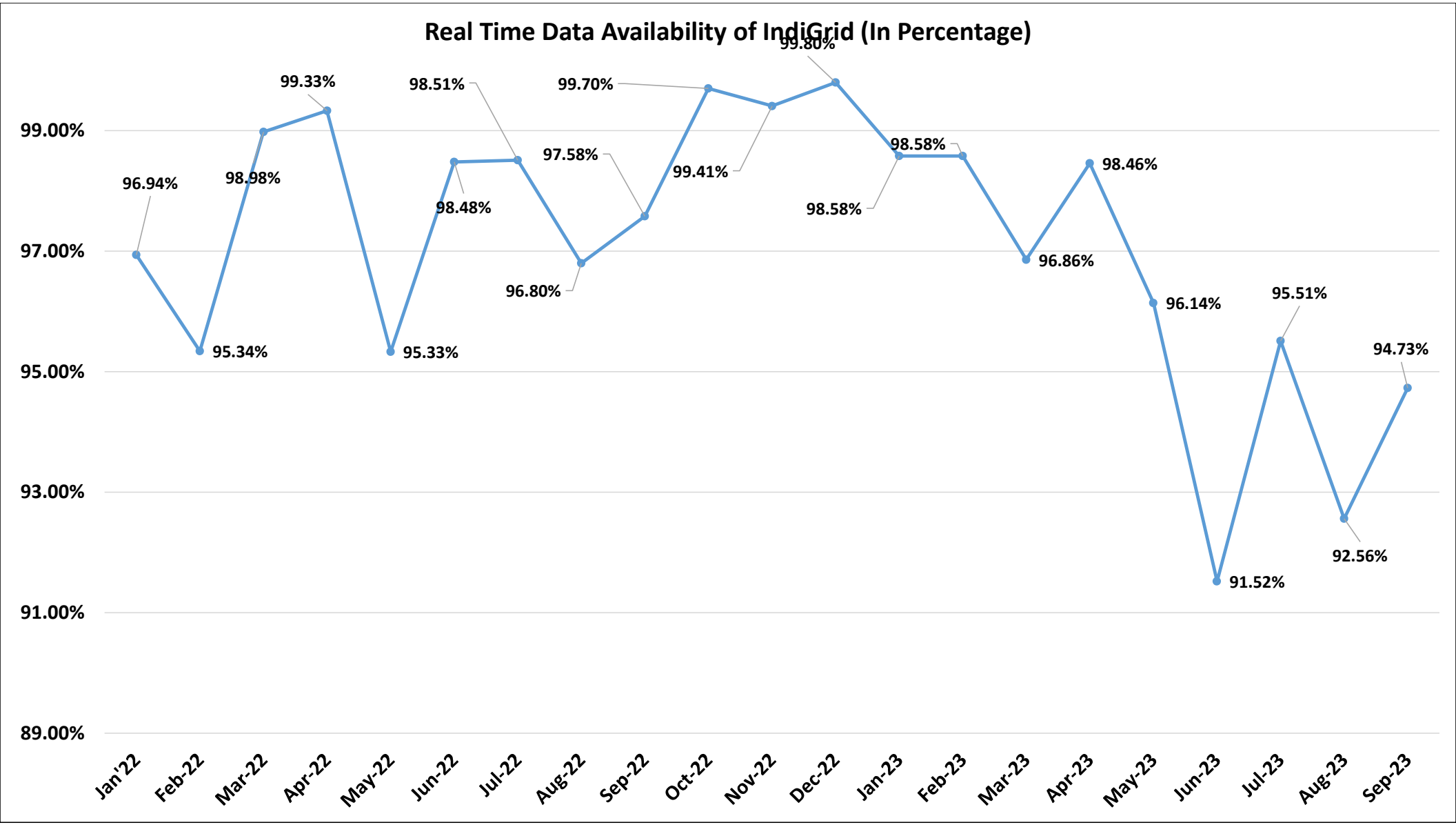
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Annexure C.1

TERMS & CONDITIONS FOR

MAINTENANCE

AND

SUPPORT SERVICES
OF

AUTOMATIC DEMAND MANAGEMENT SYSTEM

(ADMS) OF NER STATES

Section 1: Maintenance & Support services

1.0 Introduction

The scope of work shall include a comprehensive maintenance of all the software and hardware provided by the contractor for the various systems viz ADMS, Router cum Firewall, FRTUs along with the future integration and support services for meeting any expansion requirement envisaged. The maintenance practices to be followed shall be as per ISO 20000 Standard. The essence of the maintenance and support services is to provide maintenance support for the designated hardware and software, with the goal of meeting the availability as set forth herein.

1.1 Maintenance support

The period of maintenance support shall be three (3) years. The nature of maintenance support required for the different type of systems and components are described in the **Table 1-1** below:

Table 1-1 Maintenance support and Availability requirements

Sl.no.	System	Scope	System Availability requirements
1	ADMS Servers, Router cum Firewall and licence extension, extension of ADMS software license for different applications, LCD screen & FRTUs	Hardware and software in Control Centre and FRTU locations	99.99%

The system availability shall be measured equipment wise. For all third-party equipment (Hardware & Software), Contractor shall have back-to-back support along with supply of spare with appropriate response time from OEM or OEM Authorised representatives. Contractor shall be responsible for coordination with the OEM in all matters related to that equipment. The Contractor shall also be responsible for meeting the overall response times and availability requirements specified in the Specification.

The maintenance of the System shall be comprehensive and shall comprise of the following category of works which is further elaborated for each of the different subsystems:

(a) Preventive Maintenance Activity (performance monitoring, system backup, patch management, updates, emergency response and troubleshooting)

(b) Maintaining a minimum no. of specified spares.

(c) Maintenance of existing FRTUs and integration of new FRTUs at new locations other than currently integrated Sub-Stations on chargeable basis

1.2 Preventive Maintenance Activity

The preventive maintenance activity would involve activities to be performed by the Contractor to keep the system running at optimum level by diagnosis and rectification of all hardware and software failures and would broadly include

- Repair / replacement of defective equipment. The Contractor shall be responsible for repair/replacement of all the hardware required for the various systems.

- Configuration of the replaced hardware and software, periodic routine checking as part of a preventive maintenance program (as described in further detail in this document) which would include checking of functionality of hardware and software,
- Monitoring of the performance of the system and doing necessary tuning for optimum performance to accommodate any changes such as addition of new components.
- Providing all necessary assistance to Owner for addition and modification of database and displays, Database sizing activities including Backup and restoration of the system
- Restoration of the systems upon its failure and to restore the functioning of the various systems at the different Control Centres.

1.2.1 Hours of Cover

The Contractor shall provide engineers who have an experience and skill to maintain ADMS to the desired level of availability. The contractor's on-site support for the Control centre shall be standard hours of service i.e. Monday to Friday- 9:00 am to 5:00 pm local time (IST), excluding Public and Owner Company holidays, throughout a year. At least one Engineer having expertise in ADMS/SCADA System shall be available during the standard hours of service at each Main Control Centre. For any emergency arising out of the stipulated standard hours of service, the contractor shall resolve the same as per timelines given in Table 1.4.

The support personnel so deployed shall be qualified personnel in the delivered system or similar systems. The Owner can ask the Contractor to replace the personnel deployed for maintenance support if his performance is not found to be satisfactory.

Contractor and associated personnel will have to follow all rules and regulations of owner's office premises in view of owner's certifications of ISO-9001and ISO-27001 including any other future certification.

1.2.2 Service Response requirements

The severity levels are defined in coming sections and the requirement of response time for various severity levels is defined below:

Emergency Support for Severity 1 issues are to be provided as and when they occur, and resolution should be within stipulated timelines during normal working hours. The on-call support team shall include all key technical competencies so that any aspect of a system failure can be attended. The team shall comprise of experienced technical staff that are skilled in troubleshooting of the various systems covered under AMC. Severity 1 problems shall be reported by telephone for rapid response; target response times are defined in para 1.6 of this section. The bidder shall submit the process details to meet the above requirements along with the offer. For severity 1 problems, the key objective is to restore the system to an operational state as quickly as possible, including by a temporary workaround. Resolution of problems shall also be provided by an individual fix that will be installed by the contractor at no extra cost to Owner.

Severity 2, 3, and 4 problems shall be reported by Owner through a call tracking system to be provided by the contractor or any other mechanism to be specified by the contractor.

1.2.3 Monitoring

The operation and performance of the various systems under AMC shall be monitored on a fortnightly basis. The contractor shall review the following, analyse the results, and communicate to Owner. The contractor shall conduct at least the following monitoring, for the all the Control centres.

1.2.3.1 Log Monitoring

- System logs for a selected day
- System history log
- Aggregate data collection
- Events Collection

During monitoring, if any defect/ abnormality is found, the contractor shall undertake corrective maintenance for the same. The bidder shall submit the process details to meet the above along with the bid.

1.2.3.2 Resource Monitoring

Resource Monitoring services comprises checking the system's major node resources, gather log data, analyse results, and advise Owner on the appropriate actions to be taken and undertake any agreed upon actions.

- CPU loading (Peak and Average)
- Memory utilisation (Peak and Average)
- Disk utilization (Peak and Average)
- Operating system resource utilisation reports
- System error log

The bidder shall submit the procedures details to meet the above along with the offer.

1.2.3.3 Cyber security System monitoring

The Contractor shall also be responsible for monitoring of the cyber security system. Moreover, the contractor will block all malicious IPs, URLs etc provided as IOCs to the Owner by CERT-In and NCIIPC or any other government agency.

The monitoring shall encompass the various cyber security devices installed at Control Centres such as firewalls, Intrusion prevention system (both network based and host based), routers etc.

The Owner shall carry out the Annual Security Audit from CERT-In Certified auditors at his own cost for the complete systems under this project and it will be the responsibility of the contractor to implement the recommendations given by auditor in consultation with the owner.

1.2.4 Patch Management

The contractor shall also be responsible for providing updates/patches for the software products supplied under the project. All other patches of third-party products like Operating System and Anti-virus shall be tested for cyber security compliance as per CEA (Cyber Security for Power Sector) Guidelines, 2021 by the Contractor prior to installing in the supplied system. Firewalls shall be provided with secure patch management. All the patches shall be downloaded through this single point of connection.

The Contractor shall provide a mechanism for patch management so that it is known that what patches have been applied and what all patches are pending but available with System.

1.2.5 Physical maintenance

The contractor shall undertake physical maintenance of all Equipment and modules under the scope of this contract in accordance with this section. The physical maintenance shall include cleaning, dusting, inspection of equipment for loose connections, damage to insulation, pest infections etc. as follows:

Activities shall include but not limited to:

(a) Online diagnostics for servers and workstations - once every 3 months.

(b) Connection test of LAN cables for identifying potential loose contacts in machines and routers - once every 3 months.

(c) Physical hardware checks to ensure proper working of cooling fans etc. - Once every 3 months.

(d) Physical inspection to check the machines and the panels for rat droppings, lizards or other vermin - once every 3 months.

(e) Cleaning and blowing for removal of dust from Servers and Workstations and router cum firewall panels - once every 3 months.

Exclusions:

a) Interfacing panels cleaning etc. are excluded from the scope above.

b) Maintaining dust free environment and protection from rodents and vermin is the responsibility of Owner.

c) Regular cleaning of computer furniture and surroundings is the responsibility of Owner.

Equipment shutdown during preventive maintenance shall be deemed as available.

1.3 Spares inventory

The Contractor shall maintain a spares inventory at his own cost to meet the spare availability requirements of the system. The spares shall be used as and when required and no separate charges are payable except the maintenance charges. The Contractor shall decide the items and components to be maintained as spares but a minimum number of spares as listed below in Table 1.2 shall be kept at the respective control centers. This shall be periodically verified by the Owner and unavailability of spares shall be treated as non-availability as per severity 2. If spares have been used in the system, then the replenishment of the spare should be done within 45 calendar days, otherwise it will be considered as non-availability as per **Severity-2.**

Table - 1.2 Mandatory Spares inventory at each Control Centre and FRTU location

Sl.no.	Item description	Unit	Control Centre
1	ADMS Servers including main and auxiliary memory, interface cards (one of each type)		To be in the Owner's scope since these spares were not procured during the project stage
2	LAN switch		
3	Router cum Firewall		
Sl.no.	Item description	Unit	FRTU location
1	Modem, CMRs, HDRs, MFTs	Lot	1 (for each FRTU location)

1.4 Integration of new equipment

All future services and configuration support for integration of FRTUs & Control Centre Integration on ICCP shall be the responsibility of contractor and shall be part of the maintenance Services.
Support at Control centre for these integrations shall be treated as severirty-3 support as defined below.

1.5 Problem/Defect Reporting

The bidder shall submit an appropriate problem/defect reporting procedure to meet the requirement of all severity level cases to get the approval of the same from Employer/Owner. The problems will be categorized as follows:

Category	Definition
Severity 1 – Urgent	Complete system failure, severe system instability, loss or failure of any major subsystem or system component so as to cause a significant adverse impact to system availability, performance, or operational capability (as described at 1.5.1.1)
Severity 2 – Serious	Degradation of services or critical functions such as to negatively impact system operation. Failure of any redundant system component such that the normal redundancy is lost (as described at 1.5.1.2) Non-availability of Manpower at control centre during working hours, non-availability of spares
Severity 3 – Minor	Any other system defect, failure, or unexpected operation (as described at 1.5.1.3)
Severity 4 – General/Technical Help	Request for information, technical configuration assistance, "how to" guidance, and enhancement requests (as described at 1.5.1.4

1.5.1 Severity levels

The detail of the systems under different severity levels is as below:

1.5.1.1 Severity-1 (Urgent support)

This support is required when there is a complete system failure, severe system instability, the loss/ failure of any major sub-system / system or its components, which may significantly impact the system availability, performance, or operational capability at Control centre.

Following outages/disruptions will be considered under Serverity-1:

- Loss of Critical functionality as envisaged in specification due to any problem software/Hardware-related in ADMS servers and applications.
- Cyber Security issues
- Outage of both Routers or LAN Switches
- Loss of data exchange with FRTUs due to a crash in the ADMS application
- The failure of a FRTU shall be considered as Severity-1 level if it is established that the problem is inherently due to the FRTU module/database or modems. However, a minimum time of 24 hrs for resolution of the problem shall be provided in the worst case.

1.5.1.2 Severity-2

The support services not defined under Severity-1 are included under this category. Coverage under this severity would be outages that do not immediately cause on line data loss but subsequently could result into Severity-1 category outage, loss of an important subsystem that may affect the day-to-day works and loss of archived data.

Following outages/disruptions will be considered under Serverity-2:

- Failure of one ADMS server, stoppage of data collections for archiving and outage of other applications not covered under severity-1 are included in this category. However, the critical functionality loss due to loss of only one component as defined here shall be treated as Severity-1.
- Failure of any redundant system component affecting the critical redundancy like loss of any one Application Processor, Router would also be included in this category.
- The telemetry failure of a FRTU if it is established that the failure is not due to a break in the communication media or power supply in the premises where the FRTU is installed. However, a maximum time of Organization and travelling of 48 hrs shall be provided in the worst case for FRTUs in a city or town away from the capital cities where the control centres are.
- Non-availability of designated contractor's Man-power at control centre as well as required inventory of spares specified here.
- Non-compliance of Monitoring functions as specified in 1.2.3.

1.5.1.3 Severity-3 (Standard support)

The support services included under this category are when the outage or loss of functionality is neither of an emergency nor priority functionalities as indicated in severity level 1 or 2 above. Problems like database reworking, failure of any one application not included in Severity 1 or 2 and integration services as defined in 1.4 would be covered under this Severity.

1.5.1.4 Severity-4 (General Technical Help)

Request for information, technical configuration assistance, "how to" guidance, and enhancement requests are included under this category.

1.6 Response and Resolution Time

This section describes the target times within which the contractor should respond to support requests for each category of severity. The *Initial Response Time* is defined as the period from the initial receipt of the support request (through approved communications channels) and the acknowledgment of the contractor subject to the Maximum time defined in **Table 1.4**. The *Action Resolution Time* is the from the acknowledgement of support request to the contractor delivering a solution subject to the Maximum time defined in **Table1.4**. This period includes investigation time and consideration of alternative courses of action to remedy the situation. The *Action* is defined as a direct solution or a workaround.

All response and resolution times (hours and days) specified below are during working hours of the Week only.

Table 1.4: Emergency Support Response/Resolution Time

Severity	Initial Response Time	Action Resolution Time	Action
1	1 hour	4 hours	An urgent or emergency situation requiring continuous attention from necessary support staff until system is restored may be by a workaround
2	2 hours	12 hours	Attempt to find a solution acceptable to the Owner as quickly as possible
3	1 day	2 days	Evaluation and action plan. Resolution time is dependent on reproducibility, ability to gather data and Owner's prioritisation. Resolution may be by workaround
4	2 days	5 days	Report on the problem / query is to be furnished

The bidder shall submit the detailed format and procedure for all the activities such as Reporting time, Resolution time, Downtime etc. along with the bid proposal**.**

1.7 Availability and Payment charges Calculation

It is the endeavour of both the contractor and Owner to maximize system availability to the extent possible. The contractor shall provide guaranteed availability for various types of Systems as specified in Table 1.1.

The non-availability hours for availability calculation shall be counted from the end of the allowed Action Resolution time in Table 1.4. A standardized register shall be maintained at each site containing full details of each outage, actions taken by Owner to correct the problem, applicable Severity level, time of reporting to the contractor support engineer/support centres pursuant to the appropriate methods in the Agreement, allowed Response time as per the Response times defined in above section, actual Resolution time and signature of Engineer-in-charge as well as the contractor's support engineer of the site. For the incidents resolved within specified Resolution time as per Table 1.4, the same shall not be considered as part of non-availability calculation.

Duration of outages over and above the Action Resolution time, as defined in Table 1.4 in each of the Severity levels shall be counted for the non- availability computation and shall be clearly brought out in the register. The resolution may be accomplished by a work around, and such solution shall mark the end of non-availability.

In the event of frequent failures at a site, due to a common cause, the first FPR (Field Problem Report) logged shall be used for the purpose of availability calculation.

However, simultaneous multiple outages due to unrelated cause would be counted separately.

1.7.1 Availability computation for ADMS System

Availability would be on per quarter per site basis. The formula to be used for availability computation would be as under:

Availability per quarter yearly (per site) = $\frac{\text{THQ- (S1 x 1+S2 x0.8+S3 x 0.5)}}{\text{THQ}}$ x 100%

Where THQ is total hours in the quarter

S1 is the total non-available hours in Severity Level-1 in the quarter.

S2 is the total non-available hours in Severity Level-2 in the quarter.

S3 is the total non-available hours in Severity Level -3 in the quarter.

The above calculations shall be same for FRTUs.

1.7.2 Payment of maintenance charges (based on ADMS availability)

In the event of availability below a certain level, the maintenance charges would be proportionately reduced as follows:

For System:

Availability for each control centre per quarter	Deduction as % of the apportioned price of total AMC for ADMS portion of the contract applicable for that site (software price)
Greater than or equal to 99.99 %	NIL
Less than 99.99%	Deduction of 2% of the apportioned price of the apportioned quarterly AMC for every 0.5% or part thereof decrease in availability under 99.99%.

1.7.3 Computation of Availability / Non-availability

The computation of Availability / Non-availability would be rounded up to 2 decimal places at each Control Centre on quarterly basis and any deduction in the maintenance charges thereof would be calculated as stated above in Section 1.7.2 on pro-rata basis.

1.8 Contractor's Obligations

The contractor shall guarantee continuous availability of the system as indicated in Table 1.1 for the AMC period from the date of operational acceptance. The system availability shall be calculated as indicated above on monthly basis. During this period, the contractor shall take continuous actions to ensure the guaranteed availability. In case the actual availability falls short of the guaranteed availability, it would be considered as contractor's default and deductions would be made as per Section 1.7.2 above.

In order to optimise and improve the response of the system, the contractor may re-install the program modules after making the Owner engineer aware of the consequence (like data loss, database rebuild etc).

1.9 Responsibilities of Owner

The responsibilities of the owner during the maintenance period are as follows:

(a) Owner shall ensure that proper Environmental conditions and uninterrupted Power Supply for Equipment's are maintained for the system.

(b) Owner shall ensure that the System is kept and operated in a proper and prudent manner as described in the system documentation provided by the Contractor and only trained Owner representatives (or persons under their supervision) are allowed to operate the system.

(c) Owner shall provide access to the sites of installation for purposes of providing Support Services.

(d) Owner shall provide the contractor with Space for Office and storage space for their maintenance staff and spares.

(e) Owner shall ensure healthy communication medium from FRTU to ADMS System at SLDC i.e. charged 4G Data SIM (Dual Service Provider) for GPRS communication from Sub-Station to ADMS System at SLDC. Availability of dedicated Broadband connection with Static IP for ADMS Servers at SLDC.

(f) Any eventuality requiring replacement of any Hardware /Software to meet the new Guidelines of Cyber Security Compliance shall be on Owner's Account.

(g) Procurement of new FRTUs for integration with the ADMS servers.

1.10 Responsibility Matrix

The table in this section provides a summary definition of the roles and responsibilities of the contractor and Owner.

Legend	●	This indicates who has primary responsibility to perform this function
	A	This indicates who will provide assistance

Table 1-3 Responsibility Matrix

Sl.no.	Task	Owner	Contractor
1.0	PROBLEM IDENTIFICATION		
1.1	Root cause analysis to determine whether the fault is attributable to Hardware or Software	---	●
2.0	SOFTWARE PROBLEM RESOLUTION		
2.1	Report problem and assist with problem identification	---	●
2.2	Provide or recommend corrections, temporary patches, workarounds or other fixes to system problems	---	●
2.3	Install and test corrections, temporary patches, workarounds or other fixes to system problems	---	●
3.0	ROUTINE SOFTWARE SUPPORT		

3.1	Build and maintain database, displays and reports	---	●
3.2	Perform system back-ups	---	●
3.3	Restore or reinstall software from back-ups	---	●
3.4	Monitor system logs (part of remote monitoring service)	---	●
3.5	Maintain system logs	---	●
3.6	Maintain user accounts	●	A
4.0	HARDWARE PROBLEM RESOLUTION		
4.1	Report problem and assist with defining problem	●	A
4.2	Troubleshoot problem to diagnose if it is software related or hardware related	---	●
4.3	Identify failed component, replace failed components in online system using parts from spares inventory	---	●
4.4	Restore operation of repaired/replaced equipment	---	●
5.0	HARDWARE SPARE PARTS		
5.1	Manage* local spares inventory	●	●
5.2	Replenish local spares inventory	---	●
6.0	INTEGRATION AND DATABASE WORK AT SLDC		
6.1	New FRTU Integration	---	●
6.2	New ICCP Integration with upgraded SCADA-EMS system	---	●
7.0	CYBER SECURITY MONITORING		
7.1	Patch Updates	---	●
7.2	Cyber Security Monitoring	●	●
7.3	Annual Audits	---	●
7.4	Implementation of Recommendations during Audit	---	●
7.5	Maintenance of Spares	---	●
8.0	FRTU MAINTENANCE	---	●

1.11 Cancellation of Contract in Full or in Part:

This clause will apply if the Contractor

(a) makes any default in proceeding with the works with due diligence and continues to do so even after a seven (7) days' notice of writing from the Engineer-in-Charge or,

(b) commits default in complying with any of the terms and conditions of the Contract and does not remedy it or take effective steps to remedy it within seven (7) days after a notice in writing has been given pertaining to the above by the Engineer-in-Charge or,

(c) fails to complete the works or items of work or before the stipulated date of completion and does not complete the work / remaining items of work within the period specified in a notice given in writing by the Engineer-in-Charge,

(d) defaults in any of the terms and conditions of the Contract as mentioned in this Letter of Award.

2.0 Service Level Agreement and Non-Disclosure Agreement

The Service Level Agreement during the three (3) year AMC period would be in line with the specifications outlined in this document.

The bidder, by virtue of him being exposed to data of SLDCs, will be bound to execute a Non-Disclosure Agreement which would be documented and signed at the time of award of LOA.

Annexure C.2 (a)

Features	**HPE DL 380 GEN 10**	**Dell PowerEdge 740**
Processor	Intel Xeon 4 to 28 core	Intel Xeon processors, with up to 28 cores per processor
Memory	24 DDR4 DIMM slots, 32 GB RAM, supports 3.0 TB	32 DDR4 DIMM slots, 32 GB RAM, supports 3 TB max
Storage Controller	HPE Smart Array P408i-a	PERC H755
Drive Bays	8 or 12 LFF SAS/SATA/SSD	Up to 12 x 3.5-inch SAS/SATA
Power Supply	Hot Plug redundant HPE Flexible Slot Power supplies, HPE Flexible Slot Power Supply bay 2	Hot Plug redundant Power supplies
Fans	Standard 6 fans	Standard 6 fans
From Factor	2U rack server	2U rack server
Embedded Management	HPE iLO Standard with Intelligent Provisioning, HPE iLO Advanced	iDRAC9, Life Cycle Controller
Bezel	Security bezel	Security bezel
Security	Optional locking Bezel Kit, Intrusion Detection Kit, and HPE TPM 2.0	Cryptographically signed firmware, Secure Boot, System Lockdown, TPM 1.2/2.0
I/O & Ports	HPE 1 Gb 331i Ethernet adapter 4-ports per controller, 1 x iLO, 1 VGA, Internal USB 3.0 connector.	1 x iDRAC , 1 x USB 2.0, 1 x VGA, 1 x USB 2.0, 1 x Serial (optional), 1 x USB 3.0, 4 x 1G, 1 x VGA
OS and Hypervisors	Microsoft Windows Server, VMware ESXi, Red Hat Enterprise Linux (RHEL), SUSE Linux Enterprise Server (SLES), Ubuntu	Ubuntu Server LTS, Citrix Hypervisor, Microsoft Windows Server with Hyper-V, Red Hat Enterprise Linux, SUSE Linux Enterprise Server, VMware ESXi
OEM-ready version available	3 year Server Warranty includes three years of parts	3 years Server Warranty includes three years of parts

Annexure C2(b)

Features	NX 3240	HPE 1660
Processor	up to Two Intel Xeon Processor	up to two Intel Xeon processors
Memory	PC4-2933 memory	PC4-2933 memory
Storage Controller	PERC H730P mini Raid Controller	HPE Smart Array P816i-a SR Gen10 Raid controller
Drive Bays	Up to 12 3.5-inch (SAS or SATA) front accessible drives in slots 0 to 11, Up to four 3.5-inch (SAS or SATA)	Does not include data drives standard. 12 x LFF (3.5") hot-plug front drive bays standard 4 x LFF hot-plug mid-chassis drive cage is optional.
Power Supply	Two AC power supply units 750 W - 1100 W	Two AC power supply units 800 W - 1600 W
From Factor	2 U Server	2 U Server
NIC	Up to 4 NIC	Up to 4 NIC
Expansion bus	up to four PCI express (PCIe) 3.0 expansion cards	3 x PCIe; optional 3-slot secondary riser
VGA	two 15-pin VGA ports on the front and back panels.	two 15-pin VGA ports on the front and back panels.
Environmental	Operating 10°C to 35°C (50°F to 95°F) with no direct sunlight on the equipment	Standard operating temperature 10° to 35° C (50° to 95° F)
Expanded operating temperature	Continuous operation - 5°C to 40°C	5° to 40° C (95° to 104° F)