



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
NERPC Complex, Dong Parmaw, Lapalang, Shillong - 793006, Meghalaya

75
Azadi Ka
Amrit Mahotsav

Ph. No: 0364 - 2534039

Fax No: 0364 - 2534040

Website: www.nerpc.nic.in

No. NERPC/OP/Committee/2022/497-571

Date: April 12, 2022

To,

1. Hon'ble Dy. Chief Minister & In-charge of Power, Govt. of Arunachal Pradesh, Itanagar - 791 111
2. Hon'ble Dy. Chief Minister & In-charge of Power, Govt. of Meghalaya, Shillong - 793001
3. Hon'ble Dy. Chief Minister & In-charge of Power, Govt. of Tripura, Agartala - 799 001
4. Hon'ble Minister of Power, Govt. of Assam, Dispur - 781006
5. Hon'ble Minister of Power, Govt. of Manipur, Imphal - 795 001
6. Hon'ble Minister of Power, Govt. of Mizoram, Aizawl - 796 001
7. Member (GO&D), CEA, Sewa Bhavan, R. K. Puram, New Delhi - 110 066
8. Commissioner (Power), Govt. of Arunachal Pradesh, Itanagar - 791 111
9. Principal Secretary (Power), Govt. of Assam, Dispur, Guwahati - 781 006
10. Commissioner & Secretary (Power), Govt. of Manipur, Imphal - 795001
11. Principal Secretary (Power), Govt. of Meghalaya, Shillong - 793001
12. Commissioner & Secretary (Power), Govt. of Mizoram, Aizawl - 796001
13. Principal Secretary (Power), Govt. of Nagaland, Kohima - 797001
14. Secretary (Power), Govt. of Tripura, Agartala - 799001
15. Chairman, APDCL/AEGCL/APGCL, Bijuli Bhavan, Paltan Bazar, Guwahati - 781 001
16. Chairman & Managing Director, MeECL, Lumjingshai, S. R. Road, Shillong - 793 001
17. Chairman & Managing Director, TSECL, Agartala - 799001
18. Chairman & Managing Director, NEEPCO Ltd., Lower New Colony, Shillong - 793 003
19. Director (Finance), NHPC Ltd., NHPC Complex, Sector-33, Faridabad - 121 003
20. Director (Coml.), NTPC Ltd. NTPC Bhawan, Scope Complex, Institutional Area, Lodhi Road - 03
21. Managing Director, OTPC, 6th Floor, A-Wing, IFCI Tower -61, Nehru Place, New Delhi - 110019
22. Director (Operation), POWERGRID, Saudamini, Plot No. 2, Sector-29, Gurgaon, Haryana - 122 001
23. CEO, NVVNL, Core 5, 3rd Floor, Scope Complex, 7 Institutional Area, Lodhi Road, New Delhi - 03
24. Director (Marketing & BD), PTC, NBCC Tower, 15 Bhikaji Cama, Place, New Delhi - 110066
25. Managing Director, APDCL, Bijuli Bhavan, Paltan Bazar, Guwahati - 781 001
26. Managing Director, APGCL, Bijuli Bhavan, Paltan Bazar, Guwahati - 781 001
27. Managing Director, AEGCL, Bijuli Bhawan, Paltan Bazar, Guwahati - 781 001
28. COO, CTUIL, Plot No.2, sector-29, Gurgaon, Haryana - 122001
29. CMD, NLDC, B/9, Qutub Institutional Area, Katwaria Sarai, New Delhi - 16
30. ED, NERLDC, Dongtieh-Lower Nongrah, Lapalang, Shillong- 793006

Sub: Minutes of 22nd TCC & 22nd NER Power Committee Meetings held at Guwahati

Sir/Madam,

Please find enclosed herewith the minutes of 22nd TCC Meeting held at "Hotel Radisson Blu", Guwahati on 26th March, 2022 and the & 22nd NERPC Meeting held at "Hotel Vivanta", Guwahati, 28th March, 2022 for your kind information and necessary action. The minute is also available on the website of NERPC, www.nerpc.nic.in.

Encl: As above

बी. लिंगखोइ

बि. लिंगखोइ / B. Lyngkhoi
सदस्य सचिव / Member Secretary

Copy to:

1. PS to Chairman, NERPC and Hon'ble Chief Minister & In-charge of Power, Govt. of Nagaland, Kohima - 01
2. PS to TCC Chairman and Chief Engineer (T&G), Dept. of Power, Government of Nagaland, Kohima - 01

Copy for kind information to:

1. Director (Distribution), MeCL, Lumjingshai, S.R. Road, Shillong – 793 001
2. Director (Transmission), MePTCL, Lumjingshai, S.R. Road, Shillong – 793 001
3. Director (Generation), MePTCL, Lumjingshai, S.R. Road, Shillong – 793 001
4. Managing Director, MSPCL, Electricity Complex, Keishampat, Imphal – 795 001
5. Managing Director, MSPDCL, Secure Office Bldg. Complex, 3rd Floor, South Block, Imphal – 1
6. Director (Tech.), TSECL, Bidyut Bhaban, Banamalipur, Agartala -799 001.
7. Director (Generation), TPGCL, Bidyut Bhaban, Banamalipur, Agartala -799 001.
8. Director (Tech.), NEEPCO Ltd., Lower New Colony, Shillong-793 003.
9. Regional ED (East –II), NTPC, 3rd Floor, OLIC Bldg., Pl No- N.17/2, Nayapalli, Bhubaneswar-12
10. Executive Director, NERTS, PGCIL, Lapalang, Shillong - 793006
11. Executive Director (Comml.), NEEPCO Ltd., Lower New Colony, Shillong-793003.
12. Executive Director (O&M), NEEPCO Ltd., Lower New Colony, Shillong-793003.
13. Executive Director (Comml.), NHPC, NHPC Office Complex, Faridabad-121003.
14. Executive Director (O&M), NHPC, NHPC Office Complex, Faridabad-121003.
15. Executive Director (Marketing), PTC, NBCC Tower, 15 Bhikaji Cama, Place, New Delhi – 110066
16. Chief Engineer (GM), CEA, 6th Floor, Sewa Bhawan, R.K.Puram New Delhi-110066.
17. Chief Engineer (NPC), NRPC Complex, Katwaria Sarai, SJSS Marg., New Delhi - 110016
18. Engineer-in-Chief, P&E Dept., Govt. of Mizoram, Aizawl – 796 001
19. Chief Engineer (E Zone), Dept. of Power, Govt. of Arunachal Pradesh, Itanagar-791111.
20. Chief Engineer (W Zone), Dept. of Power, Govt. of Arunachal Pradesh, Itanagar-791111.
21. Chief Engineer (TP&MZ), Department of Power, Govt. of Arunachal Pradesh, Itanagar- 1
22. GM (AM), NERTS, POWERGRID, Lapalang, Shillong – 793006
23. VP (Plant), OTPC, Palatana, P.O Udaipur, Gomati Dist., Tripura – 799105
24. GM (BD), NVVNL, Core 5, 3rd Floor, Scope Complex, 7 Institutional Area, Lodhi Road, New Delhi-3
25. Chief Engineer, Loktak HE Project, NHPC, Komkeirap, Manipur-795124.
26. CGM, AEGCL, Bijuli Bhawan, Paltan Bazar, Guwahati – 781 001
27. CGM, APGCL, Bijuli Bhawan, Paltan Bazar, Guwahati – 781 001
28. CGM, APDCL, Bijuli Bhawan, Paltan Bazar, Guwahati – 781 001
29. CGM (LDC), SLDC Complex AEGCL, Kahelipara, Guwahati-781019.
30. Head of SLDC, Dept. of Power, Govt. of Arunachal Pradesh, Itanagar-791111
31. Head of SLDC, Dept. of Power, Govt. of Manipur, Keishampat, Imphal-795001
32. Head of SLDC, MeECL, Lumjingshai, S.R. Road, Shillong-793001
33. Head of SLDC, P&E Dept., Govt. of Mizoram, Aizawl-796001
34. Head of SLDC, Dept. of Power, Govt. of Nagaland, Dimapur
35. Head of SLDC, TSECL, Agartala – 799001

Special Invitee(s):

36. Chairperson, CEA, Sewa Bhawan, R.K. Puram, New Delhi – 110066
37. Member (Power Systems), CEA, Sewa Bhawan, R.K. Puram, New Delhi – 110066
38. Secretary, North Eastern Council, Nongrim Hills, Shillong – 793 003
39. Member Secretary, ERPC, 14 – Golf Club Road, Tollygunge, Calcutta – 700 033
40. Member Secretary, NRPC, NRPC Complex, 18-A, S.J.S. Marg, Katwaria Sarai, New Delhi – 16
41. Member Secretary, WRPC, MIDC Area, Marol, Andheri (E), Mumbai – 400 093
42. Member Secretary, SRPC, 29 – R.C. Cross Road, Bangalore – 560 009
43. Managing Director, NETC, #2C, 3rd Floor, D-21, DMRC Building, Corporate Park, Sector-21, Dwarka, Delhi-77

बि. लिंगखोइ

बि. लिंगखोइ / B. Lyngkhoi
सदस्य सचिव / Member Secretary

भारत सरकार **Government of India**

विद्युत मंत्रालय **Ministry of Power**

उत्तर पूर्वी क्षेत्रीय विद्युत समिति **North Eastern Regional Power Committee**



RECORD NOTE OF DISCUSSION

OF

22ND TCC MEETING

&

22ND NERPC MEETING

(UNDER THE AEGIS OF NEEPCO LTD)

Venue: Hotel Radisson Blu, Guwahati

Date (TCC): 26th March, 2022

Venue: Hotel Vivanta, Guwahati

Date (NERPC): 28th March, 2022

ABBREVIATION

A	Amperes
ACSR	Aluminum Conductor Steel Reinforced
ADB	Asian Development Bank
ADDCAP	Additional Capital Expenditure
AEGCL	Assam Electricity Grid Corporation Limited
AGBPP	Agartala Gas Based Power Plant
AIIB	Asian Infrastructure Investment Bank
AIS	Air Insulated Substation
AMC	Annual Maintenance Contract
AP / Ar. P	Arunachal Pradesh
APDCL	Assam Power Distribution Company Limited
AT&C	Aggregate Technical and Commercial
AWS	Automatic Weather Station
BHEL	Bharat Heavy Electricals Limited
BNC	Biswanath Chariali
BOQ	Bill of Quantities
BgTPP/ BTPS	Bongaigaon Thermal Power Project/ Station
CABIL	Capacity Building of Indian Load Dispatch Centers
CAGR	Compound Annual Growth Rate
CBIS	Capacity Building & Institutional Strengthening
CCM	Commercial Sub-Committee Meeting
CEA	Central Electricity Authority
CERC	Central Electricity Regulatory Commission
Ckt / ckt	Circuit
CoD/ DoCO	Date of Commercial Operation
CPRI	Central Power Research Institute
CPSUs	Central Public Sector Undertaking(s)
CS	Central Sector
CSST&DS- AP	Comprehensive Scheme for Strengthening of Transmission & Distribution system in Arunachal Pradesh
CT	Current Transformer
CTU	Central Transmission Utility
D/C	Double Circuit
DDUGJY	Deen Dayal Upadhyaya Gram Jyoti Yojana
DEA	Department of Economic Affairs
DGA	Dissolved Gas Analysis
DHEP	Doyang Hydro Electric Project
DISCOMs	Distribution Companies

DMS	Distribution Management System
DoNER	Development of North Eastern Region
DoP / DOP	Department of Power
DPR	Detail Project Report
DSM	Deviation Settlement Mechanism
E/F	Earth Fault
EHV	Extra High Voltage
EMS	Energy Management System
ERS	Emergency Restoration System
FDS	Frequency Domain Spectroscopy
FY	Financial Year
GDAM	Green Day Ahead Market
GENCO	Generation Company
GIS	Gas Insulated Substation
GNA	General Network Access
GOI	Government of India
GSS	Grid Sub Station
GST	Goods and Services Tax
GTP	Gas Turbine Plant
GW	Giga Watt
HEP	Hydro Electric Project
HVDC	High Voltage Direct Current
HPO	Hydro Power Purchase Obligation
HQ	Head Quarter
HTLS	High temperature Low Sag
ICT	Inter Connecting Transformer
IIP	Index of Industrial Production
IMD	India Meteorological Department
IPDS	Integrated Power Development Scheme
IR	Insulation Resistance
ISTS	Inter State Transmission System
JV	Joint Venture
KM / Km/ km	Kilometer
KV / kV	Kilo Volt
KWH / kwh	Kilo Watt Hour
LADF	Local Area Development Fund
LC	Letter of Credit
LILO	Loop In Loop Out
LoA	Letter of Award
LTA	Long Term Access
MeECL	Meghalaya Energy Corporation Limited
MePDCL	Meghalaya Power Distribution Corporation Limited
MePGCL	Meghalaya Power Generation Corporation Limited
MePTCL	Meghalaya Power Transmission Corporation Limited
MLHEP	Myntdu Leshka Hydro Electric Project

MNRE	Ministry of New and Renewable Energy
MOM	Minutes of Meeting
MoP	Ministry of Power
MoU	Memorandum of Understanding
MSPCL	Manipur State Power Company Limited
MSPDCL	Manipur State Power Distribution Company Limited
MTOA	Medium Term Open Access
MVA	Mega Volt Ampere
MVAR	Mega Volt Ampere Reactive
MW	Mega Watt
MYT	Multi Year Tariff
NCT	National Committee on Transmission
NE / NER	North Eastern Region
NEC	North Eastern Council
NEEPCO	North Eastern Electric Power Corporation Limited.
NERES	North Eastern Region Expansion Scheme
NERLDC	North Eastern Regional Load Dispatch Centre
NERPC	North Eastern Regional Power Committee
NERPCTP	North Eastern Regional Power Committee Transmission Planning
NERPSIP	North Eastern Region Power System Improvement Project
NERST	North Eastern Regional Standing Committee on Transmission
NERSS	North Eastern Region Strengthening Scheme
NERTS	North Eastern Regional Transmission System
NESIDS	North East Special Infrastructure Development Scheme
NETC	North East Transmission Company Limited
NETeST	NER Telecommunication, SCADA & Telemetry Coordination Sub-Committee
NHPC	National Hydroelectric Power Corporation Limited
NLDC	National Load Dispatch Centre
NoC	No Objection Certificate
NPC	National Power Committee
NPTI	National Power Training Institute
NTPC	National Thermal Power Corporation Limited
NVVN	NTPC Vidyut Vyapar Nigam Limited
O/C	Over Current
OCC	Operation Coordination Sub-Committee

OEM	Original Equipment Manufacturer
O&M	Operation and Maintenance
OPGW	Optical Ground Wire/Optical Fibre
OSD / O/s	Outstanding Dues
OTPC	ONGC Tripura Power Company Limited
P&ED	Power and Electricity Department
PFC	Power Finance Corporation Limited
PG/PGCIL/Powergrid	Power Grid Corporation of India Limited
PLCC	Power Line Carrier Communication
PLI	Performance Linked Incentive
PMO	Prime Minister's Office
POC	Point of Connection
POSOCO	Power System Operation Corporation Limited
P/S	Power Station
PSDF	Power System Development Fund
PT	Voltage (Potential) Transformer
PPA	Power Purchase Agreement
RAM	Random Access Memory
RAPDRP	Restructured Accelerated Power Development and Reforms Program
RDSS	Revamped Distribution Sector Scheme
RECPDCL	REC Power Development and Consultancy Limited
RHEP	Ranganadi Hydro Electric Project
RLA	Residual Life AssessmentLCS
RLDC	Regional Load Dispatch Centre
RMC	Regional Met Centre
RMSE	Root Mean Square Error
RoE	Return on Equity
RoW	Right of Way
RPC	Regional Power Committee
RPO	Renewable Purchase Obligation
RTM	Regulated Tariff Mechanism / Real Time Market
RTU	Remote Terminal Unit
R&U	Renovation and Upgradation
SAMAST	Scheduling Accounting Metering and Settlement of Transactions in Electricity
S/C	Single Circuit
S/S / Ss	Sub Station
SCADA	Supervisory Control and Data Acquisition
SCM	Standing Committee Meeting
SHP	Small Hydro Project
SLDC	State Load Dispatch Centre
SPS	System Protection Scheme
Stg	Stage
STOA	Short Term Open Access

TAM	Term Ahead Market
TBCB	Tariff Based Competitive Bidding
TCC	Technical Coordination Committee
TFA	Tower Footing Resistance
TL	Transmission Line
TLSA	Transmission Line Surge Arrester
TSECL	Tripura State Electricity Corporation Limited
TS	Transmission System
ULDC	Unified Load Dispatch Scheme
VSAT	Very Small Aperture Terminal
YTC	Yearly Transmission Charge

CONTENTS

ITEM NO.	PARTICULARS	PAGE NO.
I	Proceeding of the 22 nd Technical Coordination Committee Meeting	11
II	Proceeding of the 22 nd NER Power Committee Meeting	12
III	Confirmation of the Minutes of 21 st TCC & 21 st NERPC Meeting held on 03.02.2021 & 04.02.2021 at Kohima	21
CATEGORY – A: ITEMS DISCUSSED AND APPROVED BY THE COMMITTEE		
A.01	Importance of developing small hydro projects in the NER states under MNRE, GOI-SHP scheme – DOP Nagaland	28
A.02	Frequent tripping of 33kV feeders at Ziro S/S – NERTS	30
A.03	Provision of testing & diagnostic tools and equipment for post commissioning operation and maintenance of transmission lines – DOP Arunachal Pradesh	31
A.04	Providing spare materials under NERPSIP - MSPCL	32
A.05	Requirement of Manpower – MSPCL.	33
A.06	Establishment of state-of-the-art training centres at Shillong, Jowai and Tura - MePTCL	34
A.07	Providing spare materials in transmission line, EHV sub-station and DMS packages under NERPSIP - TSECL	36
A.08	Tenure of Chairmanship of NERPC - NERPC	38
A.09	Status of Renovation and Upgradation of protection and control system of 66kV substation – DOP Nagaland	38
A.10	Status of implementation of important ISTS proposals – DOP Arunachal Pradesh	39
A.11	Comprehensive Scheme for Strengthening of Transmission & Distribution System in Arunachal Pradesh (CSST&DS-AP) – DOP Arunachal Pradesh	40
A.12	Tawang-Bhutan 132kV international connectivity between Lumla (India) and 600MW Kolongchu HEP in Bhutan – DOP Arunachal Pradesh.	42
A.13	Restoration of 132kV Roing - Pasighat – DOP Arunachal Pradesh	43
A.14	Completion of substations – MSPCL	44
A.15	Fiber Optic Communication- MePTCL	45

ITEM NO.	PARTICULARS	PAGE NO.
A.16	Sanction of grant from PSDF towards construction of 132kV s/c Khliehriat – Panchgram and 132kV d/c Umiam stg-i to stg-iii line by HTLS - MePTCL	46
A.17	Additional share allocation subsequent to commissioning of all 4 units of Kameng – NEEPCO	46
A.18	Mobile substation for emergency restoration of EHV system in NER - NERPC	48
A.19	Transmission system for providing connectivity to Dibang HEP – NERPC	48
A.20	Readiness of downstream of New Kohima substation - NERLDC	52
A.21	Accurate load forecasting and installation of AWS - NERLDC	54
A.22	Straightening of 132kV RHEP-NIRJULI-LEKHI line and upgradation of LILO portion at Pare HEP - NERPC	56
CATEGORY – B: ITEMS FOR APPROVAL		
B.01	Intra-state schemes of Assam - AEGCL	58
B.02	Reconductoring of important lines in Manipur system - MSPCL	59
B.03	Intra-state strengthening schemes of Meghalaya – MePTCL	60
B.04	Strengthening of connectivity to Champhai – P&ED Mizoram	60
B.05	Reconductoring of intra-state lines with HTLS - TSECL	61
B.06	DPR of reliable communication schemes - NERPC	61
B.07	Introduction of SPS in MLHEP – MePGCL	62
B.08	Requirement for replacement of 400kV 50MVAR bus reactor-i & ii and 400kV 50MVAR 400kV Bongaigaon - Balipara-ii line reactor at Bongaigaon s/s – NERTS	63
B.09	Incorporation of bus bar protection for 132kV substations of Powergrid – NERTS	64
B.10	Re-conductoring of 66kV transmission line with HTLS Panther conductor from (1) Nagarjan – Singrijan ckt-i, (2) Nagarjan – Singrijan ckt-2, (3) Singrijan-Chumukedima s/c, (4) Singrijan – Ganeshnagar s/c – DOP Nagaland	65
B.11	Upgradation of 132kV DHEP- Mokokchung – DOP Nagaland	66
B.12	Installation of TLSA in 400kV d/c Palatana transmission system - NETC	67
B.13	Upgradation of SCADA/EMS systems at regional/state level in NER - NERPC	69

ITEM NO.	PARTICULARS	PAGE NO.
B.14	Establishment of VSAT communication in selected remote locations for state utilities in NER - NERPC	70
B.15	Deployment of new RTUs in selected substations of NER - NERPC	71
B.16	Diversion of 132kV Gohpur – Nirjuli line due to construction of greenfield airport at Holongi (Itanagar) in Arunachal Pradesh - NERTS	71
CATEGORY – C: COMMERCIAL ISSUES		
C.01	Outstanding dues - NEEPCO	73
C.02	Renewal of PPA with Arunachal Pradesh for supply of power of 600 MW Kameng HEP - NEEPCO	74
C.03	Non-receipt of payment from TSECL- NEEPCO	75
C.04	NHPC commercial issues with Meghalaya - NHPC	76
C.05	NHPC commercial issues with Manipur - NHPC	77
C.06	Dues and Opening of Letter of Credit (LC) against purchase energy from Baramura Gas Thermal Project, Tripura - TSECL	77
C.07	NERPC workshop on Draft GNA regulations 2021	78
C.08	High cost of Bongaigaon thermal power project – TSECL	78
C.09	Outstanding dues of NER beneficiaries - OTPC	79
C.10	Deviation Pool Account outstanding - NERLDC	80
C.11	Non-payment of NERLDC fees and charges bills - NERLDC	80
CATEGORY D: ITEMS FOR INFORMATION		
D.01	Update on Protection Database Management System – NERPC	82
D.02	Update on Automatic Demand Management System – NERPC	82
D.03	Update on Scheduling Accounting, Metering and Settlement of Electricity (SAMAST) – NERPC	83
D.04	Audit of Board Fund of NERPC - NERPC	83
CATEGORY – E: ITEMS TO BE REFERRED TO SUB COMMITTEE		
E.01	Connectivity between Likabali and Basar - DOP Arunachal Pradesh	84
E.02	Connectivity to Naharlagun – DOP Arunachal Pradesh	84
E.03	Connectivity between Jonai and Niglok– DOP Arunachal Pradesh	85
E.04	New EHV substations for important district headquarters– DOP Arunachal Pradesh	86

ITEM NO.	PARTICULARS	PAGE NO.
E.05	Establishment of 400kV Naharkatia substation- AEGCL	88
E.06	Establishment of 132/33kV Doulasal substation with LILO from 132kV Barpeta-Amayapur d/c- AEGCL	88
E.07	Establishment of 220/132kV Barnagar substation with LILO from 220kV Rangia-Salakati- AEGCL	88
E.08	Establishment of 50MVA 132/33kV Jonai substation- AEGCL	89
E.09	Ampacity Augmentation of lines- AEGCL	89
E.10	Enhancement of capability of 132kV Panchgram - Lumshnong, 132kV Hailakandi - Durlavcherra, 132kV Panchgram - Hailakandi, 132kV Srikona - Pailapool- NERLDC	89
E.11	Evacuation of power from Nangalbibra ISTS at 400kV - MePTCL	90
E.12	Evacuation of power from NERPSIP projects - MePTCL	91
E.13	Need for augmentation of EHV lines and substations in Ribhoi aspirational district - MePTCL	92
E.14	Indo-Bangla border transmission system improvement - MePTCL	93
E.15	Capacity augmentations and extensions of existing substations - MePTCL	95
E.16	Re-conductoring of transmission lines - MePTCL	96
E.17	Re-strengthening of intra-state 132kV transmission lines - TSECL	97
E.18	Providing of HTLS conductor with allied accessories at existing 132kV transmission line sections - TSECL	98
E.19	Installation of Raccoon covered conductor for outside source of 33kV power supply of Umiam stg-iv - MePGCL	99
E.20	Installation of two numbers generator transformer for Leshka - MePGCL	100
E.21	Upgradation of existing SCADA system of MLHEP - MePGCL	101
E.22	Renovation and Upgradation of protection system in the EHV sub-stations of Tripura - TSECL	102
E.23	Demolition and Reconstruction of residential/non-residential buildings in the substation premises at Haflong, Jiribam, Aizawl & Kumarghat under additional transmission for Gohpur Itanagar (ATGI) project & Salakati under Chukkha project through additional capitalization tariff block 2019-24 - NERTS	103

ITEM NO.	PARTICULARS	PAGE NO.
E.24	Communication system package for “Reliable Communication Scheme” under central sector for NER – NERTS	105
E.25	Additional 132kV d/c line between Kameng HEP and Khupi 132kV sub-station in view of overloading on the existing s/c line – DOP Arunachal Pradesh	106
E.26	Installation of TLSA on 132kV Leshka-Khliehriat d/c	107
CATEGORY – F: RESOLUTION ADOPTED DURING 22ND NERPC MEETING		
F.1	Importance of developing small hydro projects in the NER states under MNRE, GOI:SHP scheme	108
DATE & VENUE OF NEXT TCC/RPC MEETINGS		

ANNEXURES

ANNEX. No.	DESCRIPTION	PAGE NO.
I	List of Participants in 22 nd TCC Meeting	111
II	List of Participants in 22 nd NERPC Meeting	114
III	Keynote address of Shri Penrithung Yanthan, TCC Chairman, NERPC & Chief Engineer (T&G), Dept. of Power, Govt. of Nagaland in 22 nd TCC Meeting	118
IV	Speech of Shri Neiphiu Rio, Chairman, NERPC & Hon'ble Chief Minister & i/c Power, Govt. of Nagaland	122
V	Speech of Shri Chowna Mein Hon'ble Dy. Chief Minister & i/c Power, Govt. of Arunachal Pradesh	125
VI	Speech of Shri Prestone Tynsong, Hon'ble Dy. Chief Minister & i/c Power, Govt. of Meghalaya	131
VII	Speech of Shri Jishnu Dev Varma, Hon'ble Dy. Chief Minister & i/c Power, Govt. of Tripura	141
VIII	Speech of Shri Bimal Borah Hon'ble Power Minister, Govt. of Assam	145
IX	Keynote Address of Shri B. Lyngkhoi, IES (CPES), Member Secretary, NERPC	151
X	Presentation on General Network Access – by Sh. Abhijeet Agrawal, Dy. Director, NERPC	157
XI	Presentation on Power Procurement Mechanism of APDCL – by Sh. Indrajit Tahbildar, AGM, APDCL	172
B.13	DPR of SCADA/EMS	189
B.14	DPR of VSAT Communications	236
B.15	DPR of RTUs	325

SUMMARY RECORD OF DISCUSSIONS

22ND TECHNICAL COORDINATION COMMITTEE MEETING

&

22ND NORTH EASTERN REGIONAL POWER COMMITTEE MEETING

The 22nd TCC Meeting was held on the 26th March, 2022 at “Hotel Radisson Blu, Guwahati” & 22nd NER Power Committee meetings was held on 28th March, 2022 at “Hotel Taj Vivanta”, Guwahati. The meetings were hosted by NEEPCO Ltd.

The list of participants is enclosed at **Annexure – I & II.**

I : PROCEEDINGS OF THE 22ND TCC MEETING

The meeting started with welcome address by Shri. B. Maharana, Director (Finance), NEEPCO. Shri Maharana welcomed all TCC members and participants to the 22nd TCC meeting and wished all the participants a comfortable stay at the venue. He thanked NERPC for giving them the chance to host the august meeting for the benefit of the Region.

Thereafter, Shri Penrithung Yanthan, Chairman, TCC addressed the 22nd TCC meeting. In his brief speech, Shri Yanthan stated that TCC is an important forum for resolving various issues to make NER a self-reliant in Power sector. He mentioned that Ministry of Power, Government of India has entrusted key responsibilities pertaining to Transmission planning and communication planning to the RPCs. For any proposal on transmission for more than Rs. 500 Crores has to be ratified in RPC forums. In light of this NERPC Forum has assumed greater role in consensus building for an integrated and optimized planning. NERPC forum is unique in bringing the intra-state transmission challenges faced by NER states for deliberation. NERPSIP, a GoI flagship Scheme with the objective to strengthen the Intra-State Transmission & Distribution Infrastructure in the North Eastern Region will immensely improve the system. However, it is my humble submission unless the downstream missing links are established; the objective of the scheme will remain unfulfilled. Further, there are missing links in 33kV lines also, which needs to be addressed. He stressed about the importance of telemetry and market operation as the power supply is now market

driven. He also thanked POWERGRID for the timely completion of 220kV AIS to GIS. Finally, he thanked NEEPCO Ltd. For the excellent arrangement made and wish the meeting a grand success.

His speech is placed at **Annexure – III**.

Shri Goutam Roy, Member (Power System) Central Electricity Authority (CEA) in his brief address informed about the important role of Regional Power Committee (RPCs) and stated that it is a platform given by the Govt. of India to discuss, resolve, plan et., for all power related issues in the region. He mentioned that NER has a huge hydro potential and once they are tapped, the country will have huge share of green energy. He therefore opined that transmission line has to be planned accordingly. He mentioned that many important issues are there in the agendas and hope that meeting will be deliberated for fruitful outcome.

Sh. B. Lyngkhoi, Member Secretary, NERPC welcomed all delegates of the 22nd TCC meeting on behalf of NERPC. He expressed his sincere thanks to NEEPCO Ltd. for hosting the 22nd TCC & 22nd NERPC meetings even at the very short notice and for making excellent arrangement and providing a comfortable stay for the delegates.

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

The meeting concluded with the vote of thanks by Shri Ripunjyoy Bhuyan, General Manager, NEEPCO Ltd.

II : PROCEEDINGS OF THE 22ND NERPC MEETING

The 22nd NER Power Committee meeting commenced with bouquets presentations to dignitaries followed by ceremonial lighting of lamps by Shri Neiphiu Rio, Chairman, NERPC & Hon'ble Chief Minister, Govt. of Nagaland, Shri Chowna Mein, Hon'ble Dy. Chief Minister & I/c Power, Govt. of Arunachal Pradesh, Shri Prestone Tynsong, Hon'ble Dy. Chief Minister & I/c Power, Govt. of Meghalaya, Shri Jishnu Dev Verma, Hon'ble Dy. Chief Minister & I/c Power, Govt. of Tripura, Shri T. Ayemi, Hon'ble Adviser (Power), Nagaland, Shri Goutam Roy, Member (Power System), Central

Electricity Authority, Shri B. Lyngkhoi, Member Secretary, NERPC, Shri Penrithung Yanthan, TCC Chairman & Chief Engineer (T&G), DoP, Nagaland & Shri V.K. Singh, CMD, NEEPCO Ltd.

The meeting followed with welcome address by Shri. V.K. Singh, CMD, NEEPCO Ltd. Shri Singh thanked welcomed & thanked all NERPC members for attending the 22nd NERPC meeting to discuss and deliberate for the benefit of the Region.

Shri Neiphiu Rio, Chairman, NERPC & Hon'ble Chief Minister, Govt. of Nagaland addressed the 22nd NER Power Committee and stated that the NERPC has always been relentlessly striving towards making the NER power system operations more reliable, efficient and economically viable and stated that he has great hope and expectations towards a positive outcome from today's discussions and deliberations. He stated that the 22nd Technical Co-ordination Committee (TCC) Session held the day before had discussed many operational and technical issues were discussed & resolved and approval and further recommendations of the RPC is to be done.

On behalf of the North Eastern States, he said that he wanted to place on record his sincere gratitude to the Government of India for the continued and constant support to the North Eastern Region especially in regard to the Power sector. Implementation of World Bank funded project like NERPSIP (North East Region Power System Improvement Project) undertaken by POWERGRID through the initiative of Ministry of Power, GoI is one such programme. Through this project, the much-needed construction of Transmission lines and Sub-stations are presently in Progress in many places. He impressed upon POWERGRID, the Implementing Agency, to further expedite the work of the NERPSIP to ensure completion as per schedule.

He mentioned that in order to increase the state power generation and providing affordable and stable power supply to the consumer in the state, the state government is emphasizing more on setting up of new state-owned hydro and solar power projects such as 24MW Tizu Valley HEP, 24MW Zungki HEP, 42MW Lower Tizu HEP, 4.2MW Nrazai HEP, 2.4MW Duilumroi HEP, 20MW solar grid power plant at Ganeshnagar and 10MW solar grid power plant at Zhadima.

Full text of the speech of Hon'ble Chief Minister, Govt. of Nagaland & Chairman, NERPC is placed at **Annexure – IV**.

Shri Chowna Mein, Hon'ble Dy. Chief Minister & I/C Power, Govt. of Arunachal Pradesh in his brief address started with a note of congratulation to NEEPCO for successful commissioning of 600 MW Kameng Hydro Electric Project by putting the last and final unit into commercial operation on 12th February 2021. He wished NEEPCO Management to carry on the same tempo to take up all the new projects in Arunachal Pradesh entrusted to them to achieve planned targets.

Further, he mentioned that the construction of 2000 MW Subansiri Lower Hydro Electric Project has been resumed again in October 2019. The works are going on in a right pace as expected. He said that he was privileged to inaugurate the start of the main inlet valve assembly of the project on behalf of the Honorable Chief Minister of Arunachal Pradesh Sri Pema Khanduji on 6th February 2022. It has been informed by the National Hydro Power Corporation that two of its unit with a capacity of 500 MW would become operational by August 2022. He wished NHPC all the success and impressed upon them to work hard further to ensure completion of the entire project in August 2023 as scheduled.

He said he had full faith in this august forum of NERPC that it will have pragmatic and futuristic policy approach to help each state of the region to achieve its goal and make NER self-reliant and take a big roll to contribute hugely in making an AATMO-NIRBHAR BHARAT.

He mentioned about the importance of Inter-State link for reliability in the State and requested the executing agency to complete the Roing-Chapakhowa 132KV Double Circuit Transmission Line by September, 2022 without further delay. Then, restoration of Pasighat-Roing 132KV line which has been on ERS since last two years has to be done before this coming monsoon to prevent further damages. Regarding, the Kathalguri-Namsai 220 KV Double Circuit Transmission System, he thanked the forum of NERPC and grateful to the Ministry of Power, Government of India for early approval and notification of the proposal for implementation.

Full text of the speech of Hon'ble Dy. Chief Minister & I/C Power, Govt. of Arunachal Pradesh is placed at **Annexure – V**.

Shri Prestone Tynsong, Dy. Chief Minister & I/c Power, Govt. of Meghalaya, in his brief address, expressed gratitude to NERPC and stated that this is his first opportunity to be in this August forum. He also thanked NEEPCO Ltd for their magnanimity of hosting this event.

Sh. Tynsong at the outset mentioned that the North Eastern States often face many challenges due to its geographical isolation, the region is however blessed with vast hydro potential which could contribute to regional and national growth. Hydro power is more relevant today than ever considering the global efforts at limiting the use of coal and other fossil fuels for power generation in order to combat climate change.

He stated that the Southern region of Meghalaya gets the maximum amount of rainfall in the entire world. The need to tap this potential cannot be ignored. The Government of Meghalaya yearns to complete the Myntdu Leshka-II project which was mentioned above but would also extend all help if CPSUs show keen interest in development of projects in south Meghalaya. The proposed 120 MW project of NEEPCO at Umiam (Mawphu) area as this project would greatly benefit the people of the region in particular and the power sector of the region and nation in general. Also, the proposed RoR Myntdu Leshka Stage-II (210 MW, 3x70MW) which is being implemented by Meghalaya and located in Jaintia Hills, Meghalaya, is the downstream project of the existing Myntdu-Leshka-I 126 MW project.

Evacuation of surplus power from North East to Bangladesh continues to be a matter of discussion. The Government of Meghalaya has already sanctioned the survey of the 220kV Mawphlang (Sohra)- Ichamati line and the work is completed and the DPR is being prepared accordingly. This would enable Meghalaya and other NER states to trade surplus power to Bangladesh and earn additional revenue by providing a transmission corridor to Bangladesh. As Transmission Access Priority for Cross border Trade of electricity is to be determined by CTU, it is reiterated that PGCIL draw transmission lines for this purposed through Meghalaya preferably through Sohra grid Sub-station as it is close to Sylhet in Bangladesh.

Full text of the speech of Hon'ble Dy. Chief Minister, Govt. of Meghalaya is placed at

Annexure – VI.

Shri Jishnu Dev Verma, Dy. Chief Minister & I/c Power, Govt. of Tripura, in his brief address, expressed that the North Eastern Region being geographically isolated face many issues which are region specific in nature and many challenges that need to be tackled and overcome together. On behalf of the North Eastern States, he would like to place on record his sincere gratitude to the government of India for having a positive approach in extending continued and constant support to develop the power sector in the North Eastern Region. He hoped that the same spirit will be continued till NER reaches at par with other parts of the country. With the persistent enhancement of infrastructure and communication facilities, the NE Region will surely become a major power –house of India by using its surplus power potential.

The Asian Development Bank (ADB) is helping to tackle power sector problems by upgrading and expanding power generation, transmission and distribution systems in the North Eastern Region. Power distribution modernization & reliability improvement under ADB funded project includes modern technology like Covered Conductor, High Voltage Distribution System (HVDS), Fault Passage Indicator (FPI), Ring Main Unit (RMU), State of the Art Transformer Testing Lab, Smart Metering etc. for meeting future power demand growth, improved efficiency and facilitate reliable and quality power with reduction in AT & C losses.

The Revamped Distribution Sector Scheme (RDSS) to improve operational efficiencies and financial sustainability by providing result-linked financial assistance to DISCOMs will strengthen supply infrastructure based on meeting pre-qualifying criteria and achieving basic minimum benchmarks. He mentioned that all the North Eastern States will make use of the scheme for improvement in the quality, reliability and affordability of power supply to consumers through a financially sustainable and operationally efficient distribution sector.

Finally, he stated that this forum of NERPC is an opportunity to propose power strengthening Project for the entire North Eastern Region to the Ministry of power, government of India for funding under Power System Development Fund (PSDF).

Full text of the speech of Hon'ble Dy. Chief Minister, Govt. of Tripura is placed at **Annexure – VII.**

Shri Bimal Borah, the Hon'ble Power Minister, Govt. of Assam could not attend the meeting due to ongoing Assembly Session. In his note, he stated that Power supply in Assam has improved significantly in recent times with commissioning of Pare Hydro Electric Project, Kameng Hydro Electric Project by NEEPCO alongwith commissioning of Lakwa and Kamrup Replacement Power Project by Assam GENCO.

I would like to convey my sincere thanks to NEEPCO for supply of hydro power from Kameng HEP during the coal crisis period in October, 2021. Such instance of regional cooperation is genuinely appreciated by Assam. Further, he mentioned that commissioning of around 100 MW Solar power plants under Build, Own, Operate (BOO) model is on the verge of completion and 70 MW Amguri solar park will be commissioned by 31.03.2022.

Further, he mentioned that Ministry of Finance, Government of India has sanctioned Rs. 4510 Crore under Asian Infrastructure Investment Bank (AIIB) funded Externally Aided Project category to strengthen the transmission sector of the State. Under this project, 24 new Substation with capacity 5606 MVA along with 1113CkM of associate transmission lines will be created. Other system augmentation works are also covered in this project. This project will improve the state grid capacity to large extent.

He highlighted the forum that Assam DISCOM has been able to improve its efficiency during the period from June'21 with positive intervention from State Government. Assam DISCOM has achieved 105% collection efficiency in the period from June'21 to February'22. State Government has taken various reform measures like conversion of loan and grant to equity, waiver of unpaid interest, regular payment of Government dues etc. to enhance profitability of the utility. It is my pleasure to intimate that at present Assam DISCOM has no OVERDUE against any power supply vendors. In fact, APDCL is earning rebate with timely payment of dues.

Govt. of Assam has approved ambitious scheme of electrification of all unelectrified 48,570 Anganwadi Centres and 12696 primary schools Sonali Xaishab Bikkashit Axom with budgetary allocation of Rs. 144 Crore.

His speech was taken as read and placed at **Annexure – VIII**.

Shri B. Lyngkhai, Member Secretary, NERPC welcomed all participants and expressed gratitude for participation in the meeting. He mentioned that during the last one year many developments have taken place in the power sector in the region. He informed the house about the Resolutions taken by the 21st NERPC and expressed happiness that Govt. of India has responded in positive directions for the benefit of NER.

He stressed about the importance of SLDCs. SLDCs are like eyes and ears of State Power sectors. The success of any State lie in SLDCs. SLDCs should implement the CABIL Report in letter and spirit. SLDCs should have adequate manpower. They should have visibility to all drawing points so that the loop holes of power pilferages can be monitored by them. He mentioned that DoP Arunachal Pradesh have to pay Deviation charges as penalty for more than one crore per week due to overdrawl from the grid as they do not have telemetry system in place and this could have been avoided the public money wastage. Hence, reliable communication should be done at the earliest. Each SLDCs should have Market Operation Wing eg. Assam & Meghalaya where complete marketing operation of the State can be in Safe Hand. SLDCs should have Regulatory Affairs wing where they can study the implications of Regulations being notified regularly.

He thanked Govt. of India for the (SAMAST) project, funded through PSDF, and stated that once implemented, it will transform the forecasting, scheduling and energy accounting for the seven NER states. It will lay down the foundation of ABT regime. He appraised the forum that for Assam and Meghalaya, the project is expected to complete by September, 2022 and for the remaining 5 states the project is likely to be completed by March, 2023.

His speech is placed at **Annexure – IX**.

After this Chairman, NERPC requested Member Secretary, NERPC to take up the agenda for discussion.

After the deliberations of the agendas, Chairman, NERPC inaugurated the new website of NERPC, i.e., **nerpc.gov.in**.

The meeting concluded with the vote of thanks from NERPC Secretariat side by Shri S. M. Aimol, Director and from NEEPCO Ltd by Shri Devapriya Choudhury, Chief General Manager (Comml), NEEPCO Ltd.



22nd NERPC Meeting.

(From left to right): Sh. Sh. T. Ayemi, Hon'ble Adviser (Power), Govt. of Nagaland; Sh. Chowna Mein, Hon'ble Dy. Chief Minister, Govt. of Ar. Pradesh; Sh. Jishnu Dev Varma, Hon'ble Dy. Chief Minister, Govt. of Tripura; Sh. Neiphiu Rio, Hon'ble Chief Minister, Govt. of Nagaland & Chairman; Sh. B. Lyngkhohi, Member Secretary, NERPC; Sh. Prestone Tynsong, Hon'ble Dy. Chief Minister, Govt. of Meghalaya; Sh. P. Yanthan, TCC Chairman & CE (T&G); Sh. Goutam Roy, Member (PS), CEA and Sh. V. K. Singh, CMD NEEPCO.



Inauguration of the new NERPC website (www.nerpc.gov.in) by Hon'ble Chairman, NERPC.

RECORD NOTES OF DISCUSSION
OF
22ND TCC & 22ND NERPC MEETINGS

III : CONFIRMATION OF THE MINUTES OF 21ST TCC MEETING & 21ST NERPC MEETING

The minutes of the 21stTCC & 21stNorth Eastern Regional Power Committee (NER Power Committee) meetings held on 4th February, 2021 at Kohima were circulated vide letter no. NERPC/OP/Committee/2021/5346-5419 dated 15thMarch,2021.

TSECL vide letter dated. 07th April'2021 has submitted comments/observations as follows:

ITEM NO. B.06: APPROVAL OF SCHEMES APPROVED IN THE 1ST AND 2ND NERPCTP - NERTS

A. By POWERGRID under RTM

(iv) North Eastern Region Strengthening Scheme - XIV (NERSS-XIV)

- i. LILO of Palatana - Surajmaninagar (ISTS) 400kV D/c line at 400/132kV Surajmaninagar (TSECL) S/S
- ii. 4 no. of 400kV line bays at Surajmaningar (TSECL) S/S for termination of above LILO

Deliberation of TCC

“The proposals have not been agreed by TSECL and hence referred back by TCC to NERPC -TP for deliberation.”

Comments of TSECL

- i) Up-gradation work of Surjamaninagar 400 KV sub-station (TSECL) has already been awarded by TSECL on 11th January, 2021 with completion period of 12 months. **PowerGrid may expedite 400 KV LILO line work of Palatana - Surajmaninagar (ISTS) 400kV D/c line at 400/132kV Surajmaninagar Sub-station (TSECL).**
- ii) In line with letter No. 12/18/2017-Trans, dated 19.08.19 of Ministry of Power, Govt. of India communicated to the Ministry of DoNER, Govt. of India, 2 (two)

No. 400 KV line bays at Surjamaninagar sub-station (TSECL) and 2 (two) No. 400 KV line bays at Surjamaninagar (ISTS) sub-station are envisaged under the scope of ISTS.

TSECL will be constructing 2(two) no. 400 KV line bays within the Up-gradation Scope under NESIDS for Palatana Loop-in at Surjamaninagar 400 KV sub-station (TSECL). Scope of Up-gradation of Surjamaninagar sub-station (TSECL) has already been communicated by TSECL to CEA and PowerGrid (CTU) on dated 10th December, 2019.

For Palatana Loop - out, **only 2(two) no. 400 KV line bays will be required under ISTS scope at Surjamaninagar 400 KV sub-station (TSECL). Requirement of 4(four) nos. 400 KV line bays at Surjamaninagar 400 KV sub-station (TSECL) under ISTS scope may be reviewed.**

2. ITEM NO. B.06: APPROVAL OF SCHEMES APPROVED IN THE 1ST AND 2ND NERPCTP - NERTS

B TBCB

- i) Following ISTS schemes were approved in the 2nd meeting of North Eastern Regional Power Committee (Transmission Planning) held on 25.09.2020 through Video Conference. Such schemes requiring approval of TCC & NERPC are given below:
- ii) **Shifting of Surajmaninagar (TSECL) - Comilla (Bangladesh) 400kV cross border link to Surajmaninagar (ISTS)**
 - i) Shifting of Surajmaninagar (TSECL) — Comilla (Bangladesh) 400kV D/c (operated at 132kV) line to Surajmaninagar (ISTS) and operation as Surajmaninagar (ISTS) -Comilla (Bangladesh) 400kV D/c (operated at 132kV) line.
 - ii) 2 no. 132kV line bays at Surajmaninagar (ISTS) 400/132kV S/s for termination of Surajmaninagar (ISTS) - Comilla (Bangladesh) 400kV D/c (operated at 132kV) line.

Deliberation of TCC:

The proposals have not been agreed by TSECL and hence referred back by TCC to NERPC -TP for deliberation.

Comments of TSECL

Bangladesh has affirmed to draw power only at 132 KV and the extension of link between Comilla and Surjamaninagar sub-station (TSECL) to Surjamaninagar 400/132 KV substation (ISTS) will entail an additional cost which can be saved by retaining the present transmission configuration between Surjamaninagar sub-station (TSECL) and Comilla. Government of Tripura has already taken up the above issue with the Ministry of Power, Govt. of India, which is awaiting decision.

Surjamaninagar 400 KV sub-station (TSECL) will be connected with 400 KV transmission line from Palatana for both drawal and dispatch of power. Moreover, major Generating plants in the State periphery will be all connected at Surjamaninagar 400 KV sub-station (TSECL). As such, cross border power supply to Bangladesh can be maintained reliably and more efficiently from Surjamaninagar 400 KV sub-station (TSECL) rather than from Surjamaninagar sub-station (ISTS).

From operational point of view, power supply to Bangladesh is always being maintained by TSECL in co-ordination with NERLDC.

Bangladesh power supply from Tripura was made through strong persuasions and initiations by the State Government. Thus, future power supply to Bangladesh cannot be considered exclusively on commercial venture, rather, it has to be managed with common understanding on account of technical, economic and social relation with Bangladesh.

Moreover, Tripura has always maintained its commitment of power supply to Bangladesh. Government of Tripura has already proposed to the Ministry of Power, Govt. of India to extend Power Supply Agreement for sale of power to Bangladesh for a further period of five years, which is under active consideration by Ministry of Power, Govt. of India.

Ministry of Power, GoI has already taken a meeting on 22nd Dec, 2020 on the issue where Tripura has given all justifications in support of retention of Surajmaninagar (TSECL) -Comilla line at Surjamaninagar sub-station (TSECL).

Tripura is therefore urging again for consideration of retention of Surajmaninagar (TSECL) - Comilla line at Surjamaninagar sub-station (TSECL).

3. ITEM NO. B.07: APPROVAL OF SCHEMES APPROVED IN THE 1ST NERPCTP - NERPC

- i) **N. Shifting of Palatana - Surajmaninagar (TSECL) 400kV D/c line (operated at 132kV) to the 400/132kV ISTS S/s at Surajmaninagar** - implementation by POWERGRID (by NORTH EASTERN REGIONAL POWER COMMITTEE 30 July 2020) as already allocated to them by MoP, GoI was approved in the 1st NERPCTP meeting. The same is put up for TCC/RPC approval.

Deliberation of TCC:

TCC noted and recommended for approval of RPC.

Deliberation of RPC:

RPC noted and approved the recommendation of TCC.

Comments of TSECL:

There will be a time-lag between the commissioning of Surjamaninagar 400 KV sub-station (ISTS) and Surjamaninagar 400 KV sub-station (TSECL). During this interim period, on disconnection of Palatana Surjamaninagar (TSECL) link (presently charged at 132 KV), Tripura system stability will be highly affected.

It was proposed by Tripura that single circuit 400 KV link of Palatana - Surjamaninagar (charged at 132 KV) should be continued till the completion of Surjamaninagar 400 KV substation (TSECL). The second circuit of double circuit Palatana - Surjamaninagar line may be extended to Surjamaninagar (ISTS) 400 KV sub-station. In this arrangement, power from Palatana can be evacuated both through Surjamaninagar (TSECL) and Surjamaninagar (ISTS) sub-stations until completion of up-gradation works of Surjamaninagar sub-station (TSECL) into 400 KV.

NERLDC, POSOCO has conducted system study considering normal loading pattern and with N-1 and N - 2 contingency conditions during the interim period with disconnection of Palatana - Surjamaninagar 400 KV double circuit from Surjamaninagar 132 KV sub-station (TSECL) and the study also suggests that the disconnection of Palatana - Surjamaninagar 400 KV double circuit line (presently operated at 132 KV) from Surjamaninagar 132 KV substation (TSECL) will lead Tripura system to be vulnerable and highly insecure to run.

Government of Tripura has already taken up with Ministry of Power, Govt. of India for Palatana to remain connected with Surjamaninagar sub-station (TSECL), Tripura during the interim period between the commissioning of Surjamaninagar 400 KV sub-station (ISTS) and Surjamaninagar 400 KV sub-station (TSECL) to avoid vulnerability of Tripura Power System.

MoP, GoI has already taken a meeting on 22nd Dec, 2020 on the issue where Tripura has requested for retention of Palatana with Surjamaninagar (TSECL) sub-station during interim period of commissioning of Surjamaninagar 400 KV sub-station (ISTS) and Surjamaninagar 400 KV sub-station (TSECL) which will affect Tripura Power System severely.

It may kindly be noted that the State Government has--been intimated by the Ministry of Power, Govt. of India vide letter dated 22nd February, 2021 that the proposal of TSECL has been referred to the National Committee on Transmission (NCT) for consideration and giving its recommendation to the Ministry of Power, Govt. of India.

Tripura is therefore urging again for consideration of Palatana 132 KV connectivity retention at Surjamaninagar sub-station (TSECL) until its up-gradation to 400 KV.

Deliberation of the TCC

GM, TSECL informed the forum that Status of Surjamaninagar (TSECL) 400/132 KV sub-station is that Board of Directors (BOD) of TSECL has decided to drop the proposal for Up-gradation of 132 KV Surjamaninagar sub-station into 400 KV. It was also decided by the BOD, TSECL that the said work can be taken up by the proposed JV company between TSECL/ Govt. of Tripura and PowerGrid in any case based on the operational requirement.

JV formation will take around 6-8 months.

CGM(AM), NERTS informed that for Upgradation of 132kV Palatana – Surjamaninagar to 400kV and termination at Surjamaninagar(ISTS) 21 out of 25 foundation, 19 out of 25 erection, 3 ERS used, the entire scope of work i.e. Upgradation to 400kV and LILO of D/C line at 400kV Surjamaninagar(TSECL) has to be completed at the earliest.

Sr.GM(SO-II), NERLDC informed that due to the present arrangement during peak hours flow in 132kV Surjamaningar(ISTS) – Surjamaninagar(TSECL) exceeds 95MW during peak hours while the line capacity is 75MW.

Dy. COO, CTU opined that the delay in completion of 400kV Surjamaninagar(TSECL) has resulted in non-completion of upgradation of 132kV Palatana – Surjamaninagar to 400kV. He suggested the following alternatives:

Alternative 1:

- Complete upgradation of 132kV Palatana – Surjamaninagar to 400kV and termination at Surjamaninagar(ISTS) with removal of scope of LILO at 400kV Surjamaninagar(TSECL)
- HTLS upgradation of 132kV Surjamaninagar(ISTS) – Surjamaninagar(TSECL)
- For N-1 of 132kV Surjamaninagar – Surjamaninagar construction of second circuit of 132kV Surjamaninagar – Surjamaninagar with HTLS by TSECL

Alternative 2:

- Complete upgradation of 132kV Palatana – Surjamaninagar to 400kV and termination at Surjamaninagar(ISTS) with removal of scope of LILO at 400kV Surjamaninagar
- HTLS upgradation of 132kV Surjamaninagar(ISTS) – Surjamaninagar(TSECL)
- For N-1 of 132kV Surjamaninagar – Surjamaninagar, LILO of 132kV (2nd) Surjamaningar(TSECL)- Bodhjungnagar(TSECL) at Surjamaninagar(ISTS) with HTLS upgradation of Surjamaninagar(ISTS) – Surjamaninagar(TSECL)

After detailed deliberation the forum decided the following:

- a. (The scope of LILO of 400kV Palatana – Surjamaninagar(ISTS) at Surjamaninagar(TSECL) by POWERGRID under RTM to be deleted upon confirmation of dropping of 400kV upgradation of Surajmaninagar(TSECL) by Tripura. However, tariff for this work as admissible shall be provided to POWERGRID.
- b. HTLS upgradation of 132kV Surjamaninagar(ISTS) – Surjamaninagar(TSECL) to be expedited by TSECL.
- c. TSECL to select one of the suggested alternatives i.e. additional circuit of 132kV Surjamaninagar – Surjamaninagar OR LILO of 132kV (2nd)

Surjamaninagar(TSECL) – Bodhjungnagar(TSECL) at Surjamaninagar(ISTS) with HTLS upgradation of Surjamaninagar(ISTS) – Surjamaninagar(TSECL) and revert back at the earliest to NERPC

Regarding diversion of Bangladesh power supply to Surjamaninagar(ISTS) the forum noted that as power supply from Tripura to Bangladesh has been extended upto 2026, Bangladesh interconnection will remain connected from Surajmaninagar (TSECL) and shifting proposal may be dropped.

TCC noted and referred to RPC.

Deliberation of the RPC

Hon'ble Dy. Chief Minister, Tripura stated that the Upgradation of 132kV Surjamaninagar(TSECL) to 400kV will be awarded by JV company being set up with POWERGRID and JV formation will take around 6-8 months. He requested the forum to allow Tripura for the same.

Member Secretary, NERPC stated that the scope of LILO of 400kV Palatana – Surjamaninagar(ISTS) at Surjamaninagar(TSECL) by POWERGRID under RTM to be dropped for the time being, however, the tariff for upgradation work (undertaken in NERSS XIV) of 132kV Palatana – Surjamaninagar to 400kV and termination at Surjamaninagar(ISTS) shall be allowed to POWERGRID as admissible. Further, he mentioned that power supply to Bangladesh may be continued from Surjamaninagar(TSECL) till 2026 as decided in the 22nd TCC Meeting. Regarding upgradation of 400kV Surajmaninagar(TSECL) by Tripura, he sought the view of the forum.

After detailed deliberation, Hon'ble Chairman, NERPC stated that since Tripura will upgrade the existing 132kV Surjamaninagar S/S to 400kV after JV formation, the same may be kept in abeyance and review in next TCC/NERPC Meeting.

The RPC confirmed the minutes of 21st NERPC meeting with above modifications as no other comments or observations were received from any constituents.

CATEGORY – A : ITEMS DISCUSSED AND APPROVED BY THE COMMITTEE

ITEM NO. A.01 : IMPORTANCE OF DEVELOPING SMALL HYDRO PROJECTS IN THE NER STATES UNDER MNRE, GOI:SHP SCHEME – DoP NAGALAND

The NE (North Eastern) States of the country is endowed with vast hydropower potentials to provide clean renewable energy without affecting much of the river ecosystems and the environments. The HEPs (Hydro Electric Projects) in this region require considerably smaller space and have minimal impact of displacement and rehabilitation as it involves less land area due to favourable topography.

The development of HEPs is not only important in the North Eastern states to enhance renewable capacity addition in line with the Govt of India's road map to achieve 175 GW, but also it will be a move towards fulfillment of Renewable Purchase Obligation (RPO).

The development of HEPs is capital intensive and hence, it becomes difficult for the States to develop such projects independently due to resource constraint and are left with the alternative of importing power from outside incurring huge financial burden on the State resources.

Earlier till the 12th 5 Year Plan (2007-2012), the MNRE (Ministry of New & Renewable Energy) was supporting the development of SHPs (Small Hydro Projects) to the NE States through SHP schemes @ INR 7.5 Crore/MW, which indeed has helped many projects come into picture in the North East States. However, with the discontinuance of the said SHP Scheme by the MNRE from April 2017 onwards, the most important and viable revenue generating sector of the NE States is left alone.

It is also imperative to note that the North East states being resource crunch states needs support of the MNRE, GOI to develop revenue generating SHPs as many rivers are still yet to be exploited of their potential and harnessing renewable energy from hydro potential sites is a sustainable goal which needs to be achieved.

The MNRE, GOI may therefore reconsider the implementation of SHP scheme to support the potential and viable hydropower projects.

Deliberation of the TCC

SE(SLDC& Dimapur), DoP Nagaland informed that presently development of small and mini hydro projects are to be taken up under State funding, NEC, DONER etc. Until 2017 Government of India (GoI) has been funding for Small hydro Project (SHP) and thereafter the same was stopped subsequently. He requested the forum to acknowledge the necessity as per aspiration of Nagaland and suggest avenues for development of Small and Mini Hydro projects.

Member(Power System), Central Electricity Authority stated that it is better if small and mini hydro projects are developed as losses are minimum and nearby the load center. However, there is problem in funding from MNRE, DONER. He suggested that Private partnership model may be explored for development of Small and mini hydro projects.

SE(Comml), P&ED Mizoram stated that funding from various sources cannot be tapped as the associated conditions are so stringent. So, he requested GoI grant-in-aid for developing SHPs.

ED(Tech), MSPCL opined that due to law and order, transportation in remote corners of Manipur, Mizoram and Nagaland leads to less interest amongst the private developers. So, state utilities only have to develop the projects. So, a board resolution may be adopted.

Chairman, TCC decided that the matter is to be deliberated by the 22nd NERPC

Deliberation of the RPC

After detailed deliberation, Hon'ble Chairman, NERPC mentioned about the necessity for funding from Govt. of India to tap SHP in the region. All the constituents States unanimously stressed on the importance of the issue and requested the forum to pass a Resolution in this regard.

The RPC decided that a Resolution will be adopted to request Govt. of India to revive the earlier scheme from MNRE or any fund to tap the small hydro projects in the region as a special consideration for NER.

**ITEM NO. A.02 : FREQUENT TRIPPING OF 33kV FEEDERS AT ZIRO S/S
- NERTS**

Frequent tripping of 33kV Feeders at Ziro Ss has been observed which has stresses the Transformer winding and leads to reduction of Transformer Residual life. Table below shows that a total of 1422 tripping has occurred since May'2020 to October'2021. During such tripping heavy fault current passes through the transformer. As such it is requested to take necessary action for monitoring of Transmission lines so that reducing the tripping.

Total	Kurung Kumey		Kimin		Old Ziro	
	O/C	E/F	O/C	E/F	O/C	E/F
May'20 to Nov'20	229	109	149	55	62	24
Jan'21 to Oct'21	207	156	224	145	37	25
Total	436	265	373	200	99	49
Total (Since May'20 to Oct'21)	701		573		148	

The 184th OCC forum referred the matter for further deliberation in TCC/RPC.

Considering the above, early commissioning of 132kV Ziro to Ziro-New (Yazali), 132kV Ziro-New to Palin, 132kV Palin to Koloriang alongwith 132/33kV stations at Yazali, Palin, Koloriang is very much required.

Deliberation of the TCC

ED, NERPSIP informed that 132kV Ziro to Ziro-New (Yazali), 132kV Ziro-New to Palin, 132kV Palin to Koloriang alongwith 132/33kV stations at Yazali, Palin, Koloriang is under Stage-II of Comprehensive scheme and target completion is Mar'24

Member Secretary, NERPC advised Comprehensive Scheme, POWERGRID to schedule the commissioning as follows:

- a. 132kV Ziro to Ziro New (Yazali)
- b. Then 132kV Ziro New (Yazali) to Palin
- c. Finally, 132kV Palin to Koloriang

SE(Trans.), DoP Ar. Pradesh endorsed the suggestion of Member Secretary and stressed that without completion of the above assets as per the suggested schedule the trippings cannot be reduced even with highest operation and maintenance standards CGM(AM), NERTS stated that for trouble free operation of 132/33kV 15MVA ICT at existing Ziro Substation, the connected 33kV lines are to be made free from tripping.

ED, NERPSIP stated that project is delayed mainly due to difficulty in obtaining Forest Clearance and requested assistance from Govt of Arunachal Pradesh for the same.

TCC noted and approved the suggested schedule and referred the matter for deliberation in RPC.

Deliberation of the RPC

Hon'ble Dy. Chief Minister, Govt. of Arunachal Pradesh assured that they would assist the executing agency i.e. POWERGRID regarding RoW and forest clearance but directed them that they should adhere to the suggestion of Member Secretary on the sequence of schedule and complete the works at the earliest. POWERGRID agreed.

The RPC noted as above.

<p>ITEM NO. A.03 : PROVISION OF TESTING & DIAGNOSTIC TOOLS AND EQUIPMENT FOR POST COMMISSIONING OPERATION AND MAINTENANCE OF TRANSMISSION LINES – DoP ARUNACHAL PRADESH.</p>

Under the CSST&DS-AP project, a staggering length of more than 2,000 kilometres of 132 kV transmission lines shall be laid across entire Arunachal Pradesh and handed over to State Utility after their completion and commissioning for subsequent operations & maintenances.

However, it is given to understand that there is no provision of providing any test & diagnostic tools & equipment for their post commissioning operation & maintenance needs. If it is so, it will be a huge setback to the efficient operation & maintenance of the assets created under the ambitious flagship project.

Hence, the forum may approve and argue the Project Implementing Agency to provision such indispensable needs in consultation with the state utility and provide the required tools & equipment and hand over along with the assets so created.

Deliberation of the TCC

TCC noted the requirement of testing and diagnostic tools and directed POWERGRID to make available the same and referred the matter for deliberation in RPC.

Deliberation of the RPC

Hon'ble Chairman, NERPC mentioned that testing and diagnostic tools are very important for maintaining the assets and the same should be provided by the executing agency i.e. POWERGRID.

The RPC noted as above.

ITEM NO. A.04 : PROVIDING SPARE MATERIALS UNDER NERPSIP - MSPCL.

The following works are taken up in Manipur under NERPSIP.

- a. Construction of 2 (two) nos. of 132/33 kV substations at Gamphazol and Tamenglong;
- b. Construction of 13 (thirteen) nos of 33/11 kV substations at Hiyangthang, Keithelmanbi, Top Khongnangkhang, Andro, Kwakta, Leimapokpam, Porompat, Thangal, Sanjembam, Lamphel, Takyel and Pishum (GIS);
- c. Capacity augmentation of 4 (four) nos. of 132/33 kV substations at Ningthoukhong, Jiribam, Kongba and Ukhrul; and
- d. Capacity augmentation of 21 (twenty-one) nos. of 33/11 kV substations.

The original project cost of Manipur under NERPSIP was **Rs. 442.22 crore** and later on, it was revised to **Rs. 638.72 crore**.

It is noted that in the scope of work, no spare is included. The failure of any critical electrical equipment like CT, PT, Breaker etc. will lead to outage of supply to the area covered by the affected substation.

PGCIL is requested to make arrangement to procure **spare equipment** and hand over to the respective states at the time of handing over of the completed works. *Normally, 3% of the project cost is considered for procurement of spare equipment.*

Deliberation of the TCC

TCC noted the importance of spares considering the site locations under NERPSIP and Comprehensive Scheme and directed POWERGRID to make available the spares as per requirement of State utilities.

ED, NERPSIP (POWERGRID) stated that scope of works does not include provision of additional equipment/spare materials and therefore would need additional approval from MoP for the same.

After detailed deliberation, the forum referred the matter for discussion in RPC.

Deliberation of the RPC

After detailed deliberation, Hon'ble Chairman, NERPC directed POWERGRID to take-up with MoP for inclusion of the additional equipment/spare materials since these are the requirements by the States. He assured that in case any assistance is required the forum will take up with MoP.

The RPC endorsed the view of Hon'ble Chairman, NERPC.

The RPC noted as above.

ITEM NO. A.05 : REQUIREMENT OF MANPOWER – MSPCL.

The new substations/lines taken up under NERPSIP in Manipur can be maintained by the existing Engineers of MSPCL. However, MSPCL do not have surplus staff to maintain these substations as all the existing staffs are already utilized.

MSPCL has submitted the minimum manpower required for the operation and maintenance of the substations taken up under NERPSIP in Manipur to NERPC via. e-mail as detailed below.

Total number of Junior System Assistant required = $7 \times 13 + 11 \times 2 = 113$

Total number of WCCA required = $1 \times 13 + 2 \times 2 = 17$

The new substations/lines taken up under NERPSIP in Manipur can be operated and maintained with additional 113 nos. of JSA and 17 nos. of WCCA.

MSPCL do not have fund to bear the expenditure for the additional manpower requirement. The only option left is to request for financial assistance from the Government of India/PGCIL (NERPSIP) for appointment of the required manpower either regular appointment or outsourcing.

Deliberation of the TCC

Director (Trans), MeECL opined that financial assistance be given for placement of manpower in initial stages say for 3 years in order to facilitate O&M outlay support of 3 years relatable to principle of 3-year multiyear tariff (MYT) period principle. All the other state utilities and State Power Departments endorsed the view of MeECL.

TCC noted and requested CEA to take appropriate action in this regard.

For determination of assistance period regarding manpower the TCC forum referred the matter to 22nd NERPC for deliberation.

TCC noted and referred for discussion to RPC.

Deliberation of the RPC

Member (Power System), CEA stated that they have received the requirement data sent by NER States and they will examine the same and will send the proposal to MoP for endorsement.

After detailed deliberation, Hon'ble Chairman, NERPC directed POWERGRID to assist the NER States for the initial period of 3 (three years) or till the finalization by MoP/CEA whichever is earlier.

The RPC endorsed the view of Hon'ble Chairman, NERPC.

The RPC noted as above.

ITEM NO. A.06 : ESTABLISHMENT OF STATE-OF-THE-ART TRAINING CENTRES AT SHILLONG, JOWAI AND TURA - MePTCL
--

Under CBIS it is necessary to enable the existing and new man power with capability to operate and maintained the assets so as to impart on the job training and to avoid dislocation of man power.

The forum may explore the possibility of setting up of Power Training Institute at Shillong, Jowai and Tura for the interest of the region.

Deliberation of the TCC

Director (Trans), MeECL informed that as part of CBIS under NERPSIP On- job training was provided at NEHU sub-station. However, 14 days were required for mobilization of staff which hampered day-to-day works of these staff/technician and resulted in loss of

lots of manhours in travel and logistics. Development of local training centres would be effective in imparting training to larger audience and near to place of posting.

Further these training centers can be harnessed to provide consultancy services in the field of training and can be a revenue generating source for the state utility.

Also, Director (Trans), MeECL informed that there has not been any Power Training Institute set up in the Region even after 20 years of setting up of NPTI in Guwahati. So, it is necessary that Power Management Institute be set up at Shillong and other cities in other NER States as this will go a long way in equipping manpower with enabling capabilities of all categories of personnel to deal with the rapid advancement of latest technology in the Power Sector. Power Management Institute is a necessity as training of Specific and expert faculty who can be deployed for training in the Institute or in any other training center in the State/Region/country. This institute will be crucial in development in Power Sector of the region and its assets as Power Management has become extremely necessary.

ED, NERPSIP stated that for Capacity Building, separate training department of POWERGRID is involved, under which a central training center to be developed in each state. However, building has to be provided by State utility which will be equipped by PGCIL under CBIS. Further he assured that every aspect of the system covered in the Training program viz. GIS, EHV, DMS.

All the state utilities and State power Departments endorsed the view of MeECL to setup a Power Training Institute and requested POWERGRID to construct and equip the State-of-the-Art training Center in each state of the region under the CBIS.

With the rapid advancement in latest technology in the power sector, and Power being an essential service utility there is a strong and urgent need to train and make its workforce capable. TCC acknowledged and noted the requirement of the State utilities and State Power Departments and requested NERPSIP-POWERGRID to update fulfillment of the same in the 22nd RPC meeting. The TCC forum referred the matter to 22nd NERPC for deliberation.

Deliberation of the RPC

CGM (Projects), NERPSIP stated that building has to be provided by State utility which will be equipped by PGCIL under CBIS. She requested States to provide the building accordingly.

Members opined that building is a mandatory along with equipments to be installed by POWERGRID.

After detailed deliberation, Hon'ble Chairman, NERPC directed POWERGRID to take up with MoP for construction of the building and equip the State-of-the-Art training Center in each state within the CBIS Project.

The RPC endorsed the view of Hon'ble Chairman, NERPC.

The RPC noted as above.

ITEM NO. A.07 : PROVIDING SPARE MATERIALS IN TRANSMISSION LINE, EHV SUB-STATION AND DMS PACKAGES UNDER NERPSIP - TSECL

247 KM of New 132 kV Transmission line with 1372 KM of conductor and 895 Nos. of 132 kV towers of different types, 9 nos. new EHV sub-stations and 7 nos. Augmentation / Extension EHV sub-stations are presently in progress of construction and installation in different parts of the State under Tranche – I Scope of Work of Govt. of India and World Bank funded NER Power System Improvement Project (NERPSIP), where Power Grid Corporation of India Limited (PGCIL) is the Implementing Agency.

It is learnt that spare materials have not been incorporated in the BOQ of Power Grid in any of the ongoing Transmission / 33 KV DMS Packages under NERPSIP: Tripura.

Providing of spare materials to TSECL is very much essential to meet up any future exigency situation in this massive upcoming transmission network in the State. In addition, some spare materials will also be required to maintain the upcoming 33 KV DMS network under NERPSIP in Tripura.

In the above context, spare materials required to be provided to TSECL is furnished here-under:

Sl.	Item	Component	Spare requirement
A	Transmission Line Package		
	132 kV Tower:		
1.	A – Type	Basic	1 No.
		+ 3 Extension Portion	1 No.
		+ 6 Extension Portion	1 No.
		+ 9 Extension Portion	1 No.
		Stub	1 Set

2.	B – Type	Basic	1 No.
		+ 3 Extension Portion	1 No.
		+ 6 Extension Portion	1 No.
		+ 9 Extension Portion	1 No.
		Stub	1 Set
3.	C – Type	Basic	1 No.
		+ 3 Extension Portion	1 No.
		+ 6 Extension Portion	1 No.
		+ 9 Extension Portion	1 No.
		Stub	1 Set
4.	D – Type	Basic	3 Nos.
		+ 3 Extension Portion	1 No.
		+ 6 Extension Portion	1 No.
		+ 9 Extension Portion	3 Nos.
		Stub	1 Set

Sl.	Item	Component	Spare requirement
5.	Multi-Circuit Tower	Basic	1 No.
		+ 3 Extension Portion	1 No.
		Stub	1 Set
6.	Conductor		10 KM
7.	Conductor Hardware accessories		3 % of total supply quantity
8.	Long Rod Insulator with suitable hardware fittings		
B.	EHV Sub-station Package		
1.	EHV Sub-station Equipments		3 % of total supply quantity
C.	33 KV DMS Package		
1.	33 KV Sub-station Equipments		3 % of total supply quantity
2.	33 KV line materials		

The requirement of spare materials as indicated above is proposed to be met up by Power Grid from the project cost of NERPSIP.

Power Grid has been already communicated by TSECL in the above matter on 16.03.2022.

Deliberation of the TCC

TCC noted the importance of spares considering the site locations under NERPSIP and Comprehensive Scheme and directed POWERGRID to make available the spares as per requirement of State utilities.

ED, NERPSIP (POWERGRID) stated that scope of works does not include provision of additional equipment/spare materials and therefore would need additional approval from MoP for the same.

After detailed deliberation, the forum referred the matter for discussion in RPC.

Deliberation of the RPC

After detailed deliberation, Hon'ble Chairman, NERPC directed POWERGRID to take-up with MoP for inclusion of the additional equipment/spare materials since these are the requirements by the States. He assured that in case any assistance is required the forum will take up with MoP.

The RPC endorsed the view of Hon'ble Chairman, NERPC.

The RPC noted as above.

ITEM NO. A.08 : TENURE OF CHAIRMANSHIP OF NERPC -NERPC.

Member Secretary, NERPC highlighted that Chairmanship of NERPC is held by alphabetical rotation amongst Hon'ble Power Ministers of NER States for a period of one year i.e 1st April to 31st March. Hence the tenure of present Chairman, NERPC & Hon'ble Chief Minister, Govt. of Nagaland will end by 31.03.2022.

Hon'ble Dy. Chief Minister, Govt. of Tripura stated that he will take over the Chairmanship of NERPC w.e.f. 01.07.2022.

The RPC approved the extension of tenure of present Chairman, NERPC & Hon'ble Chief Minister, Govt. of Nagaland for a period upto 30.06.2022.

ITEM NO. A.09 : STATUS OF RENOVATION AND UPGRADATION OF PROTECTION AND CONTROL SYSTEM OF 66kV SUBSTATION – DoP NAGALAND

The 21st TCC/RPC meeting on 04th Feb'2021 approved the DPR for Renovation and Upgradation of 66kV Transmission System in Nagaland.

DoP Nagaland has already sent the proposal for PSDF funding thereafter. The exact status may be intimated.

Deliberation of the TCC

Member Secretary, NERPC informed that PSDF has agreed that R&U of 66kV system will be funded from PSDF for NER states.

ED, NLDC requested DoP Nagaland to resubmit the DPR considering cost escalation.

TCC noted and requested DoP Nagaland to take necessary action.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.10 : STATUS OF IMPLEMENTATION OF IMPORTANT ISTS PROPOSALS – DoP ARUNACHAL PRADESH
--

Kathalguri-Namsai 220 kV D/C transmission line with 2x160 MVA, 220/132 kV Sub-Station at Namsai:

Above **proposal**, being one of the top priority scheme for Central and Eastern Arunachal Pradesh in terms of ensuring an adequate redundancy and supplementing the long radial 132 kV line of Ranganadi HEP to Namsaivia Ziro, Daporijo, Aalo, Pasighat, Roing and Teju, to create a ring loop with the NE grid for power reliability, was suggested in the 1st Meeting of North Eastern Regional Standing Committee on Transmission (NERSCT) and on recommendation in the Joint System Study meeting on 05.08.2019, at Gurugram, it was approved in the 2nd Meeting of the North Eastern Regional Power Committee (Transmission Planning) (NERPCTP) held on 8th Nov. 2019 at Shillong. It was also approved in the 21st Meeting of TCC & RPC at Kohima on 3rd and 4th February 2021.

It was later given to understand that Ministry of Power, Government of India, had notified the proposal for implementation through TBCB route by appointing RECPDCL as Bid Processing Coordinator (BPC). The tender for the execution was to be opened in First Week of March 2022.

As such, considering the urgency and priority importance of the approved proposal, detailed updated status and scheduled completion timeline may be elucidated.

Roing-Chapakhowa 132 kV D/C Transmission Line:

This project is also a very important inter-state connectivity link between Assam/NE grid with Arunachal Pradesh grid requiring urgent completion and commissioning for availability reliable & stable power in the grid of Central Arunachal Pradesh as redundancy to the lone long radial line of RHEP-Namsai 132 kV transmission line.

As briefed by the implementing agency in the 21st TCC and NERPC meeting at Kohima on 3rd & 4th Feb. 2021, the project was to be commissioned by April 2022. The updated progress status and firmed up commissioning timeline may be elucidated.

Regarding 220kV D/C Kathalguri - Namsai:

Deliberation of the TCC

Member Secretary, NERPC informed that MoP had notified to RECPDCL on July'21.

Director (PSPA), CEA informed that the team of CEA, CTU and RECPDCL will visit AGBPP on 28.03.2022 to assess feasibility as per site requirements and requested NEEPCO to make the clarifications requested by RECPDCL readily available to the team members.

GM, NEEPCO opined that in generating stations all infrastructure developed based on unit size, thus space constraints and auxiliary systems deficiencies are being noticed. He suggested that for inter-connections in future, switching station may be considered rather than connecting the line to generating station.

Regarding 132kV Roing – Chapakhowa:

CGM(AM), NERTS informed that out of 117 foundations, 42 are completed and out of 117 tower erection, 8 completed. The target date for completion is September, 2022 subject to obtaining Forest clearance by April, 2022.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

<p>ITEM NO. A.11 : COMPREHENSIVE SCHEME FOR STRENGTHENING OF TRANSMISSION & DISTRIBUTION SYSTEM IN ARUNACHAL PRADESH(CSST&DS-AP) – DoP ARUNACHAL PRADESH</p>

Provision of PLCC systems in Arunachal Pradesh:

It is understood from the POWERGRID authorities that no PLCC system is provided in the scope of works under CSST&DS-AP on the plea that OPGW Communication System is adequate and reliable.

However, in consideration of Regulation 27 of CEA (Technical Standard for Communication in Power System Operation) Regulation, 2020, and Regulation 12 of CERC (Communication System for Inter-State Transmission of Electricity) Regulation, 2017, it may have to be included in the transmission system of Arunachal Pradesh under the packages of CSST&DS-AP.

On one hand, the Regulation 27 of the CEA Regulation, 2020 states the requirements of technical standards of PLCC for speech, data & tele-protection requirements of the power system, while on the other hand, Regulation 12 of CERC Regulation, 2017, states that the communication system availability should be 99.99% annually and 100% with backup communication system.

Looking at the two regulations quoted above, it maybe implied that redundancy in the communication system for 100% availability is a must. While it is agreed that OPGW communication system is the most secured, reliable and efficient system, PLCC system have to be installed for ensuring protection and communication system back-up and redundancy. The matter needs a wider deliberation and discussion of the forum to take a decision on the issue.

Deliberation of the TCC

ED, NERPSIP stated that for 132kV lines either OPGW or PLCC as per regulations, so OPGW selected as better option.

SE(SO&PSC), DoP Arunachal Pradesh stated that in many areas of Arunachal Pradesh overhanging portion of the tree upon falling on the transmission line section leads to snapping of OPGW, so PLCC has to be provided as redundant medium.

Member (Power System), CEA noted the concerns of DoP Arunachal Pradesh and requested them to add in Augmentation scheme which was recently sent to CEA.

The forum requested DoP Arunachal Pradesh to take necessary action.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.12 : TAWANG-BHUTAN 132kV INTERNATIONAL CONNECTIVITY BETWEEN LUMLA(INDIA) AND 600MW KOLONGCHU HEP IN BHUTAN – DoP ARUNACHAL PRADESH.

The upcoming 132 kV transmission line from Khuppi to Tawang under Comprehensive Scheme would become a long radial line of about 190 kilometers terminating at Lumla in Tawang district, the easternmost tip of Arunachal Pradesh bordering the neighbouring country, Bhutan. Such a long radial line in extreme high-altitude topography, aggravated with treacherous path the system that would pass through in difficult terrain and the snow cladded Sela pass could cause huge concern for stable maintenance of grid reliability and pose serious operational challenges and issues. Tawang, one of the most popular tourist destinations of the region, would very likely suffer due to low reliability in a radial feeder configuration.

Further, considering the huge military cantonment establishments in the districts of Tawang and enroute West Kameng, the demand and requirement of reliably stable and quality power supply are rising rapidly. Hence, meeting such defence related reliable power demand would be a herculean task if the transmission system is left to be a long radial one.

To overcome this bottleneck, it is proposed for initiating establishment of a suitable transmission line between Lumla in Tawang (India) and the 600 MW Kholongchu Hydro Electric Power Station in Bhutan, which would be about 40 kilometers aerially from Lumla. Such a connectivity, apart from improving the reliability of both the Grids of India and that of Bhutan, also will help in furtherance of bilateral exchange of energy in times of needs.

Deliberation of the TCC

Member (Power System), CEA noted the concerns of DoP Arunachal Pradesh and requested them to send the proposal to CEA as it entails International Connectivity.

The forum requested DoP Arunachal Pradesh to take necessary action.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.13 : RESTORATION OF 132kV ROING - PASIGHAT - DoP ARUNACHAL PRADESH.

Due to flooding in April 2020, two towers of Pasighat-Roing 132 kV transmission line of POWERGRID were damaged along Dottung river bank in Lower Dibang Valley district. Since then, the transmission line is on an Emergency Restoration System (ERS) till date, which had also to be shifted for sustenance of the supply due to continued erosion of the river bank. Presently too, the ERS is still remaining precariously vulnerable, with threat of collapse due to erosion.

It may be noted that above segment of the Pasighat-Roing 132 kV transmission line is part of the only radial backbone lengthy power line from Ranganadi to Namsai via Ziro, Daporijo, Aalo, Pasighat, Roing, Teju and Namsai, for powering the entire Central-Eastern Arunachal Pradesh. Hence, ensuring proper & regular safe transmission system of this entire line is extremely vital.

For permanent restorative works, POWERGRID had ventured for pile foundation works to be completed within April 2021. But, even after two years, the pile foundation towers could not be installed at Loc. 212P and Loc. 214P. The critical situation was personally inspected by Member Secretary, NERPC on 19.02.2022; whereon, it was found that only 6 out of the 16 piles of tower Loc. 214P was complete, no work was yet initiated for the Loc. 212P.

In view of the abnormal delay caused, and considering the inescapable importance and urgency in completion of the permanent system, it was asserted for invoking all available alternative means & approaches for expediting the works in order to complete and commission the same before onslaught of the upcoming monsoon. The representatives of NERTS, POWERGRID, and the executing agency had assured and committed for completion of the pile works of Loc. 214P by April 2022 and Loc. 212P by July 2022. The Chief General Manager, POWERGRID, NERTS, present on spot had assured completion of the entire works and charge the renovated line by September 2022; and he also further assured to ensure stability of the ERS system till such time with such measures to avoid any power supply disruption of the transmission line.

NERTS, POWERGRID, may update the status of the latest work progress and confirm the completion timeline.

Deliberation of the TCC

CGM(AM), NERTS informed that revised target date is now March, 2023.

However, he assured that there will be no interruption in power supply. For this POWERGRID is arranging additional ERS and boulder protection.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.14 : COMPLETION OF SUBSTATIONS – MSPCL.

In the meeting held on 03.03.2022 under the aegis of Ministry of Power, it was decided that the following substations under NERPSIP for Manipur will be completed within 3 (three) months.

- a. 132/33 kV substations at (a) Gamphazol and (b) Tamenglong
- b. 33/11 kV substations at (a) Lamphel and (b) Takyel

It is observed that a little progress has been made for the construction of the above substations till date.

TCC may kindly deliberate the progress made for these substations and provide the completion target.

Deliberation of the TCC

ED, NERPSIP informed the following status:

132/33kV Gamphazol S/S– Target completion by April’22

132/33kV Tamenglong S/S – Target completion by Sep’22

33/11kV Lamphel & 33/11kV Takyal - Target completion by Sep’22

For 33/11kV Lamphel S/S, POWERGRID informed that due to poor soil bearing capacity, the Substation is being done on number of piles. Members felt that POWERGIRD may explore alternate options to reduce number of piles like GIS etc., for early completion of the Substation.

TCC noted the delay in completion of the above substations and directed POWERGRID to strictly adhere to the above timeline.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.15 : FIBER OPTIC COMMUNICATION- MePTCL

In line with the 18th RPC MOM dated: 10th October, 2017, MePTCL requested M/s PGCIL for renewal of the agreement in line with CERC Regulation -2020 for revenue sharing if PGCIL intended to continue using MePTCL assets otherwise to return the assets to MePTCL on expiry of the ULDC agreement. The details of ULDC fiber to be handed over to MePTCL are:

- a. Kahelipara (AEGCL) to Umiam III (MePTCL) – 59.132 km
- b. Umiam I to Umiam III – 17.455 km
- c. Umiam I to NEHU – 10.257 km
- d. NEHU to Khliehriat (ckt-1) – 64.094 km

Deliberation of the TCC

Director (Trans), MeECL stated that the agreement for above ULDC fibers for 15 years from date of commissioning had ended on 2018, the Fibers on above OPGW links has to be handed over to MePTCL. After handing over the same, alternative arrangements like laying of additional OPGW can be discussed.

ED, NERTS informed that Under Central Sector (CS) scheme PGCIL has laid OPGW on many ISTS and under SS laid OPGW on many State lines. After useful life, the fiber may or may not be required to be replaced. As per site actuals, these fibers are fine and no need to be replaced. He suggested to keep fibers in service and ownership with POWERGRID till replacement.

TCC has suggested to review the agreement and further course of action shall be decided accordingly. TCC noted that the OPGW has to be handed over to MePTCL with O&M by POWERGRID. However, the feasibility of the same has to be confirmed by MePTCL after perusing the agreement with POWERGRID.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.16 : SANCTION OF GRANT FROM PSDF TOWARDS CONSTRUCTION OF 132kV S/C KHLIEHRIAT – PANCHGRAM AND 132kV D/C UMIAM STG-I TO STG-III LINE BY HTLS - MePTCL

The terms and conditions for implementation of PSDF for the above two project as per clause (viii) with regards to opening of “Letter of Credit” (LC) need to be removed, since MePTCL has no outstanding dues with GENCO (MePGCL).

Deliberation of the TCC

ED, NLDC informed that MoP, GoI is monitoring the payment to GENCOs and hence the clause was included. He requested MeECL to inform in writing to PSDF Secretariat regarding no “Outstanding Dues” of Meghalaya and thereafter the clause regarding LC will be removed.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.17 : ADDITIONAL SHARE ALLOCATION SUBSEQUENT TO COMMISSIONING OF ALL 4 UNITS OF KAMENG – NEEPCO

600 MW (i.e. 4 X 150 MW) Kameng HEP at Arunachal Pradesh is operating in full capacity after declaration of commercial operation of the project on 12th February 2021. As the house may be aware, the share allocation order for the plant places 345 MW of the plant capacity at the disposal of NEEPCO for merchant sale.

Therefore, further to the deliberations on the issue of additional allocation at the 38th & 43rd CCM and 20th TCC & RPC Meetings, with the commissioning of the full

installed capacity, the esteemed house is once again requested to discuss the issue and consider additional allocation from the Kameng HEP. In this context it is mentioned that the tariff application has been already filed before the Hon'ble CERC and it is seen that the tariff is expected to be very competitive and attractive. On confirmation of the additional requirement NEEPCO will take up the matter with the Ministry of Power, Government of India for share allocation.

Further, it is intimated to the house that 600 MW Kameng HEP is comes under the Renewable Purchase Obligation (RPO) trajectory where Hydro Power Obligation (HPO) is considered as a separate entity within the Non-Solar RPO. In view of above, it is requested to the beneficiary states (i.e. Manipur, Mizoram and Tripura) to consider the Kameng power to their future benefit for HPO obligation.

Deliberation of the TCC

Member Secretary, NERPC stated that since Kameng HEP is regional project, 345MW Merchant Power is still huge and the states are requested to sign additional PPA to fulfill their RPO/HPO.

ED(Tech), MSPCL informed that Manipur will avail the power after the quantum is decided.

SE, P&ED Mizoram informed that at present there is no firm allocation for Mizoram from Kameng HEP. Further he intimated that RPO/HPO is being fulfilled separately, any shortfall will be met by STOA from Kameng HEP.

CGM(Comml), NEEPCO informed that as on date NEEPCO has not received any request for additional allocation from the states.

TCC requested all the states to avail maximum power in form of LTA/MTOA/STOA from the merchant share of Kameng HEP. It was also decided that in the event of signing of any PPA the change in allocation shall be made by NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.18 : MOBILE SUBSTATION FOR EMERGENCY RESTORATION OF EHV SYSTEM IN NER – NERPC.

In 21st TCC/RPC meeting the Mobile Substation was approved with following scope:

One no. 220kV bay with all EHV equipment & protection system and one no. 132kV bay with all EHV equipment & protection system to be procured by NERTS as regional spare with the modalities as approved in the 17th TCC/RPC meeting with funding from PSDF.

In 181st OCC meeting held on 20th August, 2021 NERTS informed that the DPR for Mobile Substation Bays for NER has been submitted to NLDC/NPC for PSDF funding.

Deliberation of the TCC

CGM(AM), NERTS informed that the DPR will be submitted by POWERGRID to PSDF Secretariat by April, 2022.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.19 : TRANSMISSION SYSTEM FOR PROVIDING CONNECTIVITY TO DIBANG HEP – NERPC.

M/s NHPC Ltd. had requested for grant of 2880MW connectivity for its Dibang HEP (12x240MW) generation project in Arunachal Pradesh. Arunachal Pradesh has huge hydro potential. CEA has developed a Master Plan for power evacuation of about 37GW hydro projects in Arunachal Pradesh to other parts of the country through 7 no. ± 800 kV, 7000MWHVDC bipole lines. The hydro projects in different basins are being taken up in phases. With phased development of hydro project, various high capacity EHV substations are required to be established in border areas of Arunachal Pradesh and Assam for pooling of hydropower, and further establishment of high-capacity evacuation lines from these pooling points are necessary for power evacuation. Such transmission systems need to be developed in ISTS for seamless integration of various hydro projects at pooling points located in Arunachal Pradesh or Assam. Due to

absence of any pooling point in upper Assam or Arunachal Pradesh, Dibang HEP needs to be pooled at a new pooling point such that the same pooling point could also be utilized for pooling of other hydro projects in future. Also, there was requirement of a new 400kV substation in Upper Assam (North of Brahmaputra River) to augment power supply to areas in upper Assam and Arunachal Pradesh. Considering the availability of land in upper Assam (North of Brahmaputra River) and Arunachal Pradesh, terrain and Row of Way (RoW) requirement in that area for future transmission lines, optimization of transmission system is very essential. Accordingly, it is planned to provide Connectivity to Dibang HEP at its switchyard through ISTS line so that as per requirement this immediate evacuation line under ISTS can also be used for power evacuation from other HEPs in future. In view of the above, a new 400kV substation has been planned at Gogamukh through LILO of one D/c (ckt-1 & ckt-2 of D/c line-1) of Lower Subansiri – Biswanath Chariali 400kV (Twin Lapwing) 2xD/c lines, which are being taken up for implementation under NERES-XVI scheme (expected by Mar 2025). The Dibang HEP has been planned to be pooled at Gogamukh through 400kV 2xD/c (Quad) ISTS lines. For further power evacuation, Gogamukh – Biswanath Chariali 400kV (Quad) D/c line has been planned.

Name of the Scheme: Transmission system for providing connectivity to Dibang HEP

Scope of the Scheme

- i. Dibang – Gogamukh 400kV 2xD/c (Quad) line
- ii. Extension works at Gogamukh S/s at 400kV level
 - 4 no. of 400kV line bays for termination of Dibang – Gogamukh 2xD/c lines
 - 4x63MVAR switchable line reactors at Gogamukh end of Dibang – Gogamukh 400kV 2xD/c lines, one in each circuit

Upstream network associated with the scheme

Upstream network to be implemented under ISTS:

- a. Establishment of Gogamukh 400/220/132kV substation under NERES-XVI by Mar 2025. Upstream network to be implemented by Dibang HEP developer:
- b. 4 no. of 400kV line bays at Dibang HEP switchyard for termination of Dibang – Gogamukh 400kV D/c 2xD/c (Quad) lines along with 4x63MVAR switchable line reactors at Dibang end, one in each line.

To be implemented matching with Dibang HEP (expected by May 2029) and after completion of Gogamukh S/S (expected in Mar 2025).

Inclusion of wildlife/protected area: The transmission line route may infringe Mehao wild life sanctuary in the state of Arunachal Pradesh. However, for details of forest/protected areas survey is required to be done.

Estimated Cost: INR 1650 Cr.

Impact on Annual Transmission Charges (considering levelized tariff @ 15% of estimated cost): INR 247.50Cr.

Name of the Scheme: Transmission system for power evacuation from Dibang HEP

Scope of the Scheme

- i. Gogamukh – Biswanath Chariali 400kV D/c(Quad) line
- ii. Extension works at Biswanath Chariali(POWERGRID) S/s at 400kV level
 - ✓ 2 no. of 400kV line bays for termination of Gogamukh – Biswanath Chariali 400kV D/c(Quad) line at Biswanath Chariali
- iii. Extension works at Gogamukh S/s at 400kV level
 - ✓ 2 no. of 400kV line bays for termination of Gogamukh – Biswanath Chariali 400kV D/c(Quad) line
 - ✓ 2x80MVAR switchable line reactors at Gogamukh end of Gogamukh –Biswanath Chariali 400kV D/c line, one in each circuit

Upstream network associated with the scheme

Upstream network to be implemented under ISTS:

- a. Establishment of Gogamukh 400/220/132kV substation under NERES-XVI by Mar 2025.

To be implemented matching with Dibang HEP (expected by May 2029) and after completion of Gogamukh S/S (expected in Mar 2025).

Estimated Cost: INR 852Cr.

Impact on Annual Transmission Charges (ATC): INR 127.80Cr.

Name of the asset		From Station	To Station	Scope
Line	400kV Quad Moose 2xD/C Line	Dibang HEP	Gogamukh	TBCB
	400kV Quad Moose D/C line	Gogamukh	Biswanath Chariali	

Bays	400kV bays at Dibang HEP – 4nos	Dibang		NHPC
	400kV bay extension – 4nos	Gogamukh		TBCB
	400kV bay extension- 2nos	Biswanath Chariali		TBCB
	400kV bay extension- 2nos	Gogamukh		TBCB
Reactors	4x63MVAR switchable Line Reactors at Dibang for Gogamukh	Dibang		NHPC
	4x63MVAR switchable Line Reactors at Gogamukh for Dibang	Gogamukh		TBCB
	2x80MVAR switchable Line Reactors at Gogamukh for BNC	Gogamukh		TBCB

Approved link assets

Name of the asset		From Station	To Station	Scope
Line	LILO of 400kV Twin Lapwing Lower Subansiri – BNC D/C - I	Lower Subansiri	Gogamukh	TBCB
		Gogamukh	BNC	TBCB
Station	400/220/132kV GSS at Gogamukh			TBCB

Deliberation of the TCC

CGM(LAR), AEGCL stated 400/220/132kV Gogamukh S/Sn was initially under scope of AEGCL, however, AEGCL agreed for execution under ISTS on the condition that 400kV Substation at Naharkatia and 400kV connectivity of Naharkatia with Gogamukh is agreed.

Dy. COO, CTU stated the establishment of Gogamukh Substation alongwith Gogamukh (ISTS) – Gerukamukh (Arunachal Pradesh) 132kV interconnection proposed

in 2025 timeframe is presently under consideration in the NCT. The connectivity and evacuation system of Dibang project involving Dibang – Gogamukh – Biswanath Chariali high-capacity corridor would be required in the time frame of commissioning of Dibang HEP i.e. 2029. The proposal has been referred to NERPC on 31.01.2022 for their comment within 45 days as per the present ISTS approval process after which it would be forwarded to NCT for their consideration.

CEA stated that while examining the proposal of Gogamukh ISTS S/s and Gogamukh (ISTS) – Gerukamukh (Ar Pradesh) 132kV interconnection in the NCT, it is felt that the matter may be relooked in view of various new intrastate proposal by AEGCL and interconnection proposal between Assam and Arunachal Pradesh.

After detailed deliberation, it was felt that further study is required to exactly assess the location of Sub-station and connectivity to best serve the load centers in Assam and Arunachal Pradesh. Hence TCC requested AEGCL to submit the supporting data to CEA for further studies.

TCC decided to take up Transmission Planning for Dibang HEP after completion of the above exercise.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.20 : READINESS OF DOWNSTREAM OF NEW KOHIMA SUBSTATION - NERLDC
--

During the 5th SCM of NER held at Imphal on 8-08-2015, the following elements have been approved:

- a. Imphal-New Kohima 400 kV D/C line (under TBCB)
- b. 2 no. 400 kV line bays and 1x125 MVAR bus reactor (2nd) at Imphal (PG) (by POWERGRID)
- c. Establishment of 2x500 MVA 400/220 kV S/s at New Kohima along with 4 no. 400 kV line bays, 2x125 MVAR bus reactor and 4 no. 220 kV line bays (under TBCB).

- d. New Kohima (400/220 kV TBCB) – New Kohima (220/132kV - Nagaland) 220 kV D/c line with high capacity / HTLS conductor equivalent to twin moose (by Nagaland)

Note: Nagaland may plan and inform the utilization of remaining 2 no. 220 kV bays at New Kohima 400/220 kV substation.

“It is to be noted that the point d is yet to be implemented by Nagaland, as a result of which no power flow will occur in 2x500 MVA 400/220 kV ICTs at New Kohima. The entire cost of the ICTs will have to be borne by Nagaland and the YTC of Rs. 17.98 Crores/Annum has been submitted by Kohima Mariani Transmission Limited for 400/200 kV, 2 x 500 MVA Substation at New Kohima.”

Implementation of point “**d**” needs to be expedited by Nagaland.

During the 21st TCC Meeting held on 3rd February, 2021 at Kohima, the forum referred the matter to next NERPC-TP meeting with a note that the utilization of the 2 nos. spare 220 kV bays at New Kohima may be decided by NERPC-TP.

Deliberation of the TCC

SE (SLDC & Dimapur), DoP Nagaland informed that 220kV New Kohima – Zhadima line D/C and 220/132kV Zhadima shall be commissioned by May’22

Further, he stated that early completion of 132kV Wokha – Kohima LILO at 220/132kV Zhadima by NERPSIP – POWERGRID to ensure utilization of the assets being constructed by DoP Nagaland and the assets created at 400/220kV New Kohima.

ED, NERPSIP informed that LILO of 132kV Wokha – Kohima at New Kohima alongwith construction of 132/33kV Sub-station at New Kohima shall be completed by May’22.

Sr. GM, SO-II, NERLDC, POSOCO mentioned that Nagaland may plan and inform the utilization of the remaining 2 no. 220 kV bays at New Kohima 400/220 kV substation and also requested to expedite the commissioning of 220kV New Kohima - Zhadima D/C.

SE (SLDC & Dimapur), DoP Nagaland intimated that after construction of 220kV New Kohima to 220kV Zhadima D/C and 220kV Mokokchung to Zhadima D/C, only 2 nos 220kV bays at 400/220kV 2x500MVA New Kohima (ISTS) shall be utilized. So, any additional bays may be de-capitalised as there is no plan for utilization of the same in future.

Member (Power System), CEA requested all the state utilities to plan well in advance regarding exact requirement of number of bays from ISTS stations to avoid unnecessary transmission charges.

Dy. COO, CTU stated that as Nagaland had earlier indicated only one no. 220kV D/c line from New Kohima (ISTS) to Zhadima S/s, 2 nos. 220kV line bays has been kept under the scope of works of ISTS S/s and space for 6 nos. additional bays has been kept for future expansion.

TCC forum noted the scope of 2 nos 220kV bays at New Kohima (ISTS) S/S for Zhadima S/S and directed POWERGRID to complete the LILO works in matching schedule with 220/132kV Zhadima S/S and its upstream.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.21 : ACCURATE LOAD FORECASTING AND INSTALLATION OF AWS - NERLDC

The Median of the RMSE values of the NER States for the last three months is given as under:

	Ar. Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Tripura
Feb'22	10	7	10	8	11	14	10
Jan'22	12	4	7	7	12	8	10
Dec'21	8	11	19	14	17	14	11

States are requested to endeavour to bring down the error value. This would lead to better grid discipline and efficient dispatch of electricity.

It was informed in 158th OCCM that RMC, IMD, Guwahati would install Automatic Weather Station (AWS) in NER. As per the proposed list of stations by the constituents, IMD has surveyed the stations and has mentioned the requirement of NoC for the suitable stations.

The receipt of NOC from the concerned constituents are pending and IMD is not able to move forward with the installation of AWS in the selected stations.

It is requested to all the constituents to provide the NoC to IMD so that the installation of AWS can be done at the earliest. This would improve the weather data availability and would further improve the load forecasting of the states.

Deliberation of the TCC

Senior Scientist-G, IMD requested Arunachal Pradesh, Assam, Meghalaya and Tripura to provide NoC for the 26 selected Sub-stations. Further, he requested the remaining utilities to send the aerial photograph of the suggested sites so that Site Selection and Assessment can be carried out by IMD.

Sr.GM(SO-II), NERLDC stated that IMD, Guwahati has already purchased the AWS equipment and are ready for installation. He requested DoP Arunachal Pradesh, AEGCL, MeECL and TSECL to issue the NoC for 2 nos., 14 nos., 4 nos. and 6 nos. of stations moving ahead with the installation.

He further requested all the utilities to send names of additional stations for survey by IMD, Guwahati.

GM (Trans), TSECL expressed that more number of substation is desirable at Tripura and requested IMD to take up steps to install more number of AWS in Tripura.

SE (SLDC& Dimapur), DoP Nagaland requested IMD to install AWS at their substations as well.

SE (Trans.), DoP Ar. Pradesh expressed his approval for installation of AWS at substation of Ar. Pradesh as well for better load forecast.

ED, MSPCL also requested the forum to take up site selection process at stations of Manipur as well for installation of AWS.

ED, NERTS enquired from IMD regarding forecast of lightning. Senior Scientist-G, IMD stated that the lightning forecast will soon be available in the website of IMD.

ED, NERLDC strongly urged all the utilities to come forward and avail the facility extended by IMD, Guwahati and allow the installation of AWS in their chosen substation.

TCC noted as above.

This is for information to RPC.

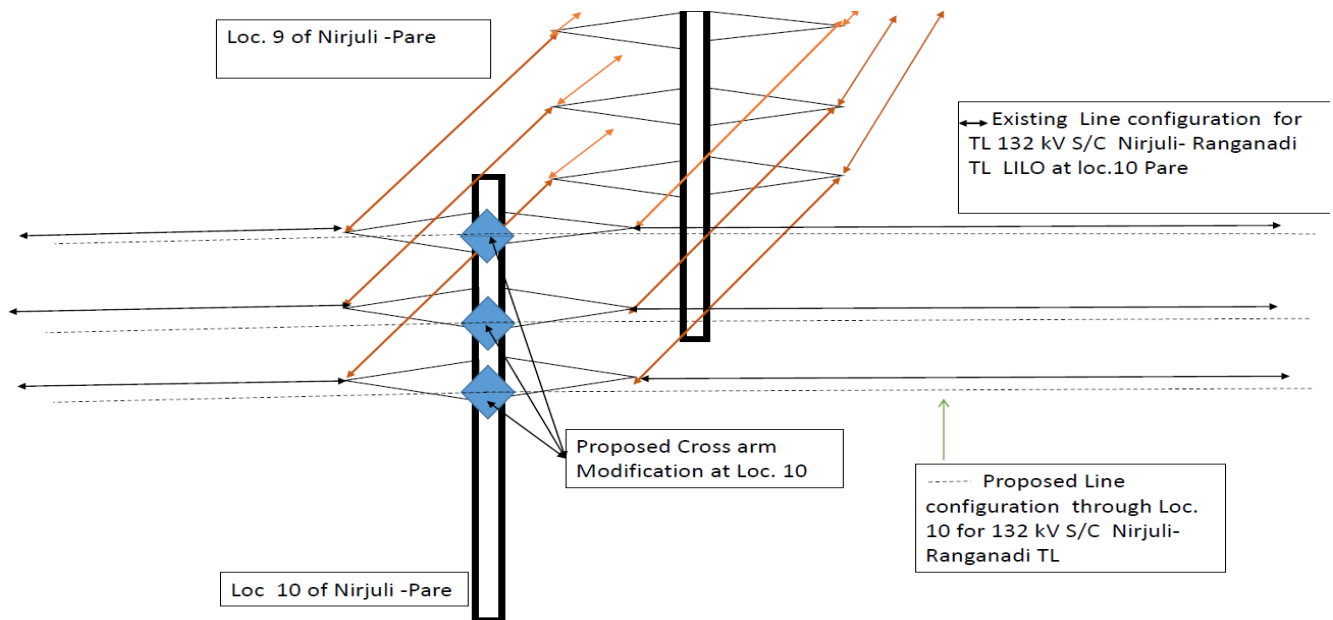
Deliberation of the RPC

The RPC noted as above.

ITEM NO. A.22 : STRAIGHTENING OF 132kV RHEP-NIRJULI-LEKHI LINE AND UPGRADATION OF LILO PORTION AT PARE HEP - NERPC

In the Special Meeting convened by NERPC on 18th Nov'2021 with presence of NERTS-POWERGRID, NEEPCO, NERLDC and M/s STERLITE the following solution was agreed by NERTS-POWERGRID and M/s STERLITE for straightening of the line:

- a. To provide additional Auxiliary cross arms in 132kV Tower(DD type) at Loc 10 of the LILO portion so that Line will go directly from Nirjuli -Lekhi to Ranganadi via Loc 10, without any connection with 132kV D/C Pare-Lakhimpur line of M/s STERLITE. Necessary strengthening (if any) may be taken care of by NEEPCO Ltd. Arrangement proposed is shown in the sketch below:



- b. Connection of 132kV Pare-N.Lakhimpur and 132kV Pare-Nirjuli via Tower at Loc 9 as suggested by M/s STERLITE.

Also, mechanical strength verification of the towers/ conductors due to the proposed scheme of tapping from mid span between Loc 9 & Loc 10 to be looked into by M/S STERITE.

After detailed deliberation, the above solution was referred to NCT/CEA for approval.

Regarding upgradation of the LILO portion, NEEPCO agreed to execute as per approval of the 6th Standing Committee of NER after approval of the above solution for straightening of the line.

Deliberation of the TCC

VP, STERLITE informed in the meeting that they shall not be able to execute the work as finalized above and suggested for alternative method by utilizing the span between Loc. 9 – Loc.10 for straightening of the line and connecting under construction line to Pare HEP.

After detailed deliberation, Member (Power System), CEA requested NERPC to send the scheme proposed by STERLITE and POWERGRID so that CEA can accord approval for suitable solution.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

CATEGORY – B : ITEMS FOR APPROVAL

ITEM NO. B.01 : INTRA-STATE SCHEMES OF ASSAM – AEGCL

In the 3rd NERPCTP meeting held on 19th July, 2021 the following schemes were approved:

Establishment of 220kV Dhaligaon S/Sn

220kV New Dhaligaon Substation with LILO of both circuits of 220kV Rangia-Salakati at New Dhaligaon by AEGCL.

Inter-connection to Diphu

220kV New Mariani – Diphu D/C and 220kV Sankardevnagar – Diphu D/C lines by AEGCL. 02 no. 220kV line bays at New Mariani to be used for termination of 220kV New Mariani – Diphu D/C line.

Establishment of 132/33kV Ghilamora S/S

Establishment of 132/33kV Ghilamora S/Sn with LILO of existing 132kV North Lakhimpur – Dhemaji S/C line at Ghilamora by AEGCL

Establishment of 132/33kV Modertoli S/S

132/33kV S/S at Modertoli near Kampur with S/C LILO of 132kV Samaguri-Sankardevnagar D/C line by AEGCL.

Establishment of 132/33kV Lakhipur S/S

132/33kV Grid S/S at Lakhipu(Tikrikilla) through LILO of 132kV Agia-Hatsingimari D/C by AEGCL

Capacity augmentation of transformers

- a. 220/132/33kV Sarusajai Substation: New 3x50MVA 132/33kV transformers to replace old 3x31.5MVA transformer.
- b. 132/33kV Sibsagar Sub-station: New 2x50MVA 132/33kV transformer to replace old 2x16MVA transformers.
- c. 132/33kV Sishugram Sub-station: New 2x50MVA 132/33kV transformer to replace old 2x30MVA transformers.
- d. 132/33kV Samaguri Sub-station: New 2x50MVA 132/33kV transformers to replace old 2x25MVA transformers

- e. 220/132kV Kukurmara Sub-station: New 2x160MVA 220/132kV transformers to replace old 2x50MVA transformers.
- f. 132/33kV Agla Sub-station: New 1x50MVA 132/33kV transformer to replace old 1x1.25MVA transformer
- g. 132/33kV Khaloigaon Sub-station: New 2x50MVA 132/33kV transformers to replace old 2x25MVA transformers

Re-conductoring of important transmission lines

Reconductoring of important lines as follows:

- 1. 132kV Sonabil-Depota S/C line
- 2. 132kV Sonabil-Pavoi S/C line
- 3. 132kV Sonabil-Gohpur S/C line
- 4. 132kV Pavoi-Gohpur S/C line
- 5. 132kV Kahilipara – Amingaon both line sections with one circuit via Kamakhya and other via Sishugram

Interconnecting lines between existing stations

220kV Rowta – Sonabil D/C line and 132kV Bokajan- Diphu S/C line by AEGCL

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.02 : RECONDUCTORING OF IMPORTANT LINES IN MANIPUR SYSTEM - MSPCL

In 3rd NERPC-TP held on 19th July'2021 upgradation of the following lines (with HTLS) alongwith bay equipments at both ends were approved:

- a) 132kV Imphal-Yurembam D/C line
- b) Existing 132kV Leimatak – NingthoukhongS/C line (subject to under construction Leimatak – NingthoukhongS/C line also to be reconducted/implemented with HTLS of same rating).
- c) 132kV Yurembam-Yaingangpokpi D/C line (agreed with CoD of 2027).

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.03 : INTRA-STATE STRENGTHENING SCHEMES OF MEGHALAYA – MePTCL.

In 3rd NERPC-TP held on 19th July'2021 the following lines were approved under Intra-State Strengthening Scheme to be executed by MePTCL:

- a) 132kV New Shillong – Sohra D/C line.
- b) 220kV New Shillong – Nangalbibra D/C line.

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.04 : STRENGTHENING OF CONNECTIVITY TO CHAMPHAI – P&ED MIZORAM.
--

In 3rd NERPC-TP held on 19th July'2021 second 132kV Khawzawl to Champhai S/C line was approved to fulfill N-1 scheme and increase in reliability of power supply to Champhai area. The line to be constructed under Intra-state scheme.

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.05 : RECONDUCTORING OF INTRA-STATE LINES WITH HTLS-TSECL.

In 3rd NERPC-TP held on 19th July'2021 re-conductoring of following 132kV intra-state lines/section by TSECL with HTLS conductor having ampacity of 800A:

- a. 132kV Surjamaninagar (TSECL) to LILO point of Surjamaninagar (ISTS) – 5.493km
- b. 132kV Bodhjungnagar (TSECL) to LILO point of Surjamaninagar (ISTS) – 12.867km
- c. 132kV Surjamaninagar (TSECL) to Bodhjungnagar (TSECL) – 18.36km
- d. 132kV Ambassa (TSECL) to LILO point of P.K. Bari (ISTS) – 35.45km alongwith LILO portion at 132kV Manu S/Sn.
- e. 132kV P.K.Bari (TSECL) to LILO point of P.K. Bari (ISTS) – 6.407km
- f. 132kV P.K.Bari (TSECL) to Kumarghat (PG) – 2.40km

Total estimated cost INR 70.93 Cr.

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.06 : DPR OF RELIABLE COMMUNICATION SCHEMES - NERPC

The DPR of Reliable Communication Schemes are revised as per discussions in the 22nd NETeST meeting held in Guwahati on 17th March'2022. Estimated cost as follows:

Assam – INR25 Cr.

Manipur – INR 20 Cr

Meghalaya – INR 20Cr.

Mizoram – INR 77 Cr.

Nagaland – INR 66 Cr.

Tripura –INR 38 Cr.

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.07 : INTRODUCTION OF SPS IN MLHEP – MePGCL

PROPOSAL: Proposal to set up a SPS to limit the generation of Leshka on the account of tripping of one circuit of 132 kV Leshka Khliehriat D/C line, NERPC stated that under NERPSIP, 132kV LeshkaKhliehriat D/C line will be LILO at 132/33kV Mynkre S/S. However, even after LILO of this line at Mynkre, full generation of Leshka cannot be safely evacuated via the other circuit in case of N-1 contingency

Explanatory Note:

The evacuation of power from Myntdu Leshka (3X42 MW) Stage-I Power Station is through two 132 Kv Double Circuit Line Connecting with 132 Kv Khliehriat Grid Sub-Station. However, due to frequent tripping of these lines especially during monsoon season, the generation from this Power Station has reduces the reliability of generation of Meghalaya Power System.

MePGCL is in the process of exploring the feasibility for finalising the SPS Scheme based on the suggested logics in the 57thPCC, in consultation with the OEM of the MLHEP, OEM Communication / Protection, at both end of the 132 KV Khliehriat — MLHEP D/C Line, in assisting for preparation of the architecture for providing the necessary command signal etc for implementation of the scheme.

A concept note on the implementation of the SPS will be prepared on obtaining the comprehensive feasibility report, scheme, architecture etc from the OEM MLHEP and OEM Communication/Protection and submitted to the competent authority for concurrence.

MePGCL is requesting the forum to consider recommending the funding of this project from PSDF.

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.08 : REQUIREMENT FOR REPLACEMENT OF 400kV 50MVAR BUS REACTOR-I&II AND 400kV 50MVAR 400kV BONGAIGAON - BALIPARA-II LINE REACTOR AT BONGAIGAON S/S – NERTS

BHEL make 400kV, 50MVAR Bus Reactor-I&II and 400kV 50MVAR Balipara-II LR at Bongaigaon S/S was commissioned in 1999 under Kaithalguri TS. Details of the reactors are mentioned below:

Sr. No.	Details of Equipment	Name of Substation	Make	Year of Manufacturing	Age
1.	400kV, 50MVAR Bus Reactor-I	Bongaigaon	BHEL	1987	35 yrs
2.	400kV, 50MVAR Bus Reactor-II	Bongaigaon	BHEL	1994	28 yrs
3.	400kV, 50MVAR LR of Balipara-II	Bongaigaon	BHEL	1994	28 yrs

Condition based monitoring/ maintenance of transformers/ reactors like DGA, Tan delta measurement of bushings & windings, oil parameters, Furan analysis, FDS, IR of core insulation etc are being carried out by POWERGRID to know the healthiness. During condition monitoring of the said reactors, violation has been observed in the test parameters and condition of the reactors found not good. M/s CPRI (Third party) was approached by POWERGRID to analyze the test results of said equipment and to know the condition of the equipment. The test results were analyzed by CPRI and based on the test results, CPRI has recommended to replace the said units.

The above-mentioned reactors are very old and due to ageing, chances of its failure are always high. Non-availability of the reactor may lead to lack of reactive power support and high Bus voltage which may cause threat to the grid. Therefore, it is proposed to replace the 400kV, 50MVAR Bus Reactor-I&II and 400kV 50MVAR Balipara-II LR at Bongaigaon S/S under ADDCAP and to be shared by constituents as per Sharing Regulation of CERC.

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

**ITEM NO. B.09 : INCORPORATION OF BUS BAR PROTECTION FOR 132kV
SUBSTATIONS OF POWERGRID – NERTS**

In order to prevent unwarranted tripping of lines due to bus fault in a particular station it is necessary to have bus bar protection system implemented in a station. However, it has been observed that the old 132kV schemes does not have the provision of bus bar protection scheme. As such in order to improve the protection system of 132kV Substations it is proposed to approve implementation of Bus Bar protection in the following stations of NERTS:

- a) 132kV Melriat Ss
- b) 132kV Bays of 220kV Mokokchung Ss
- c) 132kV Tezu Ss
- d) 132kV Namsai Ss
- e) 132kV Ziro Ss
- f) 132kV Side of 400kV Balipara Ss.

Estimated expenditure is approx. INR 1.5 Cr.

The point was approved in-principle in 188th OCC and referred to next TCC/RPC for approval. It is proposed that the aforesaid expenditure may be shared by constituents as per Sharing Regulation of CERC.

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.10 : RE-CONDUCTORING OF 66kV TRANSMISSION LINE WITH HTLS PANTHER CONDUCTOR FROM (1) NAGARJAN – SINGRIJAN CKT-I, (2) NAGARJAN – SINGRIJAN CKT-2, (3) SINGRIJAN-CHUMUKEDIMA S/C, (4) SINGRIJAN – GANESHNAGAR S/C – DOP NAGALAND

Dimapur being the only commercial hub of the Nagaland state, there is a rapid growth of economy leading to proportionate incremental growth in the demand for power. The major sub-stations feeding the Dimapur Load Centre at 66kV voltage level are as under:

1. 20MVA, 66/33/11kV substations, each at Chumukedima, Sovima & Power House
2. 1 OMVA, 66/33kV substation at Ganeshnagar (Industrial Growth Centre)
3. 5 MVA 66/33/11 kV sub-stations, each at Purana Bazar/ Diary Farm & Nita Farm

In this regard, Chumukedima being the newly created district headquarter there has been a rapid growth of population thereby increasing the power demand. In addition, there is a requirement to provide a dedicated 5MVA for National Institute of Technology (NIT) Chumukedima and another dedicated 1.6 MVA for Railways (i.e. Dimapur-Zubza railway). Also, there is a potential demand of 20MW from the upcoming industrial activities. This has necessitated for up-gradation of the existing 20MVA transformer, which is barely sufficient for meeting the existing demand. However, the department is unable to up-grade the same due to transmission constraints, as the existing 66kV line is being drawn through an ACSR WOLF conductor. The same constraint is being faced at Ganeshnagar sub-station where there is an urgent need to upgrade the transformation capacity. With the designation of Ganeshnagar as "Industrial Growth Centre" by the state Government, many medium and small-scale industries are coming up in Ganeshnagar and the department is unable to accord load sanction to these industries due to the system constrains. Further, the upcoming renewable power projects in this area totaling to nearly 40MW will require evacuation corridor. In view of all these factors, the department has considered re-conductoring of 66kV transmission line ACSR wolf with HTLS panther conductor feeding the existing 20MVA, 66/33/11kV Chumukedima sub-station and 10MVA, 66.33kV Ganeshnagar sub-station with a total circuit length of 44km so that the transformation capacity of these sub-stations can be up-graded to at least 50MVA each to meet the shortfall in the power demand. These upgraded lines will also enable to evacuate the upcoming 20MW Solar power plant under implementation at Ganeshnagar Industrial Growth Center.

In view of the above, the proposal for "Re-conductoring of 66kV Transmission line with HTLS Panther Conductor from (1) Nagarjan- Singryan Ckt-I (2) Nagarjan- Singrijan Ckt-2 (3) Singrijan Chumukedima VC (4) Singrijan - Ganeshnagar SIC, " with an estimated cost of Rs. 2865.78 lakh is put forth for consideration of funding through PSDF with 100% grant as a special dispensation.

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.11 : UPGRADATION OF 132kV DHEP- MOKOKCHUNG – DoP NAGALAND

Up-gradation of the existing 132kV DHEP – Mokokchung S/C line on S/C tower from existing Panther conductor with Single HTLS conductor and strengthening of tower, wherever required (ampacity of single HTLS shall be 798 A – equivalent to Single ACSR Moose conductor for 45°C ambient and 85°C maximum conductor temperature) alongwith upgradation of associated bays alongwith upgradation of 1 no of 132kV bay each at Doyang and Mokokchung(NAG) Sub-station. This is to relieve congestion to Dimapur and Mokokchung load center. This will also lead to complete utilization of available transformation capacity at Mokokchung(ISTS) & Dimapur(ISTS) for delivering power to Dimapur and Mokokchung load center. Further during contingencies Bokajan can be supplied from Dimapur. Applied for funding under PSDF.

Placed for approval of TCC/NERPC.

Deliberation of the TCC

TCC recommended for re-conductoring of 132kV DHEP-Mokokchung with HTLS Panther conductor at an approximate cost of INR 20 Crores and put up for NERPC approval.

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.12 : INSTALLATION OF TLSA IN 400KV D/C PALATANA TRANSMISSION SYSTEM-NETC

Major portion of the 400 kV Silchar-Byrnihat-Azara line is traversing through the State of Meghalaya which falls under high isokeraunic level and also the soil is found to be of very high resistive nature. Due to such high isokeraunic level, repeatedly lightning strikes with heavy intensity occurs during thunderstorm due to which both these circuits have experienced excessive tripping(s) since commissioning. To reduce such type of tripping(s), NETC has taken up no. of innovative measures to reduce the Tower Footing Resistances (TFR) such as Tower Shield Earthing, Bentonite treatment and Marconite treatment etc. and by which could be able to reduce the tower footing resistances (TFR) significantly i.e. below 10 ohms. However, it is observed that during monsoon, these lines are still getting tripped due to lightning strikes in the stretches where the tower footing resistances are quite low. On the basis of further study and field experience it is felt that, such tripping(s) are taking place because of lightning with very high intensity. Considering the situation, to avert such happenings in future NETC shall explore the introduction of Transmission Line Surge Arrestors (TLSA) in some critical stretches of the subject Transmission Line on experiment basis. On fixing these TLSAs the performance shall be monitored very stringently for further future use of the TLSAs. Accordingly, 2(two) critical stretches involving 22 no. towers in Silchar – Byrnihat – Azara line have been identified for fixing the TLSAs.

Further, during the last few years number of lightning strikes in a particular stretch in Byrnihat–Bongaigaon line section causing number of line outages have also been observed. Considering the same 1(one) more critical stretch involving 08 no. towers in Byrnihat – Bongaigaon line has also been identified for fixing the TLSAs. PGCIL had already installed 400 kV TLSAs in few of their lines. Accordingly, the matter was discussed with their Asset Management Department, CC, Gurgaon and obtained confirmation regarding much improvement in the performance of those lines. As per the latest LoA placed by PGCIL in March'2020 for “Supply & Supervision of Installation & Commissioning of TLSAs in their 400kV Rourkela-Sundargarh-Raigarh Transmission Line” the financial involvement for fixing TLSAs in 30 nos. (22 + 8) towers (04 no. TLSAs per tower) comes to around Rs. 200 Lakhs. For fixing the TLSAs, shutdown shall be required to be availed by NETC which may be accounted for system improvement and

availability of NETC shall not suffer. The committee is requested to recommend capitalization of the above expense.

Simultaneously, NETC will also continue the Bentonite/Marconite treatment for earthing improvement in the identified towers. On observing the satisfactory performance of such improvement measures, NETC shall come up with a detail proposal for the balance critical stretches with request for reimbursement of such expenditure through Tariff.

This issue was also highlighted / discussed in various forum of NERPC including the 2nd Meeting of NERPC(TP), 21st TCCM & 21st NERPC Meetings. In the 168th OCCM, the NERLDC had recommended for installation of TLSA in these two circuits of NETC.

In 183rd OCC meeting MD, NETC proposed installation of 30 nos. of Transmission Line Surge Arrestors (TLSA) in Palatana-Silchar-Byrnihat-Bongaigaon corridor in strategic locations to mitigate tripping of lines on lightning fault even when Tower Footing Resistance (TFR) is less than threshold value of 10 Ohms. NETC further requested the committee to assist NETC in allowing outages and capitalization of the expenses to the tune of about Rs 2 Crores. The committee deliberated the issue and accorded in principle approval, as such installation would improve the stability of the Grid. The Committee further recommended the proposal to be put up in the ensuing CCM/TCC / Board Meeting for final approval.

The 43rd CCM endorsed NETC proposal and referred to next TCC/RPC meeting.

Deliberation of the TCC

MD, NETC informed that CERC has allocated the funds and approved the same subject to NERPC approval.

TCC recommended the Installation of TLSA under Capital Expenditure to the tune of INR 5 Crores and referred for RPC approval.

TCC noted and recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

ITEM NO. B.13 : UPGRADATION OF SCADA/EMS SYSTEMS AT REGIONAL/STATE LEVEL IN NER- NERPC

A MoU related to free-of-cost consultancy with a detailed responsibility matrix was circulated in 19th and 21st NETeST meeting under which it was proposed that all SLDCs and NERLDC can upgrade in a unified manner to get benefits of seamless integration, joint capacity building and economies of scale in terms of cost implications. It was agreed in-principle to sign the draft MoU and corresponding funding through PSDF by routing the DPR – prepared by NERLDC (attached at **Annexure-B.13**) through TCC/NERPC meeting. As present the status of signing of MoUs is mentioned in table below.

S N	States	Remarks
1.	Arunachal Pradesh	Under administrative approval process in Secretariat office.
2.	Assam	Signed on 06th January 2022.
3.	Manipur	Under consideration process in MD office. Getting slightly delayed because of restrictions due to ongoing state-elections.
4.	Meghalaya	Signed on 28th October 2021.
5.	Mizoram	Signed on 01st November 2021.
6.	Nagaland	Signed on 01st March 2022.
7.	Tripura	Under administrative approval process in MD office.

Total cost estimate INR 311.2497 Cr. (incl. of GST). The amount will be divided into 7 state utilities in NER in equal part i.e. INR 44.4642 Cr. for Main and Backup SLDCs. Proposed for 100% PSDF funding.

Deliberation of the TCC

GM, TSECL stated that AMC cost is very high and shall be huge burden on state exchequer, thus project cannot be executed from state resources. All the state utilities and State power Departments agreed to the views of TSECL.

ED, NLDC stated that AMC cost has been kept as 30% to ensure allocation of cost for quality technical support during AMC period i.e. for 6 years.

TCC noted that high AMC cost is justified and recommended for 100% funding by GoI and referred for RPC approval.

Deliberation of the RPC

Hon'ble Chairman, NERPC stated that Upgradation of SCADA/EMS systems at Regional/State level in NER is necessary and requested CEA, NERPC, NLDC & NERLDC to look into the matter and get it funded from PSDF. All members endorsed the view of Chairman, NERPC.

The RPC noted and approved the above recommendation.

ITEM NO. B.14 : ESTABLISHMENT OF VSAT COMMUNICATION IN SELECTED REMOTE LOCATIONS FOR STATE UTILITIES IN NER – NERPC.

A DPR (attached at **Annexure-B.14**) has been prepared by NERLDC for establishing Very Small Aperture Terminal (VSAT) communication between remote Sub-stations of NER and Control Centers.

Deliberation of the TCC

Cost-estimate of 8,29,95,243 INR (incl. GST) from which funding is to be divided among state-utilities on the basis of quantum of VSAT installation in the respective substations. The scheme is proposed for 100% PSDF funding.

- **MePTCL (Meghalaya):** 6 VSATs plus VSAT at SLDC i.e. ₹ **31,71,792.69**
- **MSPCL (Manipur):** 8 VSATs plus VSAT at SLDC i.e. ₹ **42,29,056.93**
- **P&ED (Mizoram):** 17 VSAT plus VSAT at SLDC i.e. ₹ **89,86,745.97**
- **DoP (Arunachal Pradesh):** 42 VSAT plus VSAT at SLDC i.e. ₹ **2,22,02,549.62**
- **DoP (Nagaland):** 51 VSATs plus VSAT at SLDC i.e. ₹ **2,69,60,237.93**
- **AEGCL (Assam):** 18 VSATs plus VSAT at SLDC i.e. ₹ **95,15,378.09**
- **TSECL (Tripura):** 15 VSATs plus VSAT at SLDC i.e. ₹ **79,29,481.74**

TCC noted and recommended for 100% funding by GoI and referred for RPC approval.

Deliberation of the RPC

Hon'ble Chairman, NERPC stated that VSAT communication in remote areas like NER is justified for improvement of telemetry and visibility in respective control centers and requested CEA, NERPC, NLDC & NERLDC to look into the matter and get it funded from

PSDF. All members endorsed the view of Chairman, NERPC.

The RPC noted and approved the above recommendation.

ITEM NO. B.15 : DEPLOYMENT OF NEW RTUS IN SELECTED SUBSTATIONS OF NER - NERPC

A DPR (attached at **Annexure-B.15**) has been prepared by NERLDC for deployment of new Remote Terminal Units (RTU) in Sub-stations of NER.

Deliberation of the TCC

RTUs in selected stations: Cost-estimate of 43,21,30,700 INR (incl. GST) from which funding is to be divided among state-utilities on the basis of quantum of RTUs required for installation. The scheme is proposed for 100% PSDF funding.

- **MePTCL (Meghalaya):** 20 RTUs i.e. ₹ **5,57,58,800.90**
- **MSPCL (Manipur):** 3 RTUs i.e. ₹ **83,63,820.38**
- **P&ED (Mizoram):** 14 RTUs i.e. ₹ **3,90,31,160.13**
- **DoP (Arunachal Pradesh):** 43 RTUs i.e. ₹ **11,98,81,420.92**
- **DoP (Nagaland):** 42 RTUs i.e. ₹ **11,70,93,480.40**
- **AEGCL (Assam):** 33 RTUs i.e. ₹ **9,20,02,020.24**

TCC noted and recommended for 100% funding by GoI and referred for RPC approval.

Deliberation of the RPC

Hon'ble Chairman, NERPC stated that deployment of new RTUs in NER is necessary for improvement of the system and one again requested CEA, NERPC, NLDC & NERLDC to look into the matter and get it funded from PSDF. All members endorsed the view of Chairman, NERPC.

The RPC noted and approved the above recommendation.

ITEM NO. B.16 : DIVERSION OF 132kV GOHPUR – NIRJULI LINE DUE TO CONSTRUCTION OF GREENFIELD AIRPORT AT HOLONGI(ITANAGAR) IN ARUNACHAL PRADESH - NERTS

Diversion of 132kV Gohpur Nirjuli line is required to facilitate under construction Hollongi Airport. The said work is being carried out as per MoU signed with Dept. of Civil Aviation, Govt. of Ar. Pradesh. Details as per MoU are as given below: -

MoU Signed on – 05th July'2021

Target completion of the line as per MoU – Dec'2022

In this regard, it is to mention here that vide letter dtd 10/03/2022 received from Dept. of Civil Aviation, Itanagar, Govt. of Ar. Pradesh, it was informed that the work is to be completed at the earliest as the Hollongi airport is to be made functional by 15/08/2022 as targeted by PMO (copy attached).

Since this airport is highly important as emphasized by the government to facilitate the construction of Airport & clearing of air funnel area, the line is to be dismantled as directed, by 30/04/2022.

In view of above, it is proposed that outage of 132kV Gohpur Nirjuli Line may be accorded from 15th April'2022 onwards for dismantling of the towers so that further inspection of the airport approach funnel may be carried out by the regulatory bodies.

Moreover, the outage of the line may be provided under deemed outage category till restoration of the line after completion of diversion works though scheduled completion is Dec'22. It is assured that POWERGRID shall take all necessary actions to complete the diversion before Dec'22.

After detailed deliberation in the 188th OCC meeting on 16th March, 2022 the item was referred for discussion in TCC/RPC meeting.

Deliberation of the TCC

CGM(LAR), AEGCL requested assurance of the forum regarding continuous availability of 132kV Biswanth Chariali -Pavoi D/C during the long outage of 132kV Nirjuli-Gohpur.

CGM(AM), NERTS assured that prior to outage of 132kV Nirjuli-Gohpur all maintenance works regarding 132kV Biswanth Chariali - Pavoi D/C will be completed and continuous availability will be ensured.

TCC recommended dismantling of 132kV Gohpur – Nirjuli partially from 15th April'2022 to facilitate the construction of Halongi airport recommended for approval of RPC.

Deliberation of the RPC

The RPC noted and approved the recommendation of TCC.

3. CATEGORY - C : COMMERCIAL ISSUES

ITEM NO. C.01 : OUTSTANDING DUES - NEEPCO

Outstanding dues of beneficiaries payable to NEEPCO as on 17.03.2022 are as follows.

Rs. In Crores

SN	State (UT)	Name of Beneficiary	Outstandi ng already due (>45 days)	Late payment surcharge (LPS) due	Total Due (Inclusive of LPS)	Outstandin g yet to due (>45 days)
1	Assam	APDCL	0.80	0	0.80	61.07
2	Mizoram	Power & Electricity Dept, Mizoram	12.63	0.05	12.68	27.95
3	Manipur	MSPDCL, Manipur	20.52	0.06	20.58	13.86
4	Tripura	TSECL	173.36	0.13	173.49	68.75
5	Ar. Pradesh	Dept. of Power, Ar. Pradesh	0	0	0	0
6	Nagaland	Dept. of Power, Nagaland	0	0	0	3.86
7	Meghalaya	MePDCL, Meghalaya	0	0	0	0
8	Chhattisgarh	CSPDCL	0	0		1.95
9	Haryana	HPPC	0	0	0	0.89
10	Uttar Pradesh	UPPCL	1.49	0	1.49	0
	Grand Total			208.80	0.24	209.04

The above statement reflects an alarming situation. Yet, it has to be appreciated that some states are paying regularly and some are trying hard to clear the dues.

Due to accrual of such outstanding dues, NEEPCO is facing difficulty to meet its day-to-day expenditure including fuel costs required for operating its thermal power stations. In the interest of extending better service to its beneficiaries, NEEPCO earnestly requests all the beneficiaries to make the payment on regular basis.

Deliberation of the TCC

Forum requested all concerned utilities to clear the outstanding dues at the earliest.

All constituents agreed to clear the same soon.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.02 : Renewal of PPA with Arunachal Pradesh for supply of power of 600 MW Kameng HEP - NEEPCO

For renewal of the earlier PPA dated 21.05.2005 which expired on 20.05.2020, NEEPCO has been in discussion with the Department of Power (DoP), Govt. of Arunachal Pradesh (GoAP) and the following issues are yet to be concluded:

- a. The DoP, Govt of Ar. Pradesh has been insisting for incorporation of a provision in the PPA that requires NEEPCO to purchase the unused portion of the free power allocated to the state. NEEPCO has explained that as per prevailing regulations, NEEPCO, being a generating company, is debarred from purchasing power for the purpose of sale. However, DoP, Govt, of AP continues to insist for inclusion of the above provision in the PPA.
- b. The DoP, Govt. of Ar. Pradesh has proposed for 1% additional free power for Local Area Development Fund. Since, the Kameng HEP had been sanctioned before the Hydro Policy 2008, the 1% LADF is not applicable. The, power allocation order from CEA was accordingly issued. It was also clarified by NEEPCO that it cannot deviate from the share allocation order issued by the Ministry of Power, GoI and NERPC.
- c. The DoP, Govt. of AP has also been insisting to include a provision for termination of the PPA any time with prior notice of 90 days. NEEPCO has responded with the clarifications that since PPAs are based on the share allocations issued by MoP /

NERPC, this provision would be unnecessary. However, DoP, Govt. of Ar. Pradesh continues to insist for the same.

As a result, although all other provisions have been agreed upon, the PPA could not be finalized for renewal so far for want of consensus on the above-mentioned points.

Therefore, the above is placed for deliberation and decision in the house under the aegis and guidance of NERPC mainly for i) & ii) above, which involves conformity with prevalent regulations.

Deliberation of the TCC

Forum requested DoP Arunachal Pradesh to sign the PPA as per prevalent regulations at the earliest.

DoP Ar. Pradesh agreed.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.03 : Non-receipt of payment from TSECL- NEEPCO

Outstanding dues of TSECL, Tripura payable to NEEPCO as on 17.03.2022 are as follows:

Beneficiary	Outstanding > 45 days (₹ in crore)	Outstanding < 45 days (₹ in crore)	Total (₹ in crore)
TSECL, Tripura	173.49	68.75	242.24

Due to accrual of huge outstanding dues, NEEPCO is facing acute financial crunch to meet its day-to-day expenditure including fuel costs and other expenses required for operating its thermal power stations.

The above is for deliberation of the house, with a request to TSECL, Tripura to appraise the house on their action plan for early settlement of the said dues.

GM(Comml), NEEPCO – the LC has to be opened

Deliberation of the TCC

Forum requested TSECL to clear outstanding dues at the earliest.

Tripura agreed.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.04 : NHPC commercial issues with Meghalaya - NHPC

A. Outstanding dues of NHPC for more than 45 days (from December 2014):

Out of Rs. 29.64 Cr., MeECL/MePDCL, Meghalaya has paid Rs. 14.12 Cr. on dated 19.03.2021 through 1st tranche & Rs. 14.12 Cr. on dated 22.10.2021 through 2nd tranche under “Aatma Nirbhar Bharat Abhiyan” package. MeECL/MePDCL has cleared their maximum outstanding dues, which is appreciable and presently balance outstanding dues remain only Rs. 1.40 Cr.

Since the said payment is due from December 2014 and MeECL/MePDCL is not taking power from NHPC, therefore MeECL/MePDCL may kindly be impressed upon to clear the balance outstanding dues (Rs. 1.40 Cr.) immediately to settle the pending dues forever.

B. Pending reconciliation statement for verification:

NHPC has submitted the reconciliation statements for the verification at MeECL, Meghalaya but these are long pending since January 2020.

There conciliations are long pending since January 2020 and CAG auditor raised query in this regard. Therefore MeECL/MePDCL, Meghalaya may kindly be impressed upon to verify the same urgently.

Deliberation of the TCC

Forum requested Meghalaya to clear outstanding dues and also verify the reconciliation statement in respect of NHPC at the earliest. Meghalaya agreed.

Director (Distribution), MeECL informed that temporary allocation of Loktak power to Manipur has expired on Dec'21 and the same may be re-allocated to Meghalaya w.e.f. 01st April'22.

NHPC requested Meghalaya to clear the balance outstanding dues first and once it's cleared, the same may be allocated back to Meghalaya. Meghalaya agreed to clear the outstanding dues and also requested to schedule Loktak Power to Meghalaya as soon as the dues are cleared.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.05 : NHPC commercial issues with Manipur - NHPC

As on date, the old outstanding dues of Rs. 6.83Cr. remains to be paid by MSPDCL, Manipur. Though they are clearing payment but irregularly, as a result a chunk of amount always remains outstanding since March 2021.

The issue has also been discussed in every CCM and TCC meetings wherein MSPDCL, Manipur has given assurance to clear all dues after availing Rs. 130 Cr. loan from PFC. Further, NHPC has also given “Bill Discounting” option to Manipur to clear all outstanding dues. Till date, MSPDCL, Manipur has neither cleared all dues nor taken any decision. In present scenario, all the NE DISCOMs except MSPDCL, Manipur have cleared their old dues.

Thus, MSPDCL, Manipur may kindly be impressed upon to clear the outstanding dues at the earliest to avoid encashment of LC/regulation of power as per MoP guidelines.

Deliberation of the TCC

Forum requested MSPDCL to clear outstanding dues at the earliest.

Manipur agreed.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.06 : Dues and Opening of Letter of Credit (LC) against purchase energy from Baramura Gas Thermal Project, Tripura - TSECL

Manipur has on date, an amount of Rs.34 Crores as outstanding. Therefore, Manipur is requested to ensure monthly payment to avail rebate as well as to avoid surcharge. Manipur is also requested for opening of LC as per the guidelines of Ministry of Power, Govt. of India.

Mizoram is requested for opening of LC as per the guideline of Ministry of Power, Govt. of India.

Deliberation of the TCC

Both Manipur & Mizoram agreed to clear the dues and enhance the LC soon.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.07 : NERPC WORKSHOP ON DRAFT GENERAL NETWORK ACCESS(GNA) REGULATION 2021

NERPC has organized workshop on Draft Network Access (GNA) regulation 2021 on 25th February, 2022. From the discussion, it reveals that the own Generation is not considered for GNA calculation. Ministry of Power has considered state wise drawal of last three years data and on that basis GNA of Tripura is 311 MW. GNA is considered only for Transmission connectivity instead of present POC mechanism. It was also raised and discussed in the workshop on the cross-border issue. TSECL has requested NERPC to exclude cross border Transaction issue as the Agreement with Bangladesh is Valid up to March, 2026. In the draft regulation it is observed that, Tripura GNA is considered with Bangladesh Drawal, where the same has been proposed to be excluded.

Deliberation of the TCC

NERPC presented the synopsis of the draft General Network Access Regulations.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.08 : HIGH COST OF BONGAIGAON THERMAL POWER PROJECT - TSECL

Present tariff of BgTPP is Rs.2.40/kwh (Fixed Charge) and Rs.2.94/kwh (Energy Charge) respectively after part implementation of Expert Committee Report. It was expected that tariff reduction over fixed charge of Rs.0.21/kwh over the plant life of 25 years instead of 12 years. Regarding this TSECL already consented for Deferred Depreciation method to NTPC for filling before CERC. Balance proposal of Expert

Committee are yet to be executed / implemented like Interest Subvention, Transfer of equity to NE states etc.

Deliberation of the TCC

NTPC presented the possible steps to reduce the high cost of BgTPP.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.09 : OUTSTANDING DUES OF NER BENEFICIARIES - OTPC

The current total outstanding dues of OTPC from the NER beneficiary states (as on 19-03-2022) are as under:

(Amount in Rs Crores)

Sl. No.	Beneficiary	Outstanding Dues (>45 Days)	Total Outstanding
1	Manipur	32.70	47.64
2	Mizoram	6.76	15.40
3	Tripura	86.52	149.19
	Total	125.98	212.23

The total outstanding dues as on 19-03-2022 are Rs 212.23 Crores out of which outstanding beyond 45 days is Rs 125.98 Crores. The outstanding dues of Tripura, Manipur and Mizoram have accumulated to concerning levels. The auditors have been regularly reflecting the issue of outstanding dues especially of Tripura and Manipur as a special concern in our Board Meetings. Tripura, Manipur and Mizoram are hence requested to clear the outstanding dues over 45 days, at the earliest. The forum is also requested to impress the urgency of the liquidation of dues in view of MoP guidelines for encashment of LC/Regulation of power and non-scheduling of power by RLDC.

Deliberation of the TCC

GM, OTPC, thanked the State Utilities for their regular payments. However, Tripura and Manipur are the biggest defaulters and requested them to clear the dues at the earliest.

MD, TSECL stated that a large chunk of dues (Rs. 166Cr) are expected to be liquidated by Bangladesh through NVVN and also some 38.6 Cr are to be received from Manipur. However, they have agreed to clear the outstanding dues to OTPC within first week of April, 2022.

Manipur also agreed to pay soon.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.10 : DEVIATION POOL ACCOUNT OUTSTANDING - NERLDC

Manipur is the major defaulter of Deviation charges.

Manipur – Net O/s Payable to Pool is **₹3.68 Crores** [Breakup: Deviation Principal, ₹ 2.98 Crores + Deviation Interest, ₹ 0.70 Crores].

DSM Principal O/s greater than 90 days (13 Weeks) is ₹ 2.05 Crores.

Clearance of O/s payable had been regularly followed up.

Deliberation of the TCC

Manipur agreed to clear the deviation pool at the earliest.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. C.11 : NON-PAYMENT OF NERLDC FEES AND CHARGES BILLS - NERLDC

Although we were receiving payments against NERLDC Fees & Charges billing from our all-registered users regularly, but from last few months we are not receiving payment against NERLDC Fees & Charges billing from P&E Department, Mizoram on time.

The status of latest outstanding is as below:

Sl	Bill Description	Bill Date	Bill No	Amount (₹)	Remarks
1	Previous outstanding			-29949.00	
2	PLI Bill for the FY 2019-20	20-Sep-21	NER/2019-20/0016	634137.00	Outstanding more than 45 Days
3	Late Payment Surcharge Bill	31-Jan-22	NER/MO/ 501/504	42194.00	
4	Monthly bill for Jan' 22	1-Feb-22	NER/2021-22/0160	395588.00	
5	Monthly bill for Feb' 22	1-Mar-22	NER/2021-22/0178	392587.00	
	Total			1434557.00	

It is to be mentioned that the PLI Bill for ₹6,34,137/- which was raised on 20/09/2021 has crossed more than five months and it has attracted Late payment surcharge as per Fees & Charges regulation due to delay in payment.

Mizoram may liquidate outstanding dues at the earliest to avoid further accumulation of late payment surcharge due to delay in payment.

Deliberation of the TCC

Mizoram agreed to clear the dues at the earliest.

The TCC noted as above and placed to RPC.

Deliberation of the RPC

The RPC noted as above.

4. CATEGORY - D : ITEMS FOR INFORMATION

ITEM NO. D.01 : UPDATE ON PROTECTION DATABASE MANAGEMENT SYSTEM – NERPC

In compliance with the Task Force Report on Grid Disturbance Analysis in 2012, a Protection Database for different regions in India was envisaged. Accordingly, the web-based Protection Database Management System and Protection Setting Calculation Tool (PSCT) for entire North Eastern Region was thus sanctioned from PSDF in 2018.

Deliberation of the TCC

Member Secretary, NERPC informed that the project was commissioned on 14th February, 2020. Presently, it is under 3rd year of Comprehensive AMC from 15.02.2022 onwards.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. D.02 : UPDATE ON AUTOMATIC DEMAND MANAGEMENT SYSTEM – NERPC

In the 19th TCC/RPC meeting held on 14.01.2019, Automatic Demand Management System for NER States (funded from PSDF) were approved. Accordingly, on 04.06.2019 LoA was awarded with target completion schedule of March'2020. The present status is as follows:

Name of the utility	SAT Completion	DoCO
DoP Ar. Pradesh	27-01-2021	01-02-2021
AEGCL/APDCL	07-12-2020	10-03-2021
MSPCL	24-11-2020	To be finalized
MePTCL/MePDCL	31-08-2020	04-09-2020
P&ED Mizoram	22-02-2021	To be finalized
DoP Nagaland	17-11-2020	To be finalized
TSECL	24-12-2020	Mar'21

Deliberation of the TCC

Member Secretary, NERPC informed that the project was completed in all respects for all 7 NER States. However, commissioning or DoCO in some States as seen above are due to their internal matter and its being monitored in every OCC Meetings.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. D.03 : UPDATE ON SCHEDULING ACCOUNTING, METERING AND SETTLEMENT OF ELECTRICITY(SAMAST) – NERPC

In the 21st TCC/RPC meeting held on 04.02.2021, LoA by NERPC of SAMAST for NER states (funded from PSDF) was approved. Accordingly, on 11.02.2021 LoA was awarded for Assam & Meghalaya with target implementation by August'2022. For Arunachal Pradesh, Manipur, Mizoram, Nagaland and Tripura LoA was awarded on 23.09.2021 with target date of implementation by March'2023. At present the work is under various stages of execution.

Deliberation of the TCC

Member Secretary, NERPC informed that the SAMMAST project is being monitored in every OCC Meetings and hopefully the project will be completed as per scheduled.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. D.04 : AUDIT OF BOARD FUND OF NERPC – NERPC

The Board Fund of NERPC for FY 2018-19, 2019-20 and 2020-2021 has been audited by constituents of NERPC who are based in Shillong i.e. MeECL, NERTS & NEEPCO.

Deliberation of the TCC

Member Secretary, NERPC thanked the officers of MeECL, NERTS & NEEPCO for carrying out the Audits.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

5. CATEGORY - E : ITEMS TO BE REFERRED TO SUB-COMMITTEE

ITEM NO. E.01 : CONNECTIVITY BETWEEN LIKABALI AND BASAR - DoP ARUNACHAL PRADESH

132 kV S/C on D/C Inter-Connectivity Transmission Link between Likabali and Basar: The upcoming 400 kM long 'Khuppi-Pasighat 132 kV line via Seppa, Rilo, Sagalee, Naharlagun, Gerukamukh, Likabali, Niglok and Napit under Comprehensive Scheme shall be running in parallel to the existing 132 kV long radial line of RHEP to Pasighat via Ziro, Daporijo, Aalo and Pasighat of equal length without any interconnecting anchoring and power source in between.

Hence, for stabilized power flow in both these two lines and increase redundancies for reliable availability of power in the grid, the proposed inter-connecting line is essential. This proposal was referred to next meeting of NERPC-TP as discussed in 21st Meeting of TCC on 3rd Feb. 2021, which may therefore be accorded formal approval of TCC & NERPC.

Tentative Length: 80 kms; Cost: Rs. 225 Crs.

Estimated Time of Completion: 24 months from date of sanction

Deliberation of the TCC

The forum opined that the item is to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.02 : CONNECTIVITY TO NAHARLAGUN – DoP ARUNACHAL PRADESH

132kV LILO Link of Pare-Chimpu Transmission Line to upcoming Naharlagun/Yupia 132 kV Sub-Station: The existing Pare-Chimpu line with associated system has power

sources at Pare and Ranganadi HEPs and grid connectivity at Biswa Nath Chariali 400/220/132 kV Sub-Station via Gohpur; while the upcoming Naharlagun/Yupia 132/33 kV Sub-Station under Comprehensive Scheme is connected on the long Khuppi-Pasighat 132 kV line under the same scheme without any intermediate anchoring and connectivity to any power source or grid system till Pasighat. Hence, for stabilized power flow on the Khuppi-Pasighat line corridor, the proposed LILO connectivity is inevitably essential. This was also suggested by the CTU in the System Study Meeting on 05.08.2019, at Gurugram. This proposal was referred to next meeting of NERPC-TP as discussed in 21st Meeting of TCC on 3rd Feb. 2021. Hence, formal approval of TCC/NERPC is required for this proposal.

Tentative Length: 2 kms; Cost: Rs. 25 Crs.

Estimated Time of Completion: 18 months from date of sanction

Deliberation of the TCC

The forum opined that the item is to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.03 : CONNECTIVITY BETWEEN JONAI AND NIGLOK- DoP ARUNACHAL PRADESH

This proposal is important for ensuring reliable redundancy of the grid systems of both the states of Arunachal Pradesh and Assam for stable grid power flow. This proposal was agreed in the Joint System Study Meeting on 05.08.2019, at Gurugram, on reference from the NERSCT in its 1st meeting. The same was also referred to next meeting of NERPC-TP as discussed in the 21st Meeting of TCC at Kohima. Therefore, formal approval of TCC & NERPC be accorded.

Tentative Length: 5 kms; Cost: Rs. 30 Crs.

Estimated Time of Completion: 18 months from date of sanction.

Deliberation of the TCC

The forum opined that the item is to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.04 : NEW EHV SUBSTATIONS FOR IMPORTANT DISTRICT HEADQUARTERS- DoP ARUNACHAL PRADESH

2x10 MVA, 132/33 kV Sub-Station at Kimin in Papum Pare District: Kimin is a fast-burgeoning township having a regular local administrative Sub-Division and huge military establishments with fast growing local industrial and tourism sector set ups. Though the 132 kV transmission line of Khuppi to Pasighat via Seppa, Rilo, Sagalee, Naharlagun, Grukamukh, Likabali, Niglok and Napit had been envisaged to pass nearby the Kimin township, however, provision of the 132/33 kV Sub-Station at Kimin skipped from its scope. Presently, the township is powered through a lengthy and unreliable 33 kV Sub-Transmission lines all the way from Naharlagun and Ziro which travers through thick jungles causing unwanted frequent tripping in addition to poor voltage regulations and hazards to upstream systems and equipment. Hence, the requirement of the proposed Sub-Station has arisen, which will be powered from the upcoming Naharlagun - Gerukamukh 132 kV line through LILO arrangement to be included in the Sub-Station project.

Tentative Cost: Rs. 75 Crs.

Estimated Time of Completion: 24 months from date of sanction.

2x10 MVA, 132/33 kV Sub-Station at Raga in Kamle District:

Kamle is a new district carved out from Lower Subansiri and Upper Subansiri districts of Central Western Arunachal Pradesh, that will have a full-fledged District Head Quarter at Raga. It is the present Sub-Divisional administrative Head Quarter. With creation of this

new independent district, rapid developmental activities are taking place for establishment of infrastructures, and hence consequential rapid load growth too is being expected and more are foreseen in coming days in the district and locality, for which a stable power supply system needs to be put in place, and accordingly the proposed Sub-Station, which would be powered via 132 kV LILO line on the existing Ziro-Daporijo 132 kV S/C line, the cost of which would be included in the project proposed.

Presently Raga is fed power with long 11 kV local feeders from Tamen 33/11 kV Sub-Station whose upstream power is via a lengthy 33 kV radial line passing through dense jungles from Ziro 132/33 kV Sub-Station.

Tentative Cost: Rs. 75 Crs.

Estimated Time of Completion: 24 months from date of sanction.

2x5 MVA, 132/33 kV Sub-Station at Garu in Lower Siang District: Presently, the powers at Gensi (Sub-Divisional administrative HQ), Garu and nearby areas in Lepa Rada district in Central Arunachal Pradesh are fed on 33 kV Distribution systems through a lengthy and unreliable 33 kV line all the way from Aalo 132/33 kV Sub-Station, which poses very poor voltage regulations in addition to frequent disruptions due to the thick jungles and hilly terrains through which the line passes. Such frequent tripping also has huge impact on the lives of Sub-Station transformers and equipment.

As such, one 132/33 kV Sub-Station is essentially required to be established at Garu, which beside being local load centre along the Highway is also at equidistance from Gensi, Igo and other load localities. The proposed Sub-Station shall be powered through LILO connectivity from the proposed Likabali-Basar 132 kV line.

Tentative Cost: Rs. 60 Cr.

Estimated Time of Completion: 24 months from date of sanction.

Deliberation of the TCC

The forum opined that the item is to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

**ITEM NO. E.05 : ESTABLISHMENT OF 400kV NAHARKATIA
SUBSTATION- AEGCL**

Lines:

- a. 400 KV D/C Line to Gogamukh SS(PGCIL)
- b. 400 KV D/C Line to New-Mariani utilizing the existing 400 KV D/C Lines from New-Mariani to Kathalguri (Now charged at 220 KV) upto the location near Naharkatia
- c. 220 KV Naharkatia-Kathalguri D/C Line utilising the remaining part of the 400KV D/C line (Now charged at 220KV upto Kathalguri)
- d. 2 No of 500MVA, 400/220 KV ICT
- e. 2 No 220/33 KV 50MV Transformer for supplying load to DISCOM
- f. 2X125MVA Bus reactor (Switchable)

Deliberation of the TCC

The forum requested Assam to club this with D.15 above, and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

**ITEM NO. E.06 : ESTABLISHMENT OF 132/33kV DOULASAL
SUBSTATION WITH LILO FROM 132kV BARPETA-
AMAYAPUR D/C- AEGCL**

Associated Line:

132 KV Barpeta-Amayapur D/C Line with S/C LILO at Doulasal.

**ITEM NO. E.07 : ESTABLISHMENT OF 220/132kV BARNAGAR
SUBSTATION WITH LILO FROM 220kV RANGIA-
SALAKATI- AEGCL**

132 KV Bus extension at Barnagar with 2 no of transformer LV side Bay for 2X50 MVA, 220/132 KV transformer.

ITEM NO. E.08 : ESTABLISHMENT OF 50MVA 132/33kV JONAI SUBSTATION- AEGCL

Lines: Jonai-Silapathar S/C Line on D/C Tower.

ITEM NO. E.09 : AMPACITY AUGMENTATION OF LINES- AEGCL

- a. HTLS conversion of conductors from 132 KV Amingaon Substation to Dhaligaon Substation (excluding Rangia-Nathkuchi section)
- b. Reconductoring of 132 KV Hailakandi-Dullavchera line
- c. Reconductoring of 132 KV Panchgram-Hailakandi line

Deliberation of the TCC

The forum opined that the **items E6 – E9** are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.10 : ENHANCEMENT OF CAPABILITY OF 132kV PANCHGRAM – LUMSHNONG, 132kV HAILAKANDI – DURLAVCHERRA, 132kV PANCHGRAM – HAILAKANDI, 132kV SRIKONA – PAILAPOOL – NERLDC

The following lines have crossed the useful life of 35 years of age and need upgradation.

Sl. No.	Name of the Line	Year of Commissioning
1	132 kV Panchgram – Lumshnong line	1969 (Approx.)
2	132 kV Hailakandi – Dullavcherra line	1970 (Approx.)
3	132 kV Panchgram – Hailakandi line	1970 (Approx.)
4	132 kV Srikona - Pailapool line	1970 (Approx.)

It has been observed that the above-mentioned lines are unable to carry power to the tune of the thermal rating of the ACSR Panther conductor (79 MW approx.). The above elements are therefore not able to provide grid security and reliability in the case of

tripping of any parallel path. Also, due to low capability of the lines, reliability of power supply to Tripura, Meghalaya and South Assam Power System is reduced. NERLDC vide letter to AEGCL dated 17.02.22 already highlighted the same.

It is therefore urgently requested to take up necessary steps to enhance the capability of the aforementioned lines of Assam Power System so that the grid can be run more securely and reliably.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.11 : EVACUATION OF POWER FROM NANGALBIBRA ISTS AT 400kV – MePTCL
--

The ISTS project under Nangalbibra-Bongaigoan Transmission Ltd, TBCB envisages the construction of 400kV line (to be charged at 220kV) between Bongaigaon and Nangalbibra along with a 220/132kV substation at Nangalbibra. It is therefore imperative that evacuation plan at 400kV be also made from this substation in order to fully ensure a robust system of 400kV transmission.

In the 21st NERPC meeting, proposal for construction of 400KV, 220KV and 132KV transmission systems along the southern border of Meghalaya to facilitate the export of power to Bangladesh was made. The present proposal for this power corridor is:

- a. 400 KV D/C line charged at 220KV from Mynkre to Nongalbibra ISTS via Ichamati to connect the proposed ISTS 400 KV line from Bongaigaon to Mynkre.
- b. MePGCL has submitted the proposal for construction of the Myntdu Leshka Stage-II project (210 Mw) to the Govt. of Meghalaya (GoM) for funding. As of today, the status of the MLHEP-II project is that the High-Powered Committee of the GoM, has been constituted and to be funded as an Externally Aided Project

(EAP). Based on this, MePTCL has submitted a proposal to evacuate power through a 220KV D/C line and to LILO the 400KV Silchar-Byrnihat-Bongaigoan line at Mynkre substation. For this, construction of a 400/220KV, 2*315MVA GIS Sub-station and 220/132KV, 2*160MVA GIS substation at Mynkre is also proposed in the project cost. Land of 12 acre is available at Mynkre. In the earlier NERPC meeting this project was propose to be taken upon the coming up of Leshka-II which is being actively considered.

The proposal of 400kV South Meghalaya corridor connecting Mynkre and Nangalbibra (ISTS) will shorten the distance from Silchar to Bongaigoan and create a robust 400kV Transmission System besides ensuring evacuation.

The associated lines and substations for evacuation includes

- i. 400kV LILO and substation at Ichamati.
- ii. 132KV substation at Baghmara (District Headquarter of South Garo Hills) along with associated lines from Nongalbibra.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.12 : EVACUATION OF POWER FROM NERPSIP PROJECTS - MePTCL

The Ongoing projects of NERPSIP constitute the following substation with associated lines:

- a. 220/132kV substation at Mawphlang.
 - i) 220/132kV substation at New Shillong.
 - ii) 132/33kV substation at Phulbari.
 - iii) 132/33kV substation at Mynkre.
- b. Evacuation from 220/132kV substation at Mawphlang.

- i) 220 kV line to Ichamati with associated substation at Ichamati.
- c. Evacuation from 220/132kV substation at New Shillong.
 - (i) 132kV line to Nongpoh alongwith substation at Bhoirymbong (near Shillong Airport)
 - (ii) 132kV line and LILO at nearby IIM Shillong substation.
- d. Evacuation from Mynkre.
 - (i) 132kV line to Lumshnong Substation.
- e. Evacuation from Phulbari
 - (i) 132kV Phulbari-Mendipathar.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.13 : NEED FOR AUGMENTATION OF EHV LINES AND SUBSTATIONS IN RIBHOI ASPIRATIONAL DISTRICT – MePTCL
--

This district has been declared as Aspirational District by NITI Aayog. It is also the most industrialized district of the State of Meghalaya contributing to the economy and development of the State and the region. It has the maximum number of Hydro stations in the state and also the oldest Hydro Power Station in the region. Besides this district lies between Shillong and Guwahati. Although a number of Grid stations have been installed in the industrial area of the district but the head quarter is not having any 132KV substation to cater to the growing load demand and power supply reliability for the common public.

Further, areas adjacent to Byrnihat 400/220/132kV substation which are contiguous

to Guwahati city do not have a single 132/33kV substation rendering poor quality of power supply to residents of Khanapara, Pillangkatta and Patharkhmah areas.

It is therefore proposed that following Grid substations and associated lines be set up in the interests of the general public.

- a. 132/33KV Substation at Nongpoh with LILO of Stage III- Umtru line.
- b. 132/33kV Substation at the existing 400/220/132kV Killing Substation with LILO of 132kV Umtru – Kahelipara D/C.
- c. 132/33kV Substation at Pillangkatta with LILO of 132kV Killing- Kahilipara D/C line.
- d. 132/33kV Substation at Pathatkhmah with associated line from Nongpoh.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.14 : INDO-BANGLA BORDER TRANSMISSION SYSTEM IMPROVEMENT – MePTCL

- a. Improvement of power supply: A large number of 33Kv substations in the Indo-Bangla border areas have been constructed under DDUGJY, RAPDRP, SAUBHAGYA, Indo Bangla Border Lighting, IPDS, ADB and NERPSIP etc., but there is no existence of 132/33kV substations all along the international border.
- b. Improvement of Border Trade and Tourism: There is a large presence of border LACs and internationally known tourist areas such as Mawlynnong and Dawki.

132KV connectivity is required as follows:

1. 132/33KV substation at Balat with associated line from Ichamati
2. 132/33KV substation at Pongtung with Associated lines from Sohra/ Mawlyndep
3. 132/33KV substation at Mawkyrwat with associated line from Balat.

Expansion of Intra state network and connectivity of missing 132kV links:

For Intra State connectivity and power system stability the following lines are required:

- a. 220kV Mynkre-Mustem. Evacuation of power from MLHEP-II (Leshka) of 210 MW.
- b. LILO of 220kV Nangalbibra (ISTS) – New Shillong with substation at Mustem.
- c. 132kV MLHEP-I (Leshka) - Mustem with LILO and substation at Amlarem (Alternate evacuation route for Leshka-I). During high generation monsoon period, 2x7, 126 Mw power evacuation is dependent on only one D/C 132kV feeder to Khliehriat S/S which is susceptible to outages due to severe monsoon weather.
- d. 132 kV Ampati-Dalu-Baghmara with substation at Baghmara.
- e. 132kV Stage III- Nongkhlaw –Nongstoin with substation at Nongkhlaw.
- f. New Grid Substation and Lines: The creation of new transmission elements proposed up to 2030 need to be initiated as follows:
- g. 132kV Ichamati/Sohra-Balat-Bagmara. For ringmain connection of Sohra and Bagmara with ISTS Nangalbibra.
- h. 132kV LILO of NEIGRIHMS-Khliehriat at Shangpung along with substation. For N-1 of Khliehriat and load demand growth of Laskein Block.
- i. Stringing of 2nd circuit from Ganol P/S to Ampati on existing towers. For N-1 relief to Ganol P/S and Ampati.
- j. LILO of 400kV Silchar-Byrnihat at New Shillong. For ringmain connectivity of New Shillong-Killing-Mawngap and evacuation from NERPSIP New shilling project.
- k. 400kV Killing-Nangalbibra (charge at 220kV) with LILO and substation at Nongstoin. This will provide alternate evacuation from Nangalbibra ISTS to New Shillong.

Shillong Load: To cater to growing demand of the capital city of Shillong, 132KV substations and associated lines are proposed at:

1. 132/33KV substation at Mawlynrei with associated line from NEIGRIHMS.
2. 132/33KV substation at Laitlyngkot with associated line from Mawlyndep.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.15 : CAPACITY AUGMENTATIONS AND EXTENSIONS OF EXISTING SUBSTATIONS – MePTCL

SN	AUGMENTATIONS AND EXTENSIONS OF EXISTING SUBSTATIONS	
1	132/33KV NEHU S/S	New 132/33kV, 2x50MVA in place of old 2x20 MVA transformers
2	132/33KV Rongkhon S/S	132/33kV, capacity upgradation from 45 MVA to 60 MVA
3	132/33KV, EPIP-II, Norbong S/S	132/33kV, Augmentation from 1x50MVA to 2x50 MVA transformers
4	132/33 KV Nongstoin S/S	New 132/33kV, 2x50MVA in place of old 2x20 MVA transformers
5	132/33KV Mawphlang S/S	New 132/33kV, 2x50MVA in place of old 2x20 MVA transformers
6	132/33KV Umiam S/S	New 132/33kV, 2x50MVA in place of old 2x20 MVA transformers
7	132/33KV Lumshnong S/S	New 132/33kV, GIS 2x25MVA in place of old 1x10 MVA transformer
8	132/33KV Khliehriat S/S	Upgradation & modernisation of Khliehriat 132/33 kV Substation including providing 33kV Switchyard
9	132/33KV, EPIP-I, Rajabagan S/S	132/33kV, Augmentation from 2x20MVA to 2x50 MVA transformers

10	132/33KV, Mawlyndep S/S	132/33kV, Augmentation from 2x20MVA to 2x50 MVA transformers
11	132/33KV, Mendipathar S/S	132/33kV, Augmentation from 2x20MVA to 2x50 MVA transformers
12	132/33KV, Mustem S/S	132/33kV, Augmentation from 2x20MVA to 2x50 MVA transformers

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.16 : RE-CONDUCTORING OF TRANSMISSION LINES - MePTCL

S. No.	RECONDUCTORING OF TRANSMISSION LINES (HTLS)
1	132kV NEHU-Mawlyndep- Mustem- Khliehriat S/C line -COD 1996
2	132kV Stage 1 -Umiam S/C line COD- 1991
3	132kV Umiam-NEHU S/C line COD 1991
4	132kV Stage 1- Mawlai S/C line COD 1964
5	132kV Stage I- Stage-II S/C line COD 1969
6	132kV Umtru- Stage III D/C line COD 1964
7	132kV Umtru- Kahilipara D/C line COD 1964
8	132kV NEHU-Mawlai COD 1996
9	132kV Umtru-Sarusajai COD 1996

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings

of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.17 : RE-STRENGTHENING OF INTRA-STATE 132kV TRANSMISSION LINES – TSECL

Power flow through 132 KV network in the State of Tripura has increased considerably with addition of new generating stations in the system. As a result, there has been frequent occurrence of flashing in jumpers and snapping of conductors with current flowing above thermal limit through some intra-state line sections.

As such re-strengthening of the intra-state line sections by replacement of existing conductor with HTLS (High Temperature Low Sag) conductor of equivalent size with suitable insulator & hardware fittings on same tower structure to cope up with increased power flow with improved reliability is a necessity. The HTLS conductor though having lesser weight has much higher current carrying capacity compared to ASCR conductor.

Presently power is being evacuated through 2(two) nos. 132 KV intra-state line corridors as appended below:

- a. 79 Tilla Grid – Bodhjungnagar – Jirania – Baramura – Gamaitilla – Ambassa – P.K. Bari – MissionTilla
- b. 79 Tilla – Mohonpur – Dhalabil – Kamalpur – P.K. Bari.

Out of the above EHV line sections, DPR for re-conductoring of the 132 KV line section from Ambassa to P.K. Bari via P.K. Bari (ISTS) by HTLS conductor has been already submitted to NERPC for consideration of funding through PSDF.

Moreover, providing of HTLS conductor in 132 KV line section from Mission-Tilla (Tripura) to Durllavcherra (Assam) may also be explored.

Re-strengthening of the balance intra-state transmission line sections by replacing old aged conductor, hardware etc. with HTLS conductor of equivalent size with suitable

insulator & hardware fittings being essentially required is envisaged in the proposal for stability of the intra-state grid in respect of power flow / evacuation.

Cost Estimate along-with Detail Project Report (DPR) will be submitted for approval of the proposal by NERPC and consideration of NERPC for funding through 100 % Grant from PSDF.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

<p>ITEM NO. E.18 : PROVIDING OF HTLS CONDUCTOR WITH ALLIED ACCESSORIES AT EXISTING 132kV TRANSMISSION LINE SECTIONS – TSECL</p>
--

The said new 132 KV connectivity to Udaipur from Palatana Generating Station with HTLS conductor shall strengthen intra-state transmission system in terms of adequate power flow even for added generation at Palatana with more reliability and improved voltage profile which will be beneficial not only for the Gomati and South Districts but the State as a whole considering the future load growth.

Rokhia Generating Station is presently connected with two major intra-state transmission lines at 79 Tilla Agartala Grid and Udaipur. The existing 132 KV double circuit link from 79 Tilla Agartala Grid to Rokhia has been already provided with HTLS conductor (98 % completed).

The 132KV single circuit transmission line from Udaipur to Rokhia GTP was constructed and commissioned around 20 years back with ASCR “PANTHER” conductor. Since commissioning the line has gone through different wear-tear condition and overtime the power flow through this line has also been increased, mechanical strength of the power conductors have deteriorated to a great extent due to

prolong use causing frequent intra-state grid disturbance. By providing HTLS conductor in this 132 KV line section, the power evacuation corridor from Rokhia GTP will be completed.

As such, for adequate power evacuation from Palatana Generating Station and Rokhia GTP and to maintain grid reliability, stability and improve the voltage profile, providing of HTLS conductor in both the existing 132 KV transmission line sections from Palatana to Udaipur and Udaipur to Rokhia is very much technically essential.

Replacement of old panther conductor having low ampacity with the highest system availability and quality need be considered to achieve most reliable power transmission system in the State.

Cost Estimate along-with Detail Project Report (DPR) will be submitted for approval of the proposal by NERPC and consideration of NERPC for funding through 100 % Grant from PSDF.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

ITEM NO. E.19 : INSTALLATION OF RACCOON COVERED CONDUCTOR FOR OUTSIDE SOURCE OF 33kV POWER SUPPLY OF UMIAM STG-IV – MePGCL

The RPC noted as above.

PROPOSAL: Installation of 33KV Racoon covered conductor with accessories etc., for Outside source 33KV power supply of Umiam Stage IV Power Station, coming from Umiam Stage III power station, under MePGCL

Explanatory Note:

Stage IV power station is a generating station with two installed Units, where each unit is of capacity of 30 MW. The overall generating capacity of this station is 60MW.

The above 33KV outside source power supply line from Stage **III** Power station to Stage IV power station which runs through the reserved forest is prone to frequent power supply outages due to frequent falling of bamboos and small trees on the naked conductors of the line. Although trimming of trees is done regularly, the growth of shrubs, trees and bamboos are very fast which caused frequent outages of the line.

Therefore, in this connection it is felt necessary to replace the existing naked racoon conductor with 33KV covered racoon conductor in order to avoid frequent outages of the line.

Due to lack of fund, MePGCL is requesting the forum to consider recommending the funding of this project from PSDF.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.20 : INSTALLATION OF TWO NUMBERS GENERATOR TRANSFORMER FOR LESHKA – MePGCL
--

PROPOSAL: Procurement of (2) nos. Generator Transformer **10**, 17.5 MVA, 132/33 KV with accessories etc as spares for MLHEP Power Station.

Explanatory Note:

Myntdu Leshka Power Station is a generating station with three installed Units, where each unit is of capacity of 42 MW. The overall generating capacity of this station is (3 X 42 mw). Each unit of the Myntdu Leshka (3X42 MW) Stage-I Power Station is provided with three single phase generator transformers. In the event of failure any one of the generator transformers, a spare transformer will be required for its replacement to maintain the smooth functioning and uninterrupted generation of power supply.

However, the spare transformer which was available at the MLHEP, has failed many a times and is now not reliable with the history of similar failure in the past. Considering the importance of maintaining un-interrupted generation and grid stability in the NER, at high hydro monsoon season, it is very vital to arrange for procurement of a new Generator Transformer 10, 17.5 MVA, 132/33 KV with accessories etc., for the MLHEP Power Station, to meet the System Demand.

MePGCL is requesting the forum to consider recommending the funding of this project from PSDF.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.21 : UPGRADATION OF EXISTING SCADA SYSTEM OF MLHEP - MePGCL

Up-gradation of the existing SCADA system of Myntdu Leshka Stage — I Power Station from the obsolete windows XP operating system to windows 10 of the latest version. The existing SCADA system's response is very slow and hanging of the system is experienced on and off. This is mainly due to very low RAM and Hard Disk capacity and necessary requirement of up-gradation of the system software to the latest available version. It may be noted that the installed software of the SCADA system i.e., Windows XP is already obsolete and there is no more technical support for the same. The tentative cost of the project will be tentatively Rs2.5Cr (Inclusive of Packaging, 1-7&I, Testing & Commissioning etc.).

MePGCL is requesting the forum to consider recommending the funding of this project from PSDF.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.22 : RENOVATION AND UPGRADATION OF PROTECTION SYSTEM IN THE EHV SUB-STATIONS OF TRIPURA – TSECL

Augmentation of 5 nos. existing 132 KV sub-stations of Tripura at Udaipur, Jirania, Dhalabil, Kailashahar & Ambassa are presently in progress of installation under Tranche – I Scope of Work of Govt. of India and World Bank funded NER Power System Improvement Project (NERPSIP), where Power Grid Corporation of India Limited (PGCIL) is the Implementing Agency.

Modernization & Renovation by replacing old aged, obsolete equipments and Protection system in the balance 132 KV sub-stations of the State viz, Surjamaninagar, Bodhjungnagar, Gamaitilla, Kamalpur is very much essential to be implemented being not covered also within the ongoing scope of work of “Renovation & Up-gradation of Protection System in the Sub-Stations” under PSDF in Tripura.

In addition, left out portions of 79 Tilla Grid, P.K. Bari and Missiontilla 132 KV sub-stations in respect of renovation and up-gradation of protection system also need be considered to achieve most reliable power transmission system in the State.

Cost Estimate along-with Detail Project Report (DPR) will be submitted for approval of the proposal by NERPC and consideration of NERPC for funding through 100 % Grant from PSDF.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of

NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.23	:	DEMOLITION AND RECONSTRUCTION OF RESIDENTIAL/NON-RESIDENTIAL BUILDINGS IN THE SUBSTATION PREMISES AT HAFLONG, JIRIBAM, AIZAWL & KUMARGHAT UNDER ADDITIONAL TRANSMISSION FOR GOHPUR ITANAGAR (ATGI) PROJECT & SALAKATI UNDER CHUKKHA PROOJECT THROUGH ADDITIONAL CAPITALIZATION TARIFF BLOCK 2019-24 – NERTS
----------------------	----------	--

Residential and Non-Residential buildings at Haflong, Jiribam, Aizawl & Kumarghat are constructed under Additional Transmission for Gohpur Itanagar (ATGI) and buildings at Salakati are constructed under Chukkha project.

In order to ascertain Structural Strength of these buildings, Structural Assessment of Residential & Non-residential buildings are carried out at Salakati and Haflong by BINESWAR BRAHMA ENGINEERING COLLEGE, Kokrajhar (BTC), Assam. Report has been received for Salakati station and same is attached as Annexure-II. It was observed during the assessment that most of the structures at Salakati were found not fit for residential purpose. Structural assessment report for Haflong station is expected to be received soon. Structural assessment of the buildings at balance stations are also being taken up.

Accordingly, it is proposed for construction/demolition of buildings as per following details:

Name of Substation	Year	No of Existing Quarters	No of Quarters to be demolished	Nos of quarters to be Constructed
ATGI Project				
Haflong	1987	46	16	16
Jiribam	1985	76	16	16
Aizawl	1988	57	16	16

Name of Substation	Year	No of Existing Quarters	No of Quarters to be demolished	Nos of quarters to be Constructed
Kumarghat	1989	32	16	16
Chukkha TS				
Salakati	1987	45	08	08

Quarters and Admin buildings at above mentioned substation are in dilapated conditions. However as per present requirements, it is proposed for demolition and reconstruction of 16nos quarters at Haflong, Jiribam, Aizawl & Kumarghat and 08nos quarters at Salakati substation under ADDCAP. Moreover, 1no Transit camp and Admin building each at Haflong, Jiribam, Aizawl and Kumarghat substation are also needs to be demolished and reconstructed under ADDCAP.

Estimated Cost for Demolition/ Reconstruction for Residential & Non-Residential buildings under ATGI project: Rs 23.14 Crs

Estimated Cost for Demolition/ Reconstruction for Residential buildings under Chukkha TS: Rs 2.12 Crs

Although above requirement is coming under Clause 25, 2(a) of CERC Tariff Regulation 2019, however, honourable CERC vide its order for ATGI and Chukkha project, has advised to get the consent of RPC. Accordingly, the same is being put up for consent of NERPC.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.24 : COMMUNICATION SYSTEM PACKAGE FOR “RELIABLE COMMUNICATION SCHEME” UNDER CENTRAL SECTOR FOR NER – NERTS

In 18th and 19th NERPC meeting, implementation of Reliable Communication Scheme under Central Sector for NER was approved. Estimated cost of Rs. 75 Cr was indicated in 19th NERPC meeting dt. 28th,29th Nov’18 which was based on contracts awarded in 2018-19.

Contract for the above project has been placed on 12.11.2021, however the DPR cost is revised due to the following reasons-

- a) Tender for OPGW based communication packages being carried out through Domestic Competitive Bidding for the first time in line with guidelines on public procurement.
- b) Restriction of participation of OPGW manufacturers who have beneficial owners in countries land bordering with India in public procurements, in line with section 144 of GFR (General Financial Rules) guidelines issued by Department of Expenditure, GOI in July’20. Qualified bidders in these tenders were reduced to 3 from 5.
- c) There is an increase in price of raw materials like Aluminium and steel over the last 5 years also.

Revised estimated DPR cost of the said project is approximately **Rs. 84.83 Cr.**

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.25 : ADDITIONAL 132kV D/C LINE BETWEEN KAMENG HEP AND KHUPI 132kV SUB-STATION IN VIEW OF OVERLOADING ON THE EXISTING S/C LINE – DoP ARUNACHAL PRADESH

In the 1st Consultative Meeting for Evolving Transmission System of North Eastern Region held virtually by CTU on 25.11.2021, it was made out that as per system study, the existing Kameng/Kimi-Khupi 132 kV S/C line is critically loaded in base case itself. In case of N-1 of Gerukamukh-Naharlagun (Upcoming New) line results in further increase in power flow on Kameng/Kimi-Khupi 132 kV S/C line; thus, requiring strengthening of this segment of transmission element.

Extract of minutes of 1st Consultative Meeting for Evolving Transmission System of NER:

“However, Kameng/Kimi – Khupi 132kV S/C line is observed to be critically loaded in base case itself, N-1 of 132kV Gerukamukh – Naharlagun(New) S/C line results in further increase in power flow on Kameng/Kimi – Khupi line. Thus, re-conductoring of Kameng/Kimi- Khupi 132kV S/C line is required, in view of critical loading in base case and overloading during contingencies.

Representative of Arunachal Pradesh informed that they are planning to construct additional Kameng – Khupi 132kV D/C line in place of re-conductoring of existing circuit as the towers in the existing line are in dilapidated condition. Accordingly, the proposal of re-conductoring of the Kameng – Khupi 132kV S/C line may be dropped.”

Hence, forum may approve this proposal for construction of 132 kV Double Circuit line with associated bays at Kimi and Khupi Sub-Station ends.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

ITEM NO. E.26 : INSTALLATION OF TLSA ON 132kV LESHKA-KHLIEHRIAT D/C

The 132KV D/C Leshka-Khliehriat Line is traversing through Jaintia Hills District of Meghalaya which falls under high isokeraunic level and also the soil is found to be very resistivity nature. Due to such high isokeraunic level, repeatedly lightning strikes with heavy intensity occurs during thunderstorm due to which both these circuit have experience excessive trippings since commissioning and thus affecting generation from Leshka Power Station to large extent. To reduce such type of tripping, MePTCL has taken up No. of innovative measures to reduce the tower footing resistance such as bentonite treatment and soil resistivity improvement.

However, it is observed that during monsoon these lines are still getting tripped due to lightning strikes with very high intensity. Considering the situation and to avoid such occurrences in future, it is felt that installation of Transmission Line Surge Arresters in some critical stretches is required so that frequent tripping can be avoided and loss of generation can be reduced to minimum.

Accordingly critical stretches involving number of towers has to be identified for installation of Transmission lightning surge arresters (TLSAs).

Further, during last few years number of lightning strikes has also been observed in the 132KV Stage I to Stage III and 132KV Stage IV-Umtru P/S ,132 Kv Umtru power station-Sarusajai and 132 Kv Umtru power station-Kahilipara causing number of line outages have also been observed. Considering the same, critical stretches involving number of towers has to be identified and installation of TLSA's is required.

The above issue /problem can be addressed provided the project is financed through PSDF with full grant so that resource crunch is not encountered in any stage.

Deliberation of the TCC

The forum opined that the item is are to be first discussed in Sub-Committee meetings of NERPC for detailed study and is therefore referred back to the Sub-Committee(s) of NERPC.

TCC noted as above.

This is for information to RPC.

Deliberation of the RPC

The RPC noted as above.

CATEGORY – F : RESOLUTIONS TAKEN DURING THE 21ST NERPC MEETING

The North Eastern Regional Power Committee (NERPC) unanimously resolved in the 22nd NERPC meeting held on 28th March, 2022 at Guwahati as follows:

That this Committee strongly urges upon Ministry of Power, Government of India for the following:

RESOLUTION. F.1 : IMPORTANCE OF DEVELOPING SMALL HYDRO PROJECTS IN THE NER STATES UNDER MNRE, GOI:SHP SCHEME

The NE (North Eastern) States of the country is endowed with vast hydropower potentials to provide clean renewable energy without affecting much of the river ecosystems and the environments. The HEPs (Hydro Electric Projects) in this region require considerably smaller space and have minimal impact of displacement and rehabilitation as it involves less land area due to favourable topography.

The development of HEPs is not only important in the North Eastern states to enhance renewable capacity addition in line with the Govt of India's road map to achieve 175 GW, but also it will be a move towards fulfillment of Renewable Purchase Obligation (RPO).

The development of HEPs is capital intensive and hence, it becomes difficult for the States to develop such projects independently due to resource constraint and are left with the alternative of importing power from outside incurring huge financial burden on the State resources.

Earlier till the 12th 5 Year Plan (2007-2012), the MNRE (Ministry of New & Renewable Energy) was supporting the development of SHPs (Small Hydro Projects) to the NE States through SHP schemes @ INR 7.5 Crore/MW, which indeed has helped many projects come into picture in the North East States. However, with the discontinuance of the said SHP Scheme by the MNRE from April 2017 onwards, the most important and viable revenue generating sector of the NE States is left alone.

It is also imperative to note that the North East states being resource crunch states needs support of the MNRE, GOI to develop revenue generating SHPs as many rivers are still yet to be exploited of their potential and harnessing renewable energy from hydro potential sites is a sustainable goal which needs to be achieved.

The MNRE, GOI may therefore reconsider the implementation of SHP scheme to support the potential and viable hydropower projects.

With this background in mind and considering the poor financial conditions of NER States, we request your good self to intervene into the matter personally to revive the Scheme or grant 100% funding from Govt. of India, as a special consideration for the NER.

DATE & VENUE OF THE NEXT MEETING

The next meeting of 23rd TCC & 23rd NERPC is proposed to be held in September, 2022. The exact date & venue will be intimated later. As per roster NHPC will be the host for the next 23rd TCC/RPC Meetings.

Director (Tech), NHPC has agreed to host the next TCC/NERPC Meetings

The meeting ended with vote of thanks to the Chair



ANNEXURES

ANNEXURE - I

LIST OF PARTICIPANTS IN 22nd TCC MEETING

SN	ORGANISATION	NAME (S/SHRI)	DESIGNATION
1.	ASSAM	Sh. Deepankar Deka	CGM, AEGCL
2.		Sh. G.K. Bhuyan	CGM, AEGCL
3.		Sh. Paban Borah	CGM, SLDC, AEGCL
4.		Sh. Lekha Bhuyan	CGM, AEGCL
5.		Sh. Md. S.N. Ali Ahmed	CGM (NRE), APGCL
6.		Sh. Anamul H. Laskar	GM (TRC), APDCL
7.		Sh. S. Kaimal	DGM, AEGCL
8.		Smt. Rodali Khound	DGM (O)
9.		Sh. Himanshu Raaj Gogoi	DGM, AEGCL
10.		Sh. Raj Sharma	DGM, SLDC, AEGCL
11.		Sh. A.J. Choudhury	AGM, AEGCL
12.		Smt. Toushita Jigdung	AGM (Market Operations)
13.		Sh. Indrajit Tahbildar	AGM (TRC), APDCL
14.		Sh. Rahul Das	DM (TRC), APDCL
15.		Smt. Dipmoni Natg	AM, AEGCL
16.		Sh. Neelkamal Sarma	AM, AEGCL
17.		Sh. Taso Hinda	CE (P), Commercial
18.		Sh. T.K. Tara	SE (E), ETC, Chimpu
19.		Sh. Nongkong Perme	SE (E), SO&PSC Circle
20.	MANIPUR	Sh. H. Shanti Kr Singh	Ex. Director (Tech.), MSPCL
21.		Sh. Mangsatabam R Singh	GM (Comml.)
22.		Sh. S. Priyananda	GM (Trans.), MSPCL
23.		Sh. S. Sanajaoba	DGM (IT& Comm), MSPCL
24.		Sh. Th. Satyajeet Singh	Dy. Mgr. (PP)
25.	MEGHALAYA	Sh. E.B. Kharmujai	Director (Trans.), MePTCL
26.		Sh. R. Syiem	Director (Dist.), MePDCL
27.		Sh. M. Marbaniang	CE (Generation), MePGCL
28.		Sh. J. Hynniewta	ACE (T&T), MePTCL

SN	ORGANISATION	NAME (S/SHRI)	DESIGNATION
29.		Sh. H. Shangpliang	SE (T&T), MePTCL
30.		Sh. N. N. Sharma	SE (T&T), MePTCL
31.		Sh. B. Saibon	SE (Gen-I), MePGCL
32.		Shri. B. Nikhla	SE (Gen-II), MePGCL
33.		Sh. B. Wankhar	SE, SLDC
34.		Sh. M. Dkhar	EE (System Protection)
35.	MIZORAM	Sh. Benjamin L. Tlumtea	SE
36.		Sh. P. Yanthan	TCC Chairman & CE (T&G)
37.		Sh. Nitovi A. Wotsa	SE
38.		Sh. Lithrichum Sangtam	SE
39.	NAGALAND	Sh. S. I Asangba Tikhir	EE
40.		Sh. Rokobeito Iralu	SDO
41.		Sh. David Thungoe	SDO
42.		Sh. Debasish Sarkar	Managing Director, TSECL
43.	TRIPURA	Sh. Ranjan Debbarma	GM (Trans.), TSECL
44.		Sh. Gautam Roy	Member (PS)
45.	CEA	Sh. B. S. Bairwa	Director
46.		Sh. Rajesh Sarma	Executive Director (O&M)
47.	NHPC	Sh. Onkar Yadav	GM (Comml.)
48.		Sh. Debasis De	Executive Director, NLDC
49.		Sh. N. Roy	Executive Director
50.		Sh. S.C. De	Sr.GM (SO-II)
51.	NLDC/ NERLDC	Sh. Kaushik Sharma	Sr. GM (MO)
52.		Sh. Akhil Singhal	Chief Manager
53.		Sh. Ankit Jain	Manager (MO)
54.		Sh. Palash Jyoti Borah	DM (SO-II)
55.		Sh. R.K. Tyagi	Executive Director, NERTS
56.		Sh. N. Srivastava	Executive Director, NERPSIP
57.		Sh. P. Kanungo	CGM (I/c BNC)
58.	POWERGRID	Sh. U. Kataki	CGM (AM)
59.		Sh. Samiran Das	GM
60.		Sh. Ankit Vaish	DGM (AM)

SN	ORGANISATION	NAME (S/SHRI)	DESIGNATION
61.		Sh. Raktim Konwar	DM
62.	NTPC	Sh. Subrata Mandal	Executive Director
63.		Sh. Sankar Saran	GM (Comml.)
64.		Sh. S. K. Pradhan	AGM (Comml.)
65.	NETC	Sh. Satyajit Ganguly	Managing Director
66.		Sh. Rajesh Gupta	Director (Projects)
67.		Sh. Anil Sah	DGM
68.	OTPC	Sh. Sanjay Garhwal	Vice President
69.		Sh. Arup C. Sarmah	GM
70.	STERLITE	Sh. Sachin Deshpande	Vice President
71.		Sh. N. Chakraborty	Project In-charge
72.	CTUIL	Sh. Ashok Pal	Dy. COO
73.		Sh. Anupam Kumar	Dy. Manager
74.	Regional Meteorological Center, IMD	Sh. K. N. Mohan	Addl. Director General
75.	NEEPCO	Sh. B. Maharana	Director (F)
76.		Sh. D. Choudhury	CGM (Comml.)
77.		Sh. M. Choudhury	GM (Comml.)
78.		Sh. Ripunjoy Bhuyan	GM (Comml.)
79.		Sh. Bhaskar Goswami	GM (O&M)
80.		Sh. Arup Saikia	GM (RA)
81.		Sh. S. Deka	GM (Comml.)
82.		Sh. D. Goswami	GM (E/M)
83.		Smti. Bornali Devi	DGM (F)
84.		NERPC	Sh. B. Lyngkhoi	Member Secretary
85.	Sh. S. M. Aimol		Director
86.	Sh. S. Mukherjee		Dy. Director
87.	Sh. A. Agrawal		Dy. Director

ANNEXURE – II

LIST OF PARTICIPANTS IN 22ND NERPC MEETING

- | | |
|-------------------------|--|
| 1. Sh. Neiphiu Rio | Hon'ble Chief Minister, Govt. of Nagaland & Chairman |
| 2. Sh. Chowna Mein | Hon'ble Dy. Chief Minister, Govt. of Ar. Pradesh |
| 3. Sh. Prestone Tynsong | Hon'ble Dy. Chief Minister, Govt. of Meghalaya |
| 4. Sh. Jishnu Dev Varma | Hon'ble Dy. Chief Minister, Govt. of Tripura |
| 5. Sh. T. Ayemi | Hon'ble Adviser (Power), Govt. of Nagaland |

SN	ORGANISATION	NAME (S/SHRI)	DESIGNATION	
6.	ASSAM	Sh. Gautam Talukdar	Secretary (Power), Govt. of Assam	
7.		Sh. D. Das	MD, AEGCL	
8.		Sh. Bibhu Bhuyan	MD, APGCL	
9.		Sh. Gunajit K. Bhuyan	CGM, AEGCL	
10.		Smti. Lekha Bhuyan	CGM, AEGCL	
11.		Sh. Suresh Kaimal	DGM, AEGCL	
12.		Sh. Anjan J. Choudhury	AGM, Tariff, AEGCL	
13.		Sh. Dipmoni Nath	AM, AEGCL	
14.		Sh. Hemanta Sharma	CGM, AEGCL	
15.		Sh. Tridip Borah	AGM, AEGCL	
16.		Sh. Himanshu R. Gogoi	DGM, AEGCL	
17.		Sh. Paban Borah	CGM, SLDC	
18.		Sh. Rodali Khound	DGM (O)	
19.		Sh. Toushita Jigdung	AGM (MO)	
20.		Sh. Rakesh Kumar	MD, APDCL	
21.		Sh. Rafiul Amin Dewan	CGM (Comm), APDCL	
22.		Sh. A.H. Laskar	GM (TRC), APDCL	
23.		Sh. Indrajit Tahbildar	AGM (TRC), APDCL	
24.		Sh. Nabajit Phukan	AGM, APGCL	
25.		Sh. Rahul Das	DM (TRC), APDCL	
26.		AR. PRADESH	Sh. Kaling Tayeng	Commissioner (Power)
27.			Sh. H. R. Bado	CE (P), TP&MZ
28.			Sh. Tasso Hinda	CE (P), Comm
29.			Sh. T. K. Tara	SE (E)

SN	ORGANISATION	NAME (S/SHRI)	DESIGNATION
30.		Sh. Nongkong Perme	SE (E)
31.		Sh. A. Saring	PRO to Dy.CM, Govt. of Arunachal Pradesh
32.		Sh. Sailash Kr Chourasia	Secretary (Power), Govt. of Manipur
33.	MANIPUR	Sh. H. Shantikumar Singh	ED (Tech), MSPCL & MSPDCL
34.		Sh. M Rabi Singh	GM (Comm.), MSPDCL
35.		Sh. S. Priyananda	GM (Trans.), MSPCL
36.		Sh. S. Sanajaoba	DGM (IT &Comm.), MSPCL
37.		Sh. Th Satyajeet Singh	Dy. Mgr. (PP), MSPDCL
38.	MEGHALAYA	Sh. E. B. Kharmujai	Director (Trans.), MePTCL
39.		Sh. Rocket S	Director (Dist.), MePDCL
40.		Sh. M. Shangpliang	Director (Gen.), MePGCL
41.		Sh. M. Marbaniang	CE (Gen), MePGCL
42.		Sh. J. Hynniewta	ACE (T&T), MePTCL
43.		Sh. F. E. Kharshiing	ACE (P&D), MePTCL
44.		Sh. B. Wankhar	SE, SLDC
45.		Sh. H. Shangpliang	SE (T&T), MePTCL
46.		Sh. B. Saibon	SE (Gen-I), MePGCL
47.		Shri. B. Nikhla	SE (Gen-II), MePGCL
48.		Sh. N. N. Sharma	SE (T&T), MePTCL
49.		Sh. M. Dkhar	EE (SP), MePTCL
50.	MIZORAM	Sh. Benjamin Tlumtea	SE
51.	NAGALAND	Sh. K.D. Vizo	Principal Secretary, Govt. of Nagaland
52.		Sh. P. Yanthan	CE (T&G) & TCC Chairman
53.		Sh. Nitovi A. Wotsa	SE
54.		Sh. L Sangtam	SE
55.		Sh. S. I. Asangba Tikhir	EE
56.		Sh. Rokobeito Iralu	SDO
57.		Sh. R. Longkumer	PRO to Hon'ble CM, Govt. of Nagaland
58.		Sh. Kenesa Dawhuo	OSD (Security) to Hon'ble CM, Govt of Nagaland

SN	ORGANISATION	NAME (S/SHRI)	DESIGNATION
59.		Sh. Bokatu Swu	PS to Advisor Power, Govt. of Nagaland
60.		Sh. David Thungoe	SDO
61.	TRIPURA	Sh. Debashish Sarkar	MD, TSECL
62.		Sh. Ranjan Deb Barman	GM (Trans.), TSECL
63.		Sh. Kartik D. Jamatia	PRO to Hon'ble DCM, Govt. of Tripura
64.		Sh. Pawan Singh	OSD to DCM Tripura
65.	CEA	Sh. Goutam Roy	Member (PS)
66.		Sh. B. S. Bairwa	Director
67.	CTUIL	Sh. Ashok Pal	Dy. COO, CTUIL
68.		Sh. Anupam Kumar	Dy. Mgr., CTUIL
69.	NETC	Sh. Satyajit Ganguly	Managing Director
70.		Sh. Rajesh Gupta	Director (Projects)
71.		Sh. Anil Sah	DGM
72.	NLDC/ NERLDC	Sh. Debasis De	Executive Director, NLDC
73.		Sh. N. Roy	Executive Director, NERLDC
74.		Sh. S.C. De	Sr.GM (SO-II), NERLDC
75.		Sh. S.P. Barnwal	Sr. GM (SL), NERLDC
76.		Sh. Kaushik Sharma	Sr. GM (MO), NERLDC
77.		Sh. Akhil Singhal	Chief Manager, NERLDC
78.		Sh. Palash Jyoti Borah	DM (SO-II), NERLDC
79.	POWERGRID	Sh. R.K. Tyagi	Executive Director, NERTS
80.		Sh. Naveen Srivastav	Executive Director, NERPSIP
81.		Sh. U. Kataki	CGM (AM), NERTS
82.		Sh. P. Kanungo	CGM (I/c BNC)
83.		Smt. D. D. Basumatary	CGM (Project), NERPSIP
84.		Sh. Pranjit Deka	Sr. GM, NERTS
85.		Sh. Samiran Das	General Manager
86.		Sh. Ankit Vaish	DGM (AM), NERTS
87.		Sh. Raktim Konwar	Dy. Manager
88.	NTPC	Sh. Subrata Mandal	Executive Director
89.		Sh. Sankar Saran	General Manager (Comm.)

SN	ORGANISATION	NAME (S/SHRI)	DESIGNATION
90.		Sh. S.K. Pradhan	AGM
91.	OTPC	Sanil Namboodiripad	Managing Director
92.		Sh. Sanjay Garhwal	Vice President
93.		Sh. Arup C. Sarmah	General Manager
94.	NHPC	Sh. Y. K. Choubey	Director (Tech)
95.		Sh. Rajesh Sarma	Executive Director (O&M)
96.		Sh. Onkar Yadav	G.M (Comml.)
97.		Sh. Rajesh Kumar	Gr. Sr. Mgr. (Comml.)
98.		Sh. Deepak Rawat	Sr. Mgr.
99.	STERLITE	Sh. Sachin Deshpande	Vice President
100.		Sh. N. Chakraborty	Project In-charge
101.	NEEPCO	Sh. V. K. Singh	Chairman & Managing Director
102.		Sh. B. Maharana	Director (Finance)
103.		Sh. D. Choudhury	CGM
104.		Sh. Partha Pratim Das	CGM (T)
105.		Sh. Ripunjoy Bhuyan	GM (Comml.)
106.		Sh. M. Choudhury	GM (Comml.)
107.		Sh. S. Deka	GM (Comml.)
108.		Sh. Arup Saikia	GM (RA)
109.		Sh. D. Goswami	GM (E/M)
110.		Smti. Bornali Devi	DGM (F)
111.		NERPC	Sh. B. Lyngkhoi	Member Secretary
112.	Sh. S. M. Aimol		Director
113.	Sh. S. Mukherjee		Dy. Director
114.	Sh. A. Agrawal		Dy. Director

ANNEXURE-III

KEYNOTE ADDRESS OF SHRI PENRITHUNG YANTHAN

TCC CHAIRMAN, NERPC

&

CHIEF ENGINEER (T&G), DEPT. OF POWER, GOVT. OF NAGALAND

ON THE OCCASION OF

THE 22nd TCC MEETING OF

THE NORTH EASTERN REGIONAL POWER COMMITTEE

HELD ON 26TH MARCH, 2022 AT GUWAHATI

Respected Member (Power Systems) Central Electricity Authority Sh. Gautam Roy ji, Shri. B. Lyngkhoi, Member Secretary NERPC, Shri. Ashok Pal, Dy. COO CTU, Shri. N. Roy ED NERLDC, Shri. Debasish De, ED NLDC, Shri. S.M. Aimol Director NERPC, officials from Constituent members and Power Utilities - CEA, CTU, AEGCL, APDCL, PGCIL, NERTS, NEEPCO, MePTCL, MePGCL, MePDCL, DoP Arunachal Pradesh, DoP Mizoram, NERLDC, MSPCL, TSECL, NETC, NHPC, NTPC, OTPC and last not forgetting the officials from Power Department, Nagaland and all esteemed participants and dignitaries.

Firstly, I bring greetings to you all. I thank our Almighty God for bringing us all here together today. Indeed, it gives me immense pleasure to be part of this august gathering. I really feel privileged and humbled to chair this session of the 22nd TCC meeting of NERPC. I would like to thank NEEPCO for hosting 22nd TCC/NERPC meeting in such a short notice. Meeting after span of 1 year. Recall 21st TCC in Kohima.

Your very presence here today speaks volumes how much you value this meeting. I am sure everyone has a purpose of attending this TCC meeting to discuss and resolve the common issues for the betterment of the Power Sector and I am confident we will have a healthy discussion during this meeting for benefit of all stake holders.

(TRANSMISSION)

It is my pleasure to inform the members that Ministry of Power, Government of India has entrusted key responsibilities pertaining to Transmission planning and communication planning to the RPCs. For any proposal on transmission for more than Rs. 500 Crores has to be ratified in RPC forums. In light of this NERPC Forum has assumed greater role in consensus building for an integrated and optimized planning. Further, I would like to draw the attention towards the upcoming General Network Access (GNA) Regulation of Hon'ble CERC which will transform the LTA based transmission planning to the GNA. For the benefit of the members the broad principles of the regulations will be highlighted today by NERPC.

NERPC forum is unique in bringing the intra-state transmission challenges faced by NER states for deliberation. NERPSIP, a GoI flagship Scheme with the objective to strengthen the Intra-State Transmission & Distribution Infrastructure in the North Eastern Region will immensely improve the system. However, it is my humble submission unless the downstream missing links are established; the objective of the scheme will remain unfulfilled. Further, there are missing links in 33kV lines also, which needs to be addressed. (Infra should be an Asset and not a liability-PGCIL)

Today, in the agenda items we will holistically deliberate on the issues concerning inter as well as intra state transmission network.

(TELEMETRY)

It is a known fact that the current status of Telemetry availability for our region is poor. This becomes a growing concern for a system operator to manage the grid under very tight frequency band to avoid heavy deviation penalties.

To address this NERPC has taken many initiatives in its NeTEST sub-committee. It is my pleasure to appraise the members present that a revised DPR for reliable communication scheme for whole NER has been prepared by NERPC. We will discuss the issue along with other telemetry issues through our agenda.

(MARKET OPERATIONS)

Power markets transactions have seen an upward trend in recent years even for NER. To manage real time shortfalls and surplus, power markets have become

indispensable for the utilities. Today I express my gratitude to APDCL to share among us their practices pertaining to market operations. I urge all other NER states to kindly learn from the experience of Assam.

(NAGALAND)

Taking this opportunity, I would also like to share a few points on the recent development in Nagaland.

- On behalf of DoP, Nagaland I would like to congratulate Power Grid for timely completion of Dimapur AIS to GIS. Further, the support extended by NERPC Secretariat along with NERLDC during the planning stage of the said project is commendable. The GIS up-gradation of Dimapur will significantly improve the reliability of the system.
- Subsequent to commissioning of 3rd ICT at Mokokchung along with transformation capacity augmentation of Dimapur, the Nagaland system has seen improvement over the past year.

Power Sector in our region has made much advancement and I am proud to say that NER is at par with other regions of the country. However, it is quite disturbing to note that some of the Depts/Discoms are having huge due of their power purchase bills. This is something which we all should ponder over. We have to find out the reasons for such lapses or factors that makes the utilities a sick unit. Let us also keep in mind that we need to create mass awareness to the consumers and general public for prompt payment of electricity bills. Technology intervention is a must and already in place and has been helping the Power Departments and Discoms to a large extent in curbing the power losses. However, installation of Anti Power Theft and Vigilance Cells by the Departments and Discoms is a must to control power theft and curb losses. We have to understand that any commodity which is sold is kept under lock and key, but not electricity which can be easily tapped and bypassed. Unless such strong Anti-Power Theft and Vigilance Cells are in place people will not learn and have no fear to steal or be a defaulter in payment.

India is advancing so also power sector. When we say power sector is advancing it should be an overall advancement and growing together not only the giants or the big brothers but small sisters too. Because if you see the organizational activities, it is the small sisters that are directly linked and giving service to the people. So also,

they are the ones who faces and carries all the household problems. So, we should all strive and have a heart to grow together and not leave anyone behind.

I urge all constituents to give your full cooperation and support to make NERPC Secretariat strong. We are fortunate that we have a very competent and strong team led by MS Shri. Lyngkhai who is very capable energetic and works with a heart for the region.

I am also very happy to know that this NERPC forum is engaged in diversified activities where the platform is not only used for resolving issues but is also being used as a platform for sharing knowledge and best practices of the various utilities of the region.

With this please allow me to conclude my address and to wish for fruitful deliberations. Once again, I express my sincere regards to NEEPCO for hosting the TCC and NERPC meeting. Now I request Member Secretary to proceed further and take up the agenda for discussion.

Thank You.

ANNEXURE-IV

**SPEECH OF SHRI NEIPHIU RIO
CHAIRMAN, NERPC
&
HON'BLE CHIEF MINISTER & I/C POWER
GOVT. OF NAGALAND
ON THE OCCASION OF THE 22ND MEETING OF THE
N. E. REGIONAL POWER COMMITTEE
HELD ON 28th MARCH 2022 AT GUWAHATI**

My Dear Colleagues, Ministers from North-Eastern States, Officials of the Central and State Governments, Officials from other Central and State Power Utilities, Distinguished Guests, Special invitees, Ladies and Gentlemen.

Firstly, I would like to thank NEEPCO for organizing 22nd NERPC meeting here today in this beautiful city of Guwahati. I believe 22nd NERPC will bring fruitful resolution on various issues of our region and will act as a guiding light for overall development of power sector in NER. On account of the second wave of COVID pandemic, the NERPC meeting for the financial year 2021-22 could not be held earlier. During the last meeting of NERPC held in Feb 2021, many important issues were discussed and collective decisions on power sector were taken in the common interest of the North Eastern Region. I hope that we will be able to address and resolve many issues in the same spirit.

The North Eastern region of India has seen a very distinct and unique development story despite challenges in the form of insurgency, poor connectivity with the mainland, difficult mountainous terrain and heavy destructive monsoon. I believe power sector can take a lead in the development story of NER. This makes the forums like NERPC very important in driving both economic and social prosperity of NER people.

The importance of Power Sector can be seen from the fact that it is one of the eight crore industries in the calculation of Index of Industrial Production (IIP). Power not only acts as one of the raw materials for any modern industry but also a basic for general public. Herein we find that NERPC is the most appropriate Forum to discuss all such pertinent issues facing the power sector in the North Eastern

Region and collectively present them to the Govt. of India, in the interest of all constituents.

I am aware that the NERPC has always been relentlessly striving towards making the NE power system operations more reliable, efficient and economically viable and I look with great hope and expectations towards a positive outcome from today's discussion and deliberations. I am sure that many operational and technical issues were resolved and the TCC must have also discussed elaborately on how the power sector and the power system in the NE Region can be taken forward in a progressive manner for approval and further recommendations of the RPC.

On behalf of the North Eastern States, I would like to place on record my sincere gratitude to the Government of India for the continued and constant support to the North Eastern Region especially in regard to the Power sector. Implementation of World Bank funded project like NERPSIP (North East Region Power System Improvement Project) undertaken by POWERGRID through the initiative of Ministry of Power, GoI is one such programmed. Through this project, the much-needed construction of Transmission lines and Sub-stations are presently in Progress in many places. Let me take this opportunity to impress upon POWERGRID, the Implementing Agency, to further expedite the work of the NERPSIP to ensure completion as per schedule.

It may please be opted that timely payment of dues and outstanding bills to the CPSUs, like NEEPCO, PGCIL, NTPC, NHPC and other Generating companies is also a matter to be taken seriously by the Distribution Companies (DISCOMS) and State Governments. We all should acknowledge that buying and selling as well as timely settlement of dues are the basic requirement for running any business for sustainability. We also understand that many of our DISCOMS and State Governments are in a financial distress as the gap between the cost of supply and realization is increasing due to which the Distribution utilities are over burdened with accumulated outstanding dues. I would therefore, suggest to all the NE states to work on the rationalization of tariff. I would further urge all the states to fully explore the Revamped Distribution sector Schemes (RDSS) which can potentially turnaround the financial distress of the NE DISCOMs and the departments.

We all know that most of the power projects in NE Region are hydro based and due to the geological uncertainties, commissioning of hydro projects is being delayed

because of which the tariff is comparatively higher. Nevertheless, since Hydro Projects are the most potential area of power generation, I request the executing agencies to take up the challenge and put up all efforts for timely commissioning of the projects.

Taking this opportunity, I would also like to share a few points on the Power Scenario in Nagaland:

1. To increase the state power generation and providing affordable and stable power supply to the consumer in the state, the state government is emphasizing more on setting up of new state-owned hydro and solar power projects such as 24MW Tizu Valley HEP, 24MW Zungki HEP, 42MW Lower Tizu HEP, 4.2MW Nrazai HEP, 2.4MW Duilumroi HEP, 20MW solar grid power plant at Ganeshnagar and 10MW solar grid power plant at Zhadima.
2. With these upcoming generation projects, there is a need to strengthen the intra-state transmission network. To achieve this objective, the state government is planning many new lines and reconductoring of existing lines. Close to 500 circuit kilometers have been identified at 132/220 kV voltage level along with 1000 MVA transformation capacity.
3. To bring down the AT&C losses, the state is taking up installation of smart prepaid meters in a large scale and the department has been taking up drive against illegal power connections and disconnection of lines for non-payment on a regular basis.

On behalf of NERPC, I once again extend my heartiest greetings to all the participants and look forward to very meaningful and successful deliberations.

Thank you

Jai Hind

ANNEXURE-V

**SPEECH OF SHRI CHOWNA MEIN
HON'BLE DY. CHIEF MINISTER & I/C POWER, GOVT. OF ARUNACHAL
PRADESH
ON THE OCCASION OF THE 22ND MEETING OF THE
N. E. REGIONAL POWER COMMITTEE
HELD ON 28th MARCH 2022 AT GUWAHATI**

Hon'ble Chairman North Eastern Regional Power Committee & the Chief Minister, Government of Nagaland, most respected Ministers of Power of all the NE States, who are here as the Members, Member Secretary, all the Commissioners, Secretaries and all other dignitaries, delegates of all the Commissioners, Secretaries and all other dignitaries, delegates of all the constituent members, Ladies and Gentlemen.

I am happy to attend the 22nd North Eastern Regional Power Committee Meeting here in historic city of Guwahati- the Gate way to the North East. It is really a great privilege for me to be in this August forum for the second time. I thank North Eastern Regional Power Committee for organizing this meeting here. I would like to thank the organizers, especially the North Eastern Electric Power Corporation Ltd, for their magnanimity of hosting this event.

I thank the Hon'ble Chief Minister of Nagaland who is also the Chairman of this forum for extending his personalized invitation to be here with all today.

Let me start my deliberation with a happy note to Congratulate NEEPCO for successful commissioning of 600 MW Kameng Hydro Electric Project by putting the last and final unit into commercial operation on 12th February 2021. I wish all the best to NEEPCO and request them to carry on the same tempo to take up all the new projects in Arunachal Pradesh entrusted to them to achieve planned targets.

The construction of 2000 MW Subansiri Lower Hydro Electric Project resumed in October 2019. The works are going on in a right pace as expected since then. I was privileged to inaugurate the start of the main inlet valve assembly of the project on behalf of the Honourable Chief Minister of Arunachal Pradesh Sri Pema Khanduji

on 6th February 2022. I have been informed by the National Hydro Power Corporation that two of its unit with a capacity of 500 MW would become operational by August 2022. I wish NHPC all the success and impress upon them to work hard further to ensure completion of the entire project in August 2023 as scheduled.

I believe and have faith in this august forum of NERPC that it will have pragmatic and futuristic policy approach to help each state of the region to achieve its goal and make NER self-reliant and take a big roll to contribute hugely in making an AATMO-NIRBHAR BHARAT.

I also take this opportunity to thank the Ministry of Power, Govt. of India for formulating flap ship programs in distribution sector like **RAPDRP, DDUGJY AND SAUBHAGYA** helping the states in electrifying villages, modernizing distribution systems in urban areas and helping them to reduce overall AT&C loss. One such program “**Revamped Distribution System Scheme**” launched recently is welcome. I thank the Government of India under the leadership of Sri Narendra Modiji for bringing the scheme. I appeal all the member states to take benefit of the programme.

I would like to take this opportunity to place before this forum some of the important issues that all constituent members will appreciate and support.

A. Inter-State Connectivity for Reliability:

Reliability of Grid in my State is a persistent issue because of its long radial feeder starting from RHEP (Ranganadi Hydro Electric Project) to Namsai. This single feeder caters to the power needs of more than 50% of the State. Therefore, Arunachal Pradesh had been raising and demanding for more inter connections with the North East Regional Grid so that the long radial feeder suitably provided with anchoring at appropriate points.

Arunachal Pradesh is eager to end the radial transmission system for once and all to increase the reliability of our system at the earliest possible by making suitable interconnections with regional and neighboring transmission systems. Such inter connections would not only increase reliability to my state but to other constituent member states at the times of Grid contingencies in mitigating the difficulties and tiding over the impacts of grid

failures. Such a system would also become handy for ease of doing works for shutdown planning and management.

The following are two immediate important interconnectivity needs of Arunachal Pradesh:

1. Roing-Chapakhowa 132KV Double Circuit Transmission Line:

I am thankful to the Ministry of Power, Government of India and especially to this forum that this interconnection was approved in 20th NERPC meeting in 2019 when I placed before you for approval. I'm also happy to know that this all-important line would be completed by September 2022. I request the POWERGRID to keep the tempo well and complete in time. My government shall extend all support to achieve the target in time.

2. Kathalguri-Namsai 220 KV Double Circuit Transmission System:

As stated above, this is one of the important interconnections I put before this forum in the 20th NERPC and was approved. I thank this forum of NERPC and grateful to the Ministry of Power, Government of India for early approval and notification of the proposal for implementation. I am given to understand that the tender for execution of the approved project, which was to be opened in first week of this month, that is, March 2022, must have been done so. I hope the award process is finalised at the earliest to pave the way for timely completion.

3. Restoration of Pasighat-Roing 132KV line:

Due to fury of nature, some towers of a small segment of Pasighat-Roing 132KV Transmission line was damaged along Dotung River Bank in Lower Dibang Valley in April 2020. The transmission line is on an Emergency Restoration System till date. Even after two years the line could not be restored to permanent structures. This work involves construction of two towers on of pile foundation. Despite strict restriction for Covid-19 outbreak in the last two years, the POWERGRID has been working hard but could not make much progress. I am informed that the line is scheduled to be completed by September 2022. I take this opportunity to appeal POWERGRID to find ways and means to restore the line before this coming monsoon to prevent further damages.

4. Comprehensive Scheme for Development of Transmission and Distribution:

Presently, it is the most important Scheme ongoing in the State in Power Sector. It has been in operation under POWERGRID for the last few years. Despite hurdles and bottlenecks, the POWERGRID, the consultant cum Project implementing agency, is doing a commendable works, which I must acknowledge before this forum.

I would like to impress upon POWERGRID on some issues which may need revisiting of the approach so far taken. I, as a layman, believe that such a revisit would benefit all. It will help in making faster and purposeful progress and achieve milestone during project implementation. In my opinion every part of achievement should itself become a milestone of development that can serve the users immediately. Fragmented progress without continuity does not serve the people until the scheme is completed in its entirety.

1. Milestone based Implementation planning:

Implementation of works involve carrying the planned works from drawing table to the field where the environment may not be as congenial and conducive as they are on the drawing table. In the field, they are subjected to various dynamics and changing circumstances in the society. This is the natural law and it is the reality. We cannot avoid or escape from it. We only can accept this reality and learn how to live with. I have few suggestions for both POWERGRID and Department of Power, Arunachal Pradesh sit together and put their minds together and firm up an implementation planning.

2. Priority & packaging of the works:

POWERGRID may design and plan the package of the work as per priority of the beneficiary state and tendering done accordingly so that development of the assets so created comes up in an equitable, balanced and optimum manner so that no completed parts of assets remain idle due to incomplete upstream or downstream works.

3. Engineering design as per the site conditions:

Engineering designers are core to success of making an idea into a physical asset that serves the people. While acknowledging their great contribution, I

request the people in higher management of the organization to give some level of exposures to such designers to let them have first-hand knowledge of the site conditions. Due to topography and geography of our land, I think, every design; be it Civil or Electrical; may probably need customization to suit each location. Such a design shall not only reduce cost of the project but also improve the aesthetics greatly. Such customizations drastically reduce all extra cost that may be required for any associated modification of existing systems.

4. Transmission system augmentation of AP grid to meet demand up-to 2030.

Arunachal Pradesh is a young state in the area of transmission system development. We have one of the smallest systems in terms of grid size and electrical power consumption. Despite that, we have achieved significant development in the fled infra-structure in other areas and have gained development momentum significantly to catch up with the sister states of North East and rest of the country as well.

Demand of electrical power will increase in leap and bound with the development by 2030. In the perspective of this scenario, we have put in our plan under the guidance of ministry of power, government of India. The details of these schemes must have been discussed the day before yesterday in the Technical Coordination Committee meeting by the forum. The proposal of schemes so discussed have been planned to complement and supplement the existing system and the ones coming up under the Comprehensive scheme being implemented by POWERGRID. I will not go into the details but only highlight ones that are critical and important from the points of national security and operational reliability considerations.

- a. The proposal consists of about 152 KM of five transmission lines, 65 MVA of transformation Capacity in five new sub-station and augmentation of 100MVA in existing EHV sub-station in Itanagar with a preliminary tentative estimated cost of Rs. 642.5 Crs.

1. **Tawang-Bhutan 132 KV International connectivity between Lumla (India) and 600MW Kolongchu Hydro Electric Project in Bhutan:**The upcoming 132KV transmission line from Khuppi to Tawang under Comprehensive

Scheme would become a long radial line of about 190 KM terminating at Lumla in the Tawang District, the western most part of Arunachal Pradesh. Such a long radial line in extreme high-altitude region is a huge concern from the point of grid reliability causing serious operational challenges and issues. Tawang, one of the most beautiful tourist destinations of the region, would very likely suffer due to low reliability if left in a radial feeder configuration. The situation would get aggravated by treacherous path the system that would pass through difficult terrain and through the snowclad Sela pass.

Further, from the point of National security, considering the huge military establishment in the district of Tawang and en-route West Kameng, the demand and requirement of reliable and quality power supply are rising rapidly. Hence, meeting such defence related power demand reliably would be a herculean task if the transmission system is left to be a long radial one.

Therefore, to overcome this bottleneck, I would like to propose establishment of a suitable transmission line between Lumla in Tawang (India) and 600 MW Kholongchu Hydro Electric Power Station in Bhutan, which shall be about 40 KMs aerially from Lumla. Such connectivity, apart from improving the reliability of both the Grids of India and that of Bhutan, will help in furtherance of heart-to heart connectivity among the people of both the countries by way of bilateral exchange of energy in times of needs. It shall also enhance the age-old bilateral relationship with Bhutan while making our state more visible in the international Electricity Market. I propose the planners and the stake holders present here, specially the NERPC, to carry out a feasibility study on the issue and come out with a tangible policy decision as per norms associated with international exchange of Power. I believe the members of this Regional Committee will support this idea and help it make to a pragmatic initiative.

With these words, I thank you all for giving me this opportunity to be here in this great forum. I am proud to say that my State is a beautiful one and would like to extend my invitation to visit us. We will be happy hosting you any time. Thank you all.

Thank you all

Jai Hind

ANNEXURE-VII

**SPEECH OF SHRI PRESTONE TYNSONG
HON'BLE DY. CHIEF MINISTER & I/C POWER, GOVT. OF MEGHALAYA
ON THE OCCASION OF THE 22ND MEETING OF THE
N. E. REGIONAL POWER COMMITTEE
HELD ON 28th MARCH 2022 AT GUWAHATI**

Hon'ble Chairman NERPC and my dear Colleague Ministers from other North-Eastern States, officials of Central government and State Governments, Officials from other Central and State Power Utilities, distinguished guests, special invitees, ladies and gentlemen.

First of all, I convey my sincere gratitude to the chairman, NERPC and the Hon'ble chief Minister of Nagaland, Shri Neiphiu Rio, for having invited me to this 22nd North East Regional Power committee (NERPC) meeting here in Guwahati. I thank the North Eastern Electric Power Corporation Limited (NEEPCO Ltd.) for their gracious hospitality in hosting this important meeting. I take this opportunity to express my thankfulness to NERPC for their continuous efforts and contributions towards Power sector in the region for the overall welfare of the people.

On behalf of the people of Meghalaya, I bring heartiest and warmest greetings to all participants with great confidence that meaningful deliberations will take place for improvements of the power sector of our region.

It gives me great pleasure to be a part of this august gathering and it is my earnest hope that through this particular platform, we will be able to meet the challenges faced by the power sector in the region. I yearn to see that informed decisions are arrived at in this NERPC and look forward with a lot of hope and expectation in the leadership of our current Chairman who is one of the senior most leaders of the North East. The NERPC, since its inception, has been relentless in its efforts to strengthen the power sector in the Northeast to ensure it remains reliable, efficient and economical. Deliberations of the past NERPCs have been carried forward for the common benefit of the constituent states of the Northeast. It is therefore, imperative

to follow in the same spirit of cooperation to jointly put in our efforts to achieve our common objective of providing 24x7 quality and affordable power for all.

While the North Eastern States often face many challenges due to its geographical isolation, the region is however blessed with vast hydro potential which could contribute to regional and national growth. Hydro power is more relevant today than ever considering the global efforts at limiting the use of coal and other fossil fuels for power generation in order to combat climate change.

HYDRO IN MEGHALAYA:

- We are all aware that the region is seismically-sensitive with many geological issues causing delays to our projects which increases our overall capital expenditure. However, we are pleased to state the Ganol 22.75 MW project is slated for completion this year despite the numerous hurdles.
- The southern region of Meghalaya gets the maximum amount of rainfall in the entire world. The need to tap this potential cannot be ignored. The Government of Meghalaya yearns to complete the Myntdu Leshka-II project which was mentioned above but would also extend all help if CPSUs show keen interest in development of projects in south Meghalaya. We do sincerely extend our assistance to the proposed 120 MW project of NEEPCO at Umiam (Mawphu) area as this project would greatly benefit the people of the region in particular and the power sector of the region and nation in general.
- The proposed RoR Myntdu Leshka Stage-II (210 MW, 3x70MW) which is being implemented by Meghalaya and located in Jaintia Hills, Meghalaya, is the downstream project of the existing Myntdu-Leshka-I 126 MW project. At present, all major clearances have been obtained and funding has been initiated after the State Level Screening Committee (SLSC) held on 23rd August, 2021 has recommended the proposal for posing to DEA for external assistance from ADB. The project cost is Rs. 2187.88 Crores with levelised tariff of Rs. 2.26/unit.
- Further, MePGCL intends to harness the available hydro-electric potential in the state. Small & Medium Hydro projects totalling 80.7 MW are being

surveyed and funds are being sought from MNRE. Notable recent proposals for Survey and Investigation are Selim HEP Stage-I (2x40) MW) and Mawblei HEP (2x38) MW), Umngi (2x31MW) and Nongkohlait (2x31MW). The Riangdo SHP (2x1.5 = 3MW) is under implementation.

- Renovation, Modernization and Upgradation of existing hydro power stations: MePGCL is vigorously pursuing the Renovation and Modernization of Umiam Stage-III power station (2x30MW) which was commissioned in the year 1979. Residual Life Analysis was conducted during the year 2017 by Tokyo Electric Power Services Company Limited (TEPSCO). TEPSCO, RECOMMENDED FOR COMPLETE RMU OF THE Umiam Stage-III Power station. Accordingly, to DPR was prepared and the same was funded by Japan International Corporation Agency (JICA) at the cost of RS 408 crores. At present the project is under Tendering process. In the same line RLA study shall be conducted for Umiam-Umtru Stage-IV (2x30MW) and Umtru Power Station (4x2.8MW). Preliminary studies for exploring the possibility of undertaking Renovation and Modernization of Umtru Power Station (4x2.8MW) which was commissioned in the year 1957 is also being pursued through external funding.
- Dam Rehabilitation & Improvement Project is one the flagship projects of the Government of India and the World bank with an objective to improve safety & operational performance of dams in the country. The Ministry of Water resources, Govt. of India, along with the World Bank, has approved four dams in Meghalaya under this project at an amount of RS 441.0 crores. The dams included in this project are: Umiam Stage-I dam, umiam-Umtru, stage-III dam, Umiam-Umtru, Stage-IV dam and MLHEP Stage-I dam.
- The loan agreement between Government of India, Government of Meghalaya and World Bank was signed on 4th August, 2021. The projects are in the process of tendering.

SOLAR/GENERATION

- On Solar power Parks in Meghalaya, at present, the development of two Solar Parks of 10MW capacity each, are being taken up by the State at Suchen and Thamar village in East and West Jaintia Hills District respectively. Further,

Roof Top Solar (70MW) under “rent a roof model” for residential buildings with Net Metering is being implemented. The government of Meghalaya had allotted for Survey and Investigation of a thermal plant at Nongalbibra for private participation for installing a thermal plant (coal based) of 240MW.

TRANSMISSION (ISTS)

- A shared concern of the region in Transmission is Right of Way (RoW) where each State has its own challenges, local laws and intrigues. While the challenge remains, the entire government machinery is involved in Meghalaya to vigorously pursue RoW matters especially with regards to the ongoing NERPSIP projects. We have resolved many unforeseen issues and expect that the Implementing Agency POWERGRID continues with its sincere efforts to commission all elements within this year. We shall continue to provide all assistance to POWERGRID and earnestly hope that power flow will commence before the coming peak winter demand season with the consideration that we do not face issues of load shedding due to the limitation of transfer of power from the Khangdong Kopili corridor.
- Another concern is the need for evacuation of power from ISTS projects proposed in our State. I am sure that the NERPC has already discussed at length the need of Meghalaya and the region for early implementation of Downstream Lines and Substations for evacuation of power from the ISTS projects. The Government of Meghalaya is keen to seek sanction of Schemes for such projects especially the 220KV Nongalbibra-New shilling line. It is our request that NERPSIP in its 2nd tranche will cover left out projects in the 1st tranche and also commence new priority transmission and distribution projects.
- Understanding that Transmission is most critical sector for the Power system, Meghalaya hopes to strengthen this sector through various schemes. Several proposals, including evacuation of power from the completed NERPSIP projects at New Shillong, Mawphlang, Phulbari, Mynkre, re-conductoring with HTLS conductor of old lines especially those which have crossed their useful life of 35 years, LILO of 400kV line at Mynkre and New shilling along with 400/220/132kV Substations have been envisaged. Further, Upgradation and

modernization of a large number of EHEV Substations with construction and enhancement of associated 33 KV switchyards are envisaged.

- Regarding evacuation from the proposed Interstate Transmission System (ISTS) 400/220/132kV substation in Nongalbibra, we envision the construction of a 400kV line (to be charged at 220 KV) from Mynkre in Jaintia Hills to Nongalbibra in Garo Hills to connect with the Bongaigaon-Nongalbibra line. It is reiterated that this line will form a South Meghalaya Transmission corridor which will not only provide stability to Meghalaya but also to Assam and the entire NER Grid. Further, the implementation of the ISTS project in Nongalbibra will greatly benefit the region.

INTRA STATE TRANSMISSION

- Expansion of Intrastate Transmission network: As with other states of Northeast, Meghalaya has extreme weather conditions whereby Transmission lines get disrupted especially during harsh monsoon seasons rendering difficult and time-consuming restoration of power lines especially in the hilly rugged terrain. Due to this, it is of utmost importance to ensure Ringmain connectivity of Transmission lines. As an example, evacuation of power from Leshka Stage-I Power Station (126 MW) is dependent on only one 132 KV feeder to Khliehriat which is susceptible to outages during severe monsoon weather. An alternate link from this Power Station to Mustem and Substation at Alarms near Dawki will go a long way in ensuring continuous power evacuation during high generation periods and reduce water spillage.
- Improvement of power supply in the aspirational District of Ri-Bhoi which is the most industrialized district of Meghalaya contributing to the economic development of the State and the region is much needed. The district has the maximum number of Hydro stations in the state and also the oldest Hydro Power Station in the region. Besides, this district lies between Shillong and Guwahati. Although a number of Grid stations have been installed in the industrial area of the district but the District head quarter of Nongpoh is not having any 132KV substation to cater to the growing load demand and power supply reliability for the common public.

- Further, there is not a single 132/33kV substation in the areas adjacent to the prestigious Byrnihat 400/220/132kV substation, which is contiguous to Guwahati city, resulting in the residents of Khanapara, Pillingkatta and Patharkmah, having to bear the brunt of acutely poor quality of power supply. It is an earnest request that the forum looks into the Transmission system development in Killing and in this district in the years to come.
- Expansion of Intra state network and connectivity of mission 132kV links: For Intra State power system stability, new Grid Substations and Lines are to be created through 132KV lines connecting Ampati and Baghmara, Stage-II Power House and Nongkhlaw, Shore and Balata with associated substations. There is need to evacuate power from Nongalbibra at 400KV, 220KV and 132 KV. We need a futuristic approach to meet N-1 requirement for existing lines and substations such as LILO of 132 KV NEIGRIHMS-Khliehriat at Shangpund with substation, Stringing of 2nd circuit from proposed Ganol P/S to Ampati on existing towers, 400 KV, LILO of 400 kV Silhar-Byrnihat at New Shillong for Ringmain connectivity of New shillong-Killing Mawngap and evacuation from NERPSIP New shilling project, 400kV Killing Nongalbibra (charge at 220kV) with LILO and sub-station at Nongstoin to provide alternate evacuation from Nongalbibra ISTS to New Shillong. Also, 220kV Mynkre-Mustem-line with LILO and substation at Mustem is needed to evacuate power from the proposed MLHEP-II (Leshka) OF 210 MW.

CROSS-BORDER

- Evacuation of surplus power from North East to Bangladesh continues to be a matter of discussion. The Government of Meghalaya has already sanctioned the survey of the 220kV Mawphlang (Sohra)- Ichamati line and the work is completed and the DPR is being prepared accordingly. This would enable Meghalaya and other NER states to trade surplus power to Bangladesh and earn additional revenue by providing a transmission corridor to Bangladesh. As Transmission Access Priority for Cross border Trade of electricity is to be determined by CTU, it is reiterated that PGCIL draw transmission lines for this purposed through Meghalaya preferably through Sohra grid Sub-station as it is close to Sylhet in Bangladesh.

- Indo-Bangla Border Transmission System Improvement: Meghalaya urgently needs to have a robust Indo-Bangla border Transmission System for improved power supply in the Indo-Bangladesh border areas. Although, a large number of 33KV substations have been constructed under DDUGJY, RAPDRP, SAUBHAGYA, Indo bangle Border Lighting, IPDS, ADB etc. But there is no existence of 132/33kV substations all along the international border. Also, there is need for improvement of Border Trade and Tourism as there are border LCS and internationally known tourist areas such as Mawlynnong and Dawki. At least four Grid substation and associated lines need to be envisaged for Ichamati, Pongtung (near Mawlynnong) Balat, Baghmara and Mawkyrwat to improve to Transmission system for the sake of power stability in the Bangladesh border area which should be seen as a challenge to Meghalaya and the forum as it is a matter of prestige to the region and the country as well.

DISTRIBUTION

- Meghalaya's distribution sector being the most critical segment of the entire power supply value chain received a boost from the Government of India's assistance through system improvement schemes and electrification schemes, such as DDUGJY, NERPSIP, IPDS and SAUBAGYA, with the aim of providing 24x7 Power for All. The SAUBHAGYA scheme for the electrification of all households in the entire State has been closed. The sub-transmission system needs to be upgraded and strengthened for which Meghalaya is presently implementing distribution projects as part of the Meghalaya power Distribution Sector Improvement project under funding by ADB. The RDSS (Revamped Distribution Sector Scheme) duly approved by the Cabinet (Meghalaya) is envisaged to bring new challenges and opportunities to help improve the performance of the DISCOM. We are aware of the fact that we are not able to commit our full payments towards power purchase dues. But with the availing of the loans under the Atmanirbhar Bharat Scheme, we have been able to leverage the funds to substantially alleviate the financial situation of CPSUs. Tariff for the utilities need to be looked into holistically on a win-win approach. The financial viability of DISCOMS is quintessential for the sustainable growth of the sector. This matter could perhaps be further

deliberated in the days and years to come so as to ensure that the electricity utilities are able to sustain themselves in the long run for the interests of the people of the state, the region and the nation.

- As beneficiaries of Bongaigaon Thermal power plant (BgTTP), which has caused a huge financial burden on the state, we join hands with other states to address the issue of comparatively high tariff and hope to ensure reduction of the cost of power or the de-allocate the firm shares.

SLDC AND COMMUNICATION

- Cyber Security, which is the practice of defending computer systems, software, mobile devices, electronic systems, networks and data from malicious digital attacks, is increasingly becoming significant. It presents one of the significant challenges in the contemporary world due to its complexity. With cyber threats to the Indian power system, the Ministry of power, Government of India had, in its meeting on the 4th March 2021, resolved that all Load Despatch Centres (LDCs) at the National, regional and State levels should ensure Cyber Security measures. Meghalaya SLDC is already complying with the mandates of CEA's Cyber Security Guidelines.

- **Reliable communication** in the Electricity Network remains a major concern. As the Power system in India is rapidly expanding with increased number of interconnections between regions, new technologies are being implemented. Reliable communication system is required to cater to the need for adapting new technologies in Power System operation which are bandwidth intensive such as Special protection Scheme, Grid Security Expert System, Load Management, Advanced Protection System, Substation Automation System, SAMAST and Synchro phasor.

Reliable communication is essential for coordinating preventive measures to be taken by multiple authorities on receipt of warnings for natural disasters and also during grid restoration operations.

Meghalaya envisages a strong communication network as the backbone to accommodate various advance technology systems for optimal operation of

the power system, and entrusts MePTCL, the Transmission utility to undertake various OPGW connectivity of its EHV sub-stations across the state. Despite acute financial constraint, and with the immense support of NERPC secretariat and CTU for financial aid from the Central Government, MePTCL have been able to improve OPGW connectivity successfully and a large part of the MePTCL transmission network is being utilised for OPGW. However, a few transmission network corridors which are not included in any earlier schemes are being proposed on Reliable Communication Scheme prepared by MePTCL which I request the forum to reach a consensus for 100% PSDF funding and hope that Government of India extends its full support to this respect so that telemetry's availability can be achieved as per CERC's guidelines. Commercial use of our OFC network in the region remains limited. For Meghalaya which is cash-strapped and landlocked, it is again suggested that 50% funding by the state for PSDF schemes on reliable communication be re-looked, so as to enable us to strengthen our telemetry system for the smooth functioning of the Power Transmission system.

TRAINING OF MANPOWER

- Establishment of State-of-the-Art Training Centres at Jowai and Tura. Under CBIS, it is necessary to equip our man power with capability to operate and maintain the assets by imparting on-the-job training at areas close to their work place so as to avoid dislocation of man power. The forum may explore the possibility of setting up of Power Training Institutes/Centres in Meghalaya and other states for the interest of the states and the region.

Despite the Covid lockdown, Meghalaya is witnessing exponential growth in demand for power. Power Supply to both Urban and Rural Centres in Meghalaya and the region need to be further revamped due to the fact that today, power availability is so vital for our daily activities with digitalization of numerous activities including those relating to financial and educational institutions requiring online transactions, virtual conferencing and impart of teaching.

- We thank the Government of Indian for sanctioning **SAMAST** for Meghalaya. Works for the same have commenced. As value addition to the project and to reduce the Power Purchase Cost for the state, Meghalaya is planning to award Energy portfolio Management software which will complement the SAMAST project.

In conclusion, considering our acute need for power system strengthening despite our financial situation, I request the Committee to endorse our proposals for the interest of the power sector in Meghalaya and the region especially, with respect to transmission system capacity and reliability in the region. I would also request the Government of India to fast-track the clearance process for new proposed projects. Furthermore, i propose that this Committee ensure that the funds available under PSDF are optimally sanctioned for as many schemes as possible, and also to relax the funding norm under PSDF to ensure that States get the full share of the fund.

It is earnestly hoped that the deliberations of today will benefit Meghalaya, the Northeast and the nation.

Thank you

Jai Hind

ANNEXURE-VII

**SPEECH OF SHRI JISHNU DEV VARMA
HON'BLE DY. CHIEF MINISTER & I/C POWER, GOVT. OF TRIPURA
ON THE OCCASION OF THE 22ND MEETING OF THE
N. E. REGIONAL POWER COMMITTEE
HELD ON 28th MARCH 2022 AT GUWAHATI**

Hon'ble Chairman NERPC- the Chief Minister, in charge Minister Power, Government of Nagaland, most respected Ministers of Power of all the NE States, who are here as the Members, Member Secretary, all the delegates of all the constituents, Ladies and Gentlemen.

At the very outset, I took over the reins as the chairman of the North Eastern Regional Power Committee (NERPC), it is my privilege to have all of you here and I warmly welcome each and every one of you in this 22nd NERPC meeting being organized under the aegis of North Eastern Electric Power corporation Ltd. (NEEPCO) at Guwahati, Assam.

- ✓ We all know that the North Eastern Region of the country is rich not only in natural resources but also in social capital. It is a region joined together by historical and cultural circumstances. I, chairman of NERPC, bring heartiest and warm greetings to all the participants with certainly in my heart that tis meeting will result in indicative thoughts and decisions that aim at reducing the developmental gaps that exist in comparison with the other part of the country. The meeting will certainly help in improving and transforming the power sector of the region to match with the best infrastructure in the country. Not only the existing challenges are sought to be dealt with but new opportunities need also to be explored in power sector for the entire North Eastern Region through this particular platform. I feel India as a nation can truly be called a developed nation only when the North Eastern Region also prospers in every aspect of development including power sector.
- ✓ Commercial needs and social obligations in the power sector of the entire region need be balanced properly using cooperative and combined wisdom.

NERPC is the most appropriate forum to discuss and bring about some consensus on all the pertinent issues which are being faced by the power sector in the North Eastern Region. In the interest of North Eastern States, this august forum should also be utilized to collectively present the common views and issues to the government of India.

- ✓ We are all aware that the NERPC has always been persistently taking endeavour for making the NER power system operations more reliable, efficient and economically viable and I sincerely hope that this particular meeting will resolve many of the significant issues affecting the power sector in the North Eastern region. This is crucial if we are to achieve our sole objective of providing 24 X 7 power for all at an affordable price.
- ✓ I comprehend that the 22nd Technical Co-ordination Committee (TCC) meeting was held on last Saturday and I hope that in the said meeting many operational and technical issues were mitigated. TCC must have also addressed in detailed on the way forward for power sector in the North Eastern Region.
- ✓ The North Eastern Region being geographically isolated face many issues which are region specific in nature and many challenges that need to be tackled and overcome together. On behalf of the North Eastern States, I would like to place on record my sincere gratitude to the government of India for having a positive approach in extending continued and constant support to develop the power sector in the North Eastern Region. I hope that the same spirit will be continued till NER reaches at par with other parts of the country. With the persistent enhancement of infrastructure and communication facilities, the NE Region will surely become a major power – house of India by using its surplus power potential.
- ✓ The implementation of government of India and World Bank funded project North East Region Power System Improvement Project (NERPSIP) is one such major infrastructure development programme which has already started to benefit North Eastern Region as a whole. I would like to use this forum to call upon the Power Grid Corporation of India Limited (PGCIL), the implementing agency to expedite the work for completion of Tranche – I which is running

behind the completion schedule in all NE States, so that planning of Tranche – II can be taken up.

- ✓ Despite of the many challenges faced by the North Eastern States due to its geographical isolation, the region is however blessed with vast hydro potential. We sincerely appreciate the efforts of the government of India for passing several policies such as The National Resettlement and Rehabilitation Policy to ensure transparent and fair compensation and rehabilitation for those displaced due to development of hydro-power projects.
- ✓ The Asian Development Bank (ADB) is helping to tackle power sector problems by upgrading and expanding power generation, transmission and distribution systems in the North Eastern Region. Power distribution modernization & reliability improvement under ADB funded project includes modern technology like Covered Conductor, High Voltage Distribution System (HVDS), Fault Passage Indicator (FPI), Ring Main Unit (RMU), State of the Art Transformer Testing Lab, Smart Metering etc. for meeting future power demand growth, improved efficiency and facilitate reliable and quality power with reduction in AT & C losses.
- ✓ Distribution sector schemes such as Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGYA), Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY), Integrated Power Development Scheme (IPDS) etc. have largely succeeded in building infrastructure to provide 24 X 7 Power to all.
- ✓ The Revamped Distribution Sector Scheme (RDSS) to improve operational efficiencies and financial sustainability by providing result-linked financial assistance to DISCOMs will strengthen supply infrastructure based on meeting pre-qualifying criteria and achieving basic minimum benchmarks. I am sure that all the North Eastern States will make use of the scheme for improvement in the quality, reliability and affordability of power supply to consumers through a financially sustainable and operationally efficient distribution sector.

- ✓ This is an opportunity to propose power strengthening Project for the entire North Eastern Region to the Ministry of power, government of India for funding under Power System Development Fund (PSDF).
- ✓ I, on behalf of all NE States, will like to thank the government of India for sanctioning scheduling, Metering, Accounting and settlement of transactions in electricity (SAMAST) scheme for the NE states. The SAMAST group formed by NERPC comprising of members of NERPC, NERLDC and representatives from states have been actively working for implementation of SAMAST mechanism in all NE states.
- ✓ One of the major concerns for the electricity network is reliable communication. I may request the government of India to extend funding support to this sector so that telemetry's availability can be achieved as per CERC's guidelines in the NE region.
- ✓ I would also like to mention here that development of skilled manpower in the region along-with capacity building is the need of the hour and the process should be effectively and efficiently continued as skills determine ability to execute plans with success.

With these words, on behalf of NERPC, I once again extend my heartiest greetings to all the participants and look forward to meaningful and successful deliberations towards a fruitful outcome with one common goal and objective in developing the North Eastern Region generously.

Thank you all

JAI HIND

ANNEXURE-VIII

**SPEECH OF SHRI BIMAL BORAH
HON'BLE POWER MINISTER, GOVT. OF ASSAM
ON THE OCCASION OF THE 22ND MEETING OF THE
N. E. REGIONAL POWER COMMITTEE
HELD ON 28TH MARCH 2022 AT GUWAHATI**

Hon'ble Chairman, NERPC, my counterparts from other North Eastern states, officials from Central and State Governments as well as other Central and State utilities, ladies and Gentlemen.

It is indeed a great pleasure to be a part of this august gathering on the occasion of the 22nd NERPC meeting.

Power sector in the country has experienced significant development in last 8 years under the dynamic leadership of Hon'ble Prime Minister Sri Narendra Modiji. In the said period, India has achieved the massive goal of universal household electrification in a record time. India has become power surplus from power deficit. One Nation One Grid become a reality in the said period. Massive growth in renewable energy is also experienced in the period.

It is our good fortune that North East Region of the country has a special place in the heart of Hon'ble Prime Minister and power sector of the region is also not an exception.

It is my pleasure to intimate the august house that Assam is the first state to get sanction under Revamped Distribution Sector Scheme. Already project implementation agreement has been executed.

With improved supply position, now the focus is more on quality and reliability putting Consumers at the forefront. Electricity (Rights of Consumers) Rules, 2020 is already notified and consumers are immensely empowered to even penalize DISCOM on service lapses. As such, DISCOM has to gear up also with adequate facilities to ensure quality supply to all consumers. Implementation of updated technologies (IT/OT) is the need of the hour for survival in this competitive age. To address all consumer related issues in a time bound manner and safeguard its

commercial interest, implementation of Smart metering is the tool in the hand of DISCOM.

Power Scenario

Power supply scenario of the region and Assam in particular has improved significantly in recent times with commissioning of Pare Hydro Electric Project, Kameng Hydro Electric Project by NEEPCO benefitting all the beneficiary states. Assam Genco has also commissioned Lakwa and Kamrup Replacement Power Project.

I would like to convey my sincere thanks to NEEPCO for supply of hydro power from Kameng HEP during the coal crisis period in October, 2021. Such instance of regional cooperation is genuinely appreciated by Assam.

In Assam, commissioning around 100 MW Solar power plants under Build, own, operate (BOO) model is on the verge of completion. 70 MW Amguri solar park will be commissioned by 31.03.2022.

Peak demand of Assam has touched 2200 MW. Assam DISCOM has tied up capacity of 2340 MW. However, lesser generation than the potential capacity for most of CPSU well as State Generators, primarily due to inadequate fuel supply, has led to peak shortage up to 500 MW. Such gaps are being mitigated through balanced procurement from open market. But such eventuality exposes the DISCOM to market volatility. I urge upon all the generation utilities of the region to gear up and ensure maximum possible generation in the overall interest.

In this context, I would also like to avail this opportunity to request the members of Committee for collective effort in right earnest to take up with hydro carbon producers viz. OIL/ONGC as well as CIL to ensure adequate fuel supply to the power generating stations for greater interest of the region.

A. Generation & Availability of Power

With massive increase in consumer base vis-à-vis expansion of delivery system with massive electrification programs, availability of adequate generation capacity within stipulated timeline is very crucial. All stakeholders shall endeavor to explore all

possibilities to harness all the resources of the region. Addition of non-conventional source of power also needed to be explored to ensure fulfillment of commitment by India in regard to clean energy vis-à-vis reduction in carbon emission. I am happy to learn that the first item for discussion in TCC is on importance of Developing Small Hydro Projects in the NER.

It needs no mention that dependency on fossil fuel-based power is to be minimized in days to come and renewable power is the only alternative. I am pleased to inform this august gathering that in furtherance to declaration of Hon'ble Prime Minister at COP26 Summit in Glasgow, Hon'ble Chief Minister of Assam has planned to install 1,000 MW of solar power plants in free government lands. A portion of the same is envisaged to be installed with storage capacity in line with guidelines for procurement and utilization of battery energy storage systems as part of Generation, Transmission and Distribution assets, along with Ancillary Services issued by Ministry of Power on 10th March, 2022.

I would like to take this opportunity to mention that works of 120 MW Lower Kopili HEP is going on expeditiously and expected to get commissioned within schedule.

APDCL is also taking up 50 MW solar plant under PM KUSUM Scheme. Majuli has been nominated to be developed as a solar city by MNRE. Assam Genco (APGCL) is also taking up 60 MW Sonbeel floating solar and 50 MW solar plants at Majuli & Golaghat. Karbi Langpi Middle HEP I & II with aggregated capacity of 46 MW and 55 MW Kulsi HPP is also under active consideration.

Commissioning of the projects will not only be beneficial for general consumers in term of supply availability but also contribute to India's ambitious goal of non-fossil energy capacity to 500 GW by 2030.

Assam GENCO (APGCL) is also exploring for gas based 100 MW NRPP Ph-II and 100 MW Namrup Gas Engine project.

I would like to convey my sincere thanks to Union Power Minister for his positive intervention resulting in some reduction in the generation tariff of power from Bongaigaon Thermal Project with swapping of coal sources, spreading of depreciation, debt restructuring etc. However, I would further like to reiterate our request for reduction in Return on Equity (RoE) through this august forum.

Hopefully, all the beneficiaries will endorse the same for kind consideration from Ministry of Power in the interest of overall development of the region.

It is learnt that Subansiri HEP (2000MW) by NHPC will be partially operative in August this year and fully by August next year. On the apprehension raised by Hon'ble Chief Minister of Assam, Hon'ble Union Power Minister has intimated that the generation tariff for this station will be around Rs.5 per unit. Hydro power at this tariff will surely be beneficial for all the beneficiaries.

B. Transmission System and Charges thereof

A robust transmission system is of utmost importance to ensure quality supply to end users.

It is my pleasure that Assam State Transmission Utility (AEGCL) is taking adequate steps to augment its transmission as well as transformation capacity over the recent years. Various bottlenecks of the network are being removed expeditiously. Constraints at some difficult pockets like Hatsingimari, Mankachar etc. are dealt with in mission mode for expeditious resolution.

Further, I'm delighted to mention that Ministry of Finance, Government of India has sanctioned Rs. 4510 Crore under Asian Infrastructure Investment Bank (AIIB) funded Externally Aided Project category to strengthen the transmission sector of the State. Under this project, 24 new Substation with capacity 5606 MVA along with 1113CkM of associate transmission lines will be created. Other system augmentation works are also covered in this project. This project will improve the state grid capacity to large extent.

C. Distribution

It is admitted fact that Distribution sector is still the weak link of the entire supply chain and is in need of further investment to become self-sustainable.

Since my taking over the office in the month of May, 2021; special emphasis is given to power sector of the State under the dynamic leadership of Hon'ble Chief Minister of Assam. Strategic measures are taken to address various issues

pertaining to the sector to make it one of the vibrant sectors catalyzing overall growth to make Assam one of top five States of India.

It is my pleasure to inform the august gathering that Assam Discom has been able to improve its efficiency during the period from June'21 with positive intervention from State Government. Assam Discom has achieved 105% collection efficiency in the period from June'21 to February'22. State Government has taken various reform measures like conversion of loan and grant to equity, waiver of unpaid interest, regular payment of Government dues etc. to enhance profitability of the utility. It is my pleasure to intimate that at present Assam Discom has no OVERDUE against any power supply vendors. In fact, APDCL is earning rebate with timely payment of dues.

Govt. of Assam has also taken various steps to create/augment distribution infrastructure to enhance quality supply.

As already mentioned, Assam is first state to get approval from Ministry of Power for revamping the existing infrastructure to bring down the AT&C losses to 13% by FY 2024-25 under Revamped Distribution Sector Scheme with project outlay of Rs. 8727 Crore.

To ensure the reliable power and voltage improvement, Govt. of Assam has approved the AIIB funded "Assam Electricity Distribution System Enhancement & Loss Reduction Project". This project will improve the voltage scenario and will reduce the distribution losses. Total cost of the project is around Rs.3284 Crore. Under this project, around 7500 CKM of high voltage distribution lines (33 kV & 11 kV) will be installed. Also 1140 Nos. of High Voltage Distribution System and 196 numbers of new Distribution Sub Stations will be constructed. It will strengthen the power distribution network of the State to meet the growing power demand also.

Since June, 2021, more than 3.80 lakh left out households were electrified of under DDUGJY-New (additional). More than Rs. 1200 Crore was spent for implementation of this project in the state.

Govt. of Assam has approved ambitious scheme of electrification of all unelectrified 48,570 Anganwadi Centres and 12696 primary schools Sonali Xaishab Bikkashit Axom with budgetary allocation of Rs. 144 Crore.

Assam is one of the first states to roll out smart metering projects under DBFOOT model in September, 2021.

Various IT/OT initiatives like expansion of SCADA, upgradation of ERP is considered under RDSS.

I hope the deliberations in this meeting will be in right perspective for achieving the desired result in the power sector of the region envisioning the future challenges like resource adequacy, penetration of RE and all other relevant matters.

At the end I express my special thanks to NEEPCO and NERPC Secretariat for organizing this meeting.

I wish you all a great success in this meeting.

Thank you

ANNEXURE-IX

**KEYNOTE ADDRESS OF SHRI B. LYNKGHOI, IES (CPES)
MEMBER SECRETARY, NERPC
ON THE OCCASION OF THE 22ND MEETING OF THE
N. E. REGIONAL POWER COMMITTEE
HELD ON 28TH MARCH, 2022 at GUWAHATI**

Hon'ble Chief Minister, Govt. of Nagaland & Chairman, NERPC, Hon'ble Dy. Chief Minister, Govt. of Arunachal Pradesh Sh. Mein Ji, Hon'ble Dy. Chief Minister, Govt. of Meghalaya, Shri Tynsong Ji, Hon'ble Dy. Chief Minister, Govt. of Tripura, Shri Dev Varma Ji, Hon'ble Power Minister, Govt. of Assam, Shri Borah Ji could not attend the meeting due to ongoing Assembly session, Hon'ble Adviser (Power), Govt. of Nagaland, Shri Ayemi Ji, Member (Power System), CEA, Shri Goutam Roy Ji, TCC Chairman & Chief Engineer (T&G), Dept. of Power, Govt. of Nagaland Shri Yanthan Ji, Principal Secretaries, Commissioners & Secretary Power of NE States, CMDs, MDs of States & Central Utilities, and all the Senior officers from NE States, Central Utilities, Special Invitees, ladies and gentlemen.

It gives me immense pleasure to convey my gratitude to all the esteemed participants to this 22nd North East Regional Power Committee (NERPC) meeting here in Guwahati. I would like to convey my deepest gratitude to NEEPCO for hosting this meeting and all the gracious hospitality. I sincerely hope, this meeting will result in meaningful deliberations and decisions that aim at improving and transforming the power sector of our region to be at par with the rest of the country.

Ministry of Power, Government of India has established NERPC under the Electricity Act 2003, to ensure optimal performance of the grid. We have been further entrusted with the responsibilities of transmission planning, communication planning and to evolve consensus on all issues relating to economy and efficiency in the operation of power system in the region. To achieve these objectives, NERPC Secretariat persistently work through its various sub-committees (operation, protection, commercial, NeTest) and put-forth the matters of highest significance to the august forum of TCC/NERPC. Yesterday we had a detailed

deliberations on all the agendas and today only those agendas which were referred by TCC are put up to deliberate and resolve.

Key Highlights of NER/NERPC:

- It is my pleasure to appraise the forum about the developments in Power Sector in NER since the last TCC/NERPC Meetings.

1. (Transmission)

- In the past year inspite of multiple lockdown restrictions, a number of EHV Sub-stations have been upgraded as follows:
 - 132kV Aizawl AIS upgraded to GIS on January, 2022
 - 132kV Kumarghat AIS upgraded to GIS on October'2021
 - 220/132kV Dimapur AIS upgraded to GIS on February, 2022
 - 132kV Haflong AIS upgraded to GIS on August, 2021
 - 132kV Jiribam AIS upgraded to GIS on August, 2021

POWERGRID could complete the above projects with the co-operation of DoP Nagaland, P&ED Mizoram and TSECL, who had arranged shutdown in face of dire circumstances.

On 02nd August, 2021 400kV Palatana – Surjamaninagar was commissioned. This led to improved reliability in Tripura Grid in particular and Southern grid in general. Further due to addition of evacuation path for Palatana generation, the Availability of Palatana generation for NER beneficiaries increased drastically.

On 10th May, 2021 220kV New Mariani- Misa D/C was upgraded to 400kV leading to reduced congestion in evacuation of power from Gas based generating stations in Upper Assam Area.

On 02nd April, 2021 the 132kV Biswanath-Chariali to Chimpu D/C line was commissioned. Subsequently the reliability in power supply to Capital Area of Arunachal Pradesh was improved drastically and also number of disturbances in Capital reduced to an enormous extent.

On 28th January, 2021 the 220kV New Mariani – Mariani line was commissioned leading to completion of the entire upgradation of Transmission system in Upper Assam area. After this, the Gate Flow Constraint in Upper Assam area was resolved much to the satisfaction of NEEPCO and APGCL.

Inter State: With the support and cooperation of NER constituents, close to 70 key elements were added in NER grid to augment the inter-state transmission system in the last FY. To name a few, 400/132 kV 105 MVA ICT at PK Bari (ISTS) of STERLITE, 400 kV New Mariani (PG)- Misa lines, 400 kV Palatana – Surajmaninagar, 50 MVAR New Mariani line reactors at Misa etc. of POWERGRID. Dimapur completely converted to GIS. The forum thanked NERTS-POWEGRID for timely execution and DoP Nagaland for the co-operation and support at every step of the project. The upcoming key projects in the region are as follows:

- a. 3rd 220/132kV ICT of 30MVA (3x10MVA) single phase units at Mokokchung S/s along with associated bays – Mar 2022
- b. Installation of 1x100MVA, 220/132kV ICT (3rd) at Salakati alongwith associated bays at both levels
- c. LILO of Palatana – Surajmaninagar (ISTS) 400kV D/c line at 400/132kV Surajmaninagar (TSECL) S/ s along with associated 4 no. 400kV line bays – In matching timeframe of upgradation of 400/132kV Surajmaninagar (TSECL) substation.
- d. Establishment of new 220/132kV substation at Nangalbibra (by Sterlite): Dec 2023
- e. Upgradation of existing 132kV Namsai (POWERGRID) S/s to 220kV (with 220kV side as GIS) with 2x160MVA ICTs alongwith Kathalguri (NEEPCO) – Namsai (POWERGRID) 220kV D/c line (150ckm)
- f. Transmission system for providing Connectivity to Dibang HEP: (May’ 2029, as mentioned in the connectivity Connectivity intimation dated 03-01-2022) Dibang – Gogamukh 400kV 2xD/c (Quad) line, Gogamukh – Biswanath Chariali 400kV D/c (Quad) line and extension work & Establishment of New Gogamukh 400/220/132kV substation

Intrastate: The government of India has sanctioned two schemes, namely North Eastern Region Power System Improvement Project (NERPSIP) in 6 NER States & Comprehensive Scheme for strengthening of Transmission & Distribution in Arunachal Pradesh for improving intra-state connectivity. The entire cost of the project is being borne by the Government of India through the Plan Scheme of Ministry of Power. The outlay and the scope of the schemes have been enhanced in the year 2020. On 3rd March 2022, a detailed review of the schemes was taken under CEA, Chairperson. NERPC Secretariat is committed to ensure the timely completion of the projects and proper redressal of the grievances of the states. These schemes will not only improve the downstream network but also provide DISCOMs to connect the last mile consumer.

2. (Generation)

- NER is blessed with vast hydro potential.

“The biggest human temptation is to settle for too little”- Thomas Merton

- We are looking forward for commissioning of NHPC’s Subansiri HEP in the upcoming year. The first unit is expected to come by August 2022.
- This decade of 2020-2030 promises to bring prosperity to the region. Big hydel projects such as Dibang of 2880 MW and Siang of 1600 MW will harness the hydro potential of the region.
- This vast hydro reserve can supplement Government of India’s ambitious push for 500 GW of Renewable Energy. Further, the hydro and gas-based plants in NER can participate in ancillary services thus providing the necessary support to the grid, especially in the context of expected increased Renewable Penetration.
- NERPC is proud to inform the members that during the pan India coal crisis, NER managed to remain power surplus and averted any substantial power shortage in the region.

3. (DISTRIBUTION)

- Given the current state of operational and financial losses of Discoms in the country and to provide a much-needed fillip to the power sector as well as the overall economy in the pandemic affected year, Revamped Distribution Sector Scheme (RDSS) has an outlay of Rs.3,03,758 crore with an estimated budgetary support from Central Government of Rs. 97,631 crores, which would be available till FY 2025-26.
- We further need to work on rationalization of the tariff to improve financial viability of DISCOMS. Over the years it has been observed that Assam has drastically reduced their outstanding energy dues and transmission dues despite having very high-power purchase cost and transmission cost. This can be largely attributed to its rationalized tariff policy.

4. (SYSTEM OPERATION)

- System operators are responsible for carrying out real time operations for grid control and despatch of electricity within the region through secure and economic operation of the regional grid, in accordance with the Grid Standards and the Indian Electricity Grid Code (IEGC).
- NERLDC, POSOCO at regional level and SLDSs at state levels are functioning to provide load forecasting, active and reactive power management, cross border and inter-regional exchanges, congestion management, optimum scheduling and despatch power, open access, metering and market operations etc.
- I take this opportunity to appraise the importance of SLDCs. SLDCs are like eyes and ears of State Power sectors. The success of any State lie in SLDCs. We should implement the CABIL Report in letter and spirit. SLDCs should have adequate manpower. They should have visibility to all drawing points so that the loop holes of power pilferages can be monitored by them. I can tell you that DoP Arunachal Pradesh have to pay Deviation charges as penalty for more than one crore per week due


to overdrawl from the grid as they do not have telemetry system in place and this could have been avoided the public money wastage. Hence, reliable communication should be done at the earliest. Each SLDCs should have Market Operation Wing e.g. Assam & Meghalaya where complete marketing operation of the State can be in Safe Hand. SLDCs should have Regulatory Affairs wing where they can study the implications of Regulations being notified regularly.

- Pursuance to the MoU between IMD and POSOCO for installation of AWS (Automatic Weather Station) to improve weather forecasting for power sector, NERPC Secretariat has been inviting IMD officials in its OCC meetings to identify locations and install AWS in NER and we are trying to bring down the forecast error less than 5%.
- We are very thankful to GoI for the (SAMAST) project, funded through PSDF, once implemented will transform the forecasting, scheduling and energy accounting for the seven NER states. It will lay down the foundation of ABT regime. To appraise the forum, this is to state that for Assam and Meghalaya, the project is expected to complete by September, 2022. For the remaining 5 states, I am pleased to share that LOAs have been placed in Sept 2021 and likely to be completed by March, 2023.

“You can’t manage what you can’t measure” – Edwards Deming

- It is often said that global problems need local solutions. One such inescapable challenge is climate change. North Eastern Region of India will be instrumental in fulfilling India’s Glasgow commitments.
- On behalf of NERPC, I once again extend my heartiest greetings to all the participants and look forward to meaningful deliberation. I once again thank NEEPCO for hosting this meeting in a very Grand way and wish the plenary a grand success.

Jai Hind!



**PHILOSOPHY BEHIND DRAFT
CONNECTIVITY/GNA REGULATIONS 2021**
22ND TCC MEETING
26TH MARCH 2022

NERPC

CHRONOLOGY

GNA/CONNECTIVITY REGIME

- “Ensuring adequacy in the planning and development of ISTS” - CEA 2013
- Staff Paper CERC - Sept 2014.
- Mata Prasad Committee to Review Transmission Planning - Sept 2016.
- Ministry of Power Gazette Notification “Electricity (Transmission System Planning, Development and Recovery of IST Charges) Rules 2021” - Oct 2021.
- Draft CERC (Connectivity and GNA) Regulations 2021.

BACKGROUND STORY

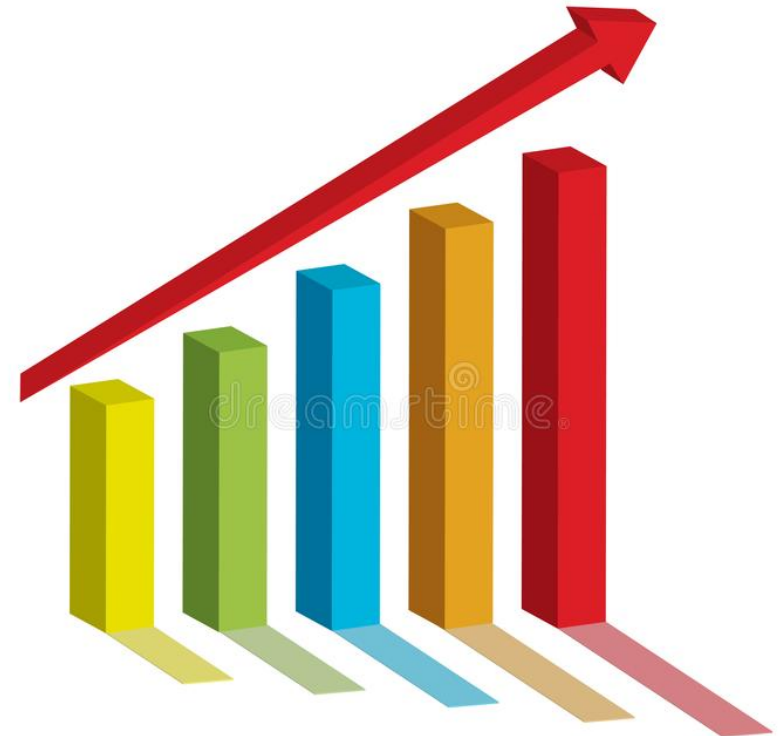
- 2003 ELECTRICITY ACT AND DELICENSING OF GENERATORS.
- IPPs faced difficulties in signing LTAs/PPAs.
- 2009 Connectivity LTA/MTOA Regulations.

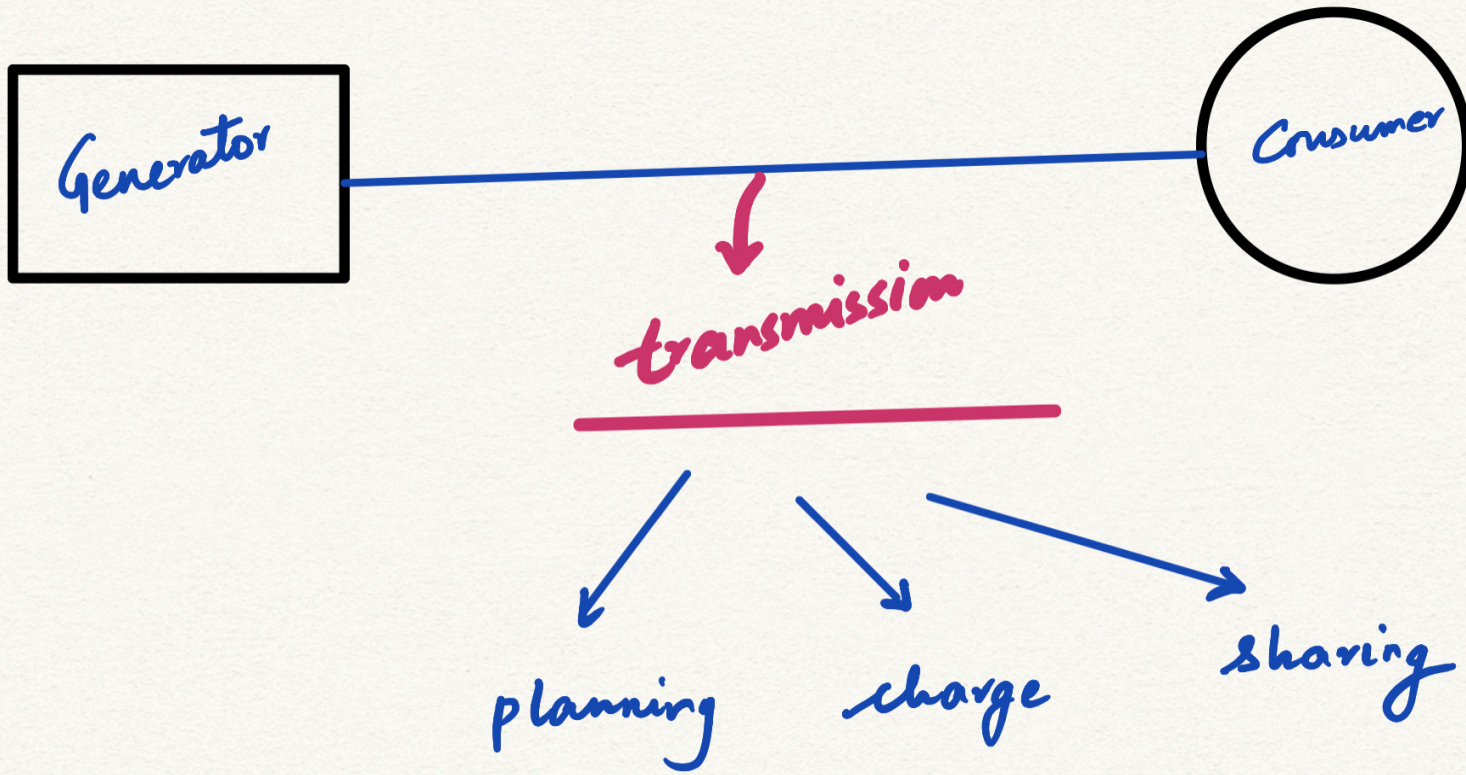
“Connectivity: for a generating station/bulk consumer/transmission licensee means the state of getting connected to ISTS”

(Without upfront commitments)

Result

- TREND OF MTOA/STOA found increasing.
(Accommodated under existing margin)
Many utilities surrendered PPAs.
- Congestion in transmission corridors.





TRANSMISSION PLANNING

- The planning of transmission system to meet long term requirements of ISGS projects is being carried out since 1975.
- This took place with prior knowledge of quantum of power, point of injection and point of drawl. (Of course with inherent margins)
- Based on LTA.
- LTAs are no longer predominant.
- No augmentation in the transmission system is carried out for grant of STOA/MTOA.
- The provisions of Connectivity do not mandate for system strengthening and thus do not ensure delivery of power from the connected generator. This generator leans on the existing grid, causes congestion and risks stability.

NEED OF A NEW APPROACH

- We have to recognise the fact that STOA/MTOA/Market can no longer be restricted to spare margins.
- IPPs/GENCOS should get the comfort to sell their powers under long/medium/short term w/o congestion.
- Transmission system should fulfil requirements of consumers irrespective of term of contract.
- The sharing mechanism should be fairer.

रजिस्ट्री सं. डी.एल.- 33004/99

REGD. No. D. L.-33004/99



भारत का राजपत्र The Gazette of India

सी.जी.-डी.एल.-अ.-04102021-230130
CG-DL-E-04102021-230130

असाधारण
EXTRAORDINARY

भाग II—खण्ड 3—उप-खण्ड (i)
PART II—Section 3—Sub-section (i)

प्राधिकार से प्रकाशित
PUBLISHED BY AUTHORITY

title and commencement. – (1) These rules may be called the Electricity (Transmission System Planning, Management and Recovery of Inter-State Transmission Charges) Rules, 2021.

These rules shall come into force on the date of their publication in the Official Gazette.

Definitions. – (1) In these rules, unless the context otherwise requires,

- (a) “Act” means the Electricity Act, 2003 (36 of 2003);
- (b) “Designated Inter-state Customer” means the user of any element of the Inter-State Transmission System and include Generating Station, State Transmission Utility, Distribution Licensee, State Electricity Board and its successor company, Electricity Department of the State and Union Territory, Bulk Consumer and any other entity directly connected to the Inter-State Transmission System;
- (c) “General Network Access” means non-discriminatory access to the Inter - State Transmission System as requested by a Designated Inter-State Customer and granted by the Central Transmission Utility for a maximum injection or drawal, as the case may be in MegaWatt and for a specific period.

words and expressions used and not defined herein but defined in the Act shall have the meanings assigned to the Act.

Planning and Approvals.-(1)The Central Electricity Authority shall draw up short term plan every year on rolling basis for upto next five years and perspective plan every alternate year on rolling basis for next ten years for development of the electricity system and co-ordinate the activities of the planning agencies for the optimal utilisation of resources to subserve the interests of the national economy and to provide reliable and affordable electricity in accordance with section 73 of the Act.

Central Electricity Authority shall also draw up the perspective plan for development of transmission system in consultation with all the relevant stakeholders such as, Central Transmission Utility, State Transmission Utilities, Operators, generating and distribution companies, industry associations and the State Governments, etc. and

preparing this plan, Central Transmission Utility shall consult with State Transmission Utilities, Central Government, State Governments, generating companies, Regional Power Committees, Central Electricity Authority, System Operators, licensees and any other person notified by the Central Government in this behalf.

(4) The principle for planning of the Inter-State Transmission System shall be to ensure that it is available as per the requirements of the States and the generators, as reflected by their General Network Access requests and the planning should be such that the lack of availability of the transmission system does not act as a brake on the growth of different regions. The transmission system shall, be planned and developed matching with growth of generation and load, as far as possible and while doing the planning, care shall be taken that there is no wasteful investment.

(5) The Inter-State Transmission System projects drawn up by Central Transmission Utility shall be placed before the National Committee on Transmission constituted by the Central Government and the National Committee on Transmission shall also include a nominee of each Regional Power Committee. The projects along with their timeline for implementation shall be approved by the Central Government after considering the recommendations of the National Committee on Transmission:

GNA

- Ability in MW to draw/supply from a PoC to any ISTS point.
- GNA as like PoC is not path specific.
- Use of GNA
 - New transmission corridors can be planned based on GNA.
 - Generators do no need to declare target beneficiaries.
 - Drawing utilities shall also access to ISTS to the extent of their GNA and get the system created for power transfer over ISTS from anywhere in the grid.

SIGNIFICANCE OF CONNECTIVITY

- As a separate product only as in-principle approval by CTU for facilitating siting of a generation project.
- It is a critical milestone for securing finance.
- However, injection/drawl of power should be allowable with only GNA.

Content of the Regulations

- Connectivity
 - Eligibility/application
 - BG (Bank Guarantee)
 - Transfer of connectivity etc.
- GNA
 - Eligibility
 - Additional GNA for a period
 - Transfer of GNA
 - T-GNA

Takeaways for NER

State	Proposed GNA (MW)	LTA as per Dec'21 RTA	%ge Decrease wrt LTA
North Eastern Region			
Arunachal Pradesh	137	288	52%
Assam	1,525	1622	6%
Manipur	204	237	14%
Meghalaya	238	336	29%
Mizoram	95	136	30%
Nagaland	137	170	19%
Tripura	311	353	12%
BNC_HVDC	1.16	1.37	15%

Takeaways

- Delinked Schedule Access and Transmission Access.
- Need of close coordination of STUs/SLDCs/Market Operation.
- High Relinquishment charges.

Power Procurement Mechanism of APDCL



Indrajit Tahbildar,
Assistant General Manager
Commercial Wing, APDCL

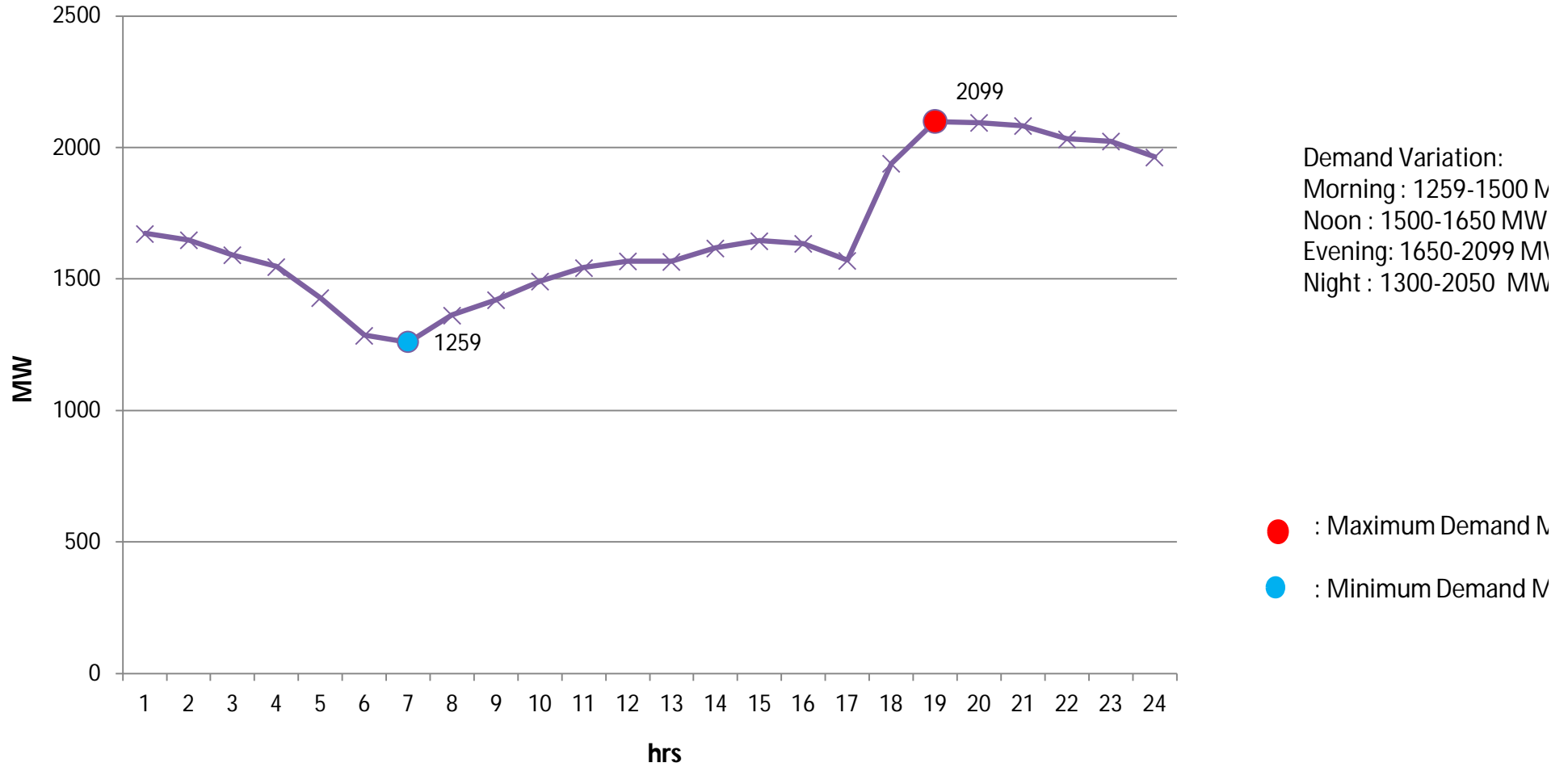
Topics Covered:

- Overview of Assam's power scenario
- APDCL's Load Forecasting & Power Procurement Planning:
Long Term, Medium Term and Short Term
- A few success stories
- Some challenges

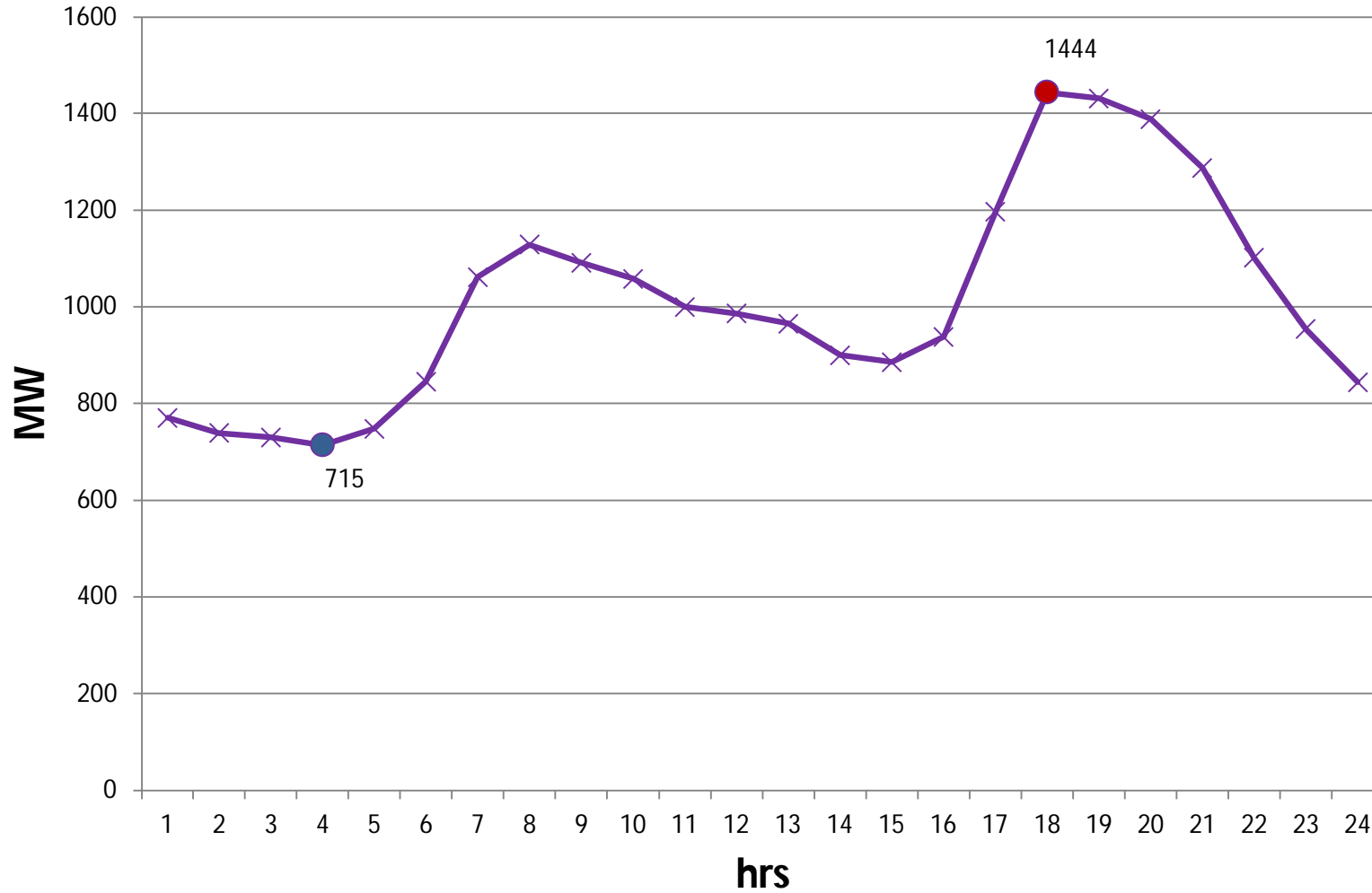
Maximum Demand Met of Assam			
FY	Max Demand met (MW)	Date	Year to Year Increase (%)
2017-18	1745	10.10.17	
2018-19	1809	5.9.18	3.9
2019-20	1956	27.8.19	8.2
2020-21	1987	14.10.22	1.5
2021-22	2099	13.9.21	5.6

Demand of Assam at present	
Summer	1200 MW to 2099 MW
Winter	750 MW to 1450 MW

Hourly demand variation in Summer in MW (13.09.2021)



Hourly demand variation in Winter in MW (17.01.2022)



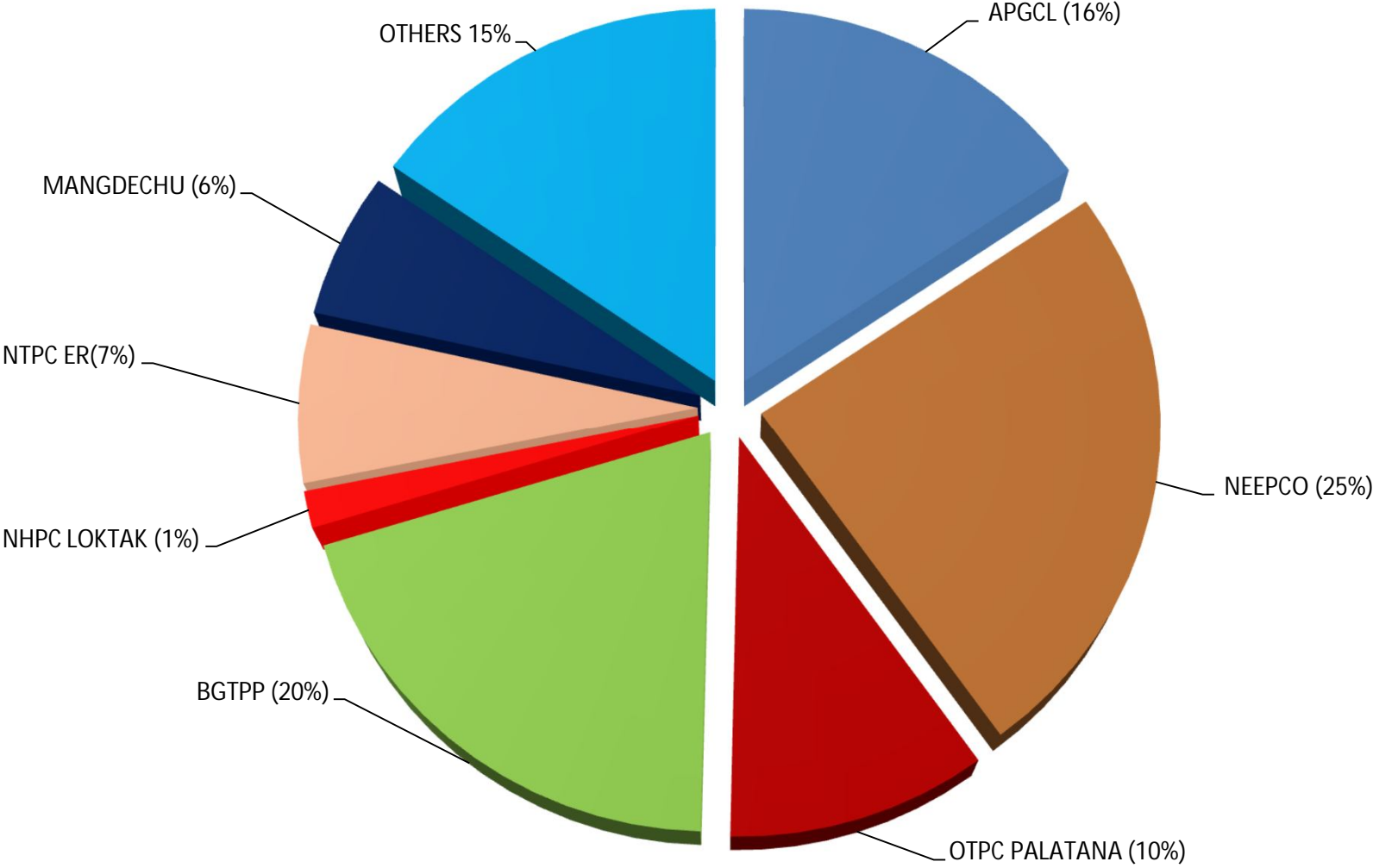
Demand Variation:
Morning : 715-1170 MW
Noon 850-1000 MW
Evening: 1100-1444 MW
Night : 750-1300 MW

● : Maximum Demand Met

● : Minimum Demand Met

SOURCE WISE AVAILABILITY DURING PEAK HOURS

■ APGCL ■ NEEPCO ■ OTPC Palatana ■ NTPC BGTPP ■ NHPC Loktak ■ NTPC ER ■ Mangdechu ■ Others



APDCL's Load Forecasting & Power Procurement Planning

"Proper power procurement needs proper Load Forecasting"

- Long Term (Annual) Load and RPO Forecasting : to enter into agreement
- Medium Term (Monthly) Load Forecasting : For banking arrangement
- Short Term Load Forecasting
 - Day Ahead Forecasting : to participate in DAM mainly
 - Intra Day Forecasting : to participate in TAM and RTM mainly

Long Term Load Forecasting & Planning by APDCL:

Own Method of Load Forecasting:

- The calculation is done on excel sheet and basically CAGR type of method.
- The trend of last 10 years' category wise demand is projected for the future years.

Under USAID PACE-D 2.0 RE program

- A software "DISCOM REPOSE" is deployed at APDCL office by the team of PACE-D 2.0 RE program in April 2021.
- The program is in partnership with USAID and works with the MNRE. The software was developed by PRDC.

Long Term Load Forecasting & Planning by APDCL:

Expecting more accurate result in “DISCOM REPOSE” software, because:

- The software handles much more historical data of last 10 years. Also, it has considered various other factors like GDP, population, per capita energy consumption etc.
- Effect of Open Access consumption, Electric Vehicles, Demand Side Management are also considered in the module.
- The result in the module is calculated based on many techniques like CAGR, trend, econometric, partial end use method, artificial neural network, ARIMA etc. The best fitted curve can be selected out of these techniques.

To have optimised power procurement cost with existing and upcoming LTA and 25% RE penetration, the output of the software has recommended to have renewable and independent storage from FY 2027 along with small procurement from the exchange. The data updating is to be done every year.

Long Term Load Forecasting (under USAID PACE-D 2.0 program):

- The projected Energy Sales (in MU) and Peak Demand (in MW) of Assam for FY 2021-30, as per the outcome of the software is as below.

FY	Energy Sales (MU)	Peak Demand (MW)	Year on year % increase in Peak Demand
2021	8046	2035	
2022	8467	2135	4.9%
2023	9047	2276	6.6%
2024	9660	2419	6.3%
2025	10313	2600	7.5%
2026	11027	2792	7.4%
2027	11797	2969	6.3%
2028	12631	3151	6.1%
2029	13534	3366	6.8%
2030	14612	3612	7.3%

Medium Term Load Forecasting by APDCL: *(Month on Month basis)*

- It is done mainly to decide upon Banking of Power arrangement. Primarily done in the beginning of an FY and accordingly tender is floated for Banking of power for next year.
- Trend of last 5 years' month wise both peak and avg Demand are studied.
- The calculation is done on excel sheet and basically CAGR type of method.
- Assam generally has surplus of power in winter and shortfall of power in the summer.

In the past, Assam had done Banking of power with Himachal Pradesh through traders as the seasonal power scenario of Himachal Pradesh is almost opposite to that of Assam.

Short Term Load Forecasting by APDCL:

Day Ahead basis

- Time block wise availability from LTA are received from RLDC, APGCL and IPPs
→ Demand is forecasted carefully for every time block wise for the next day
→ Gap is traded in the exchange
- On forecasting, mainly the previous day's every block wise schedule vs drawal are studied: *whether the difference was due to change in schedule or change in demand.*
- Also, factors like weather and its probable impact on line fault, holiday, special occasion like festival, election, shutdown of major lines etc. are considered :
Qualitative study rather than Quantitative: *with past experience*

Intra Day basis

- On forecasting, mainly the previous day's same blocks and also present day's previous blocks are studied. Decision is taken whether to take URS power or procure in RTM.

A Few Success Stories:

Membership in Exchange Market:

- APDCL has become Proprietary Member of Indian Energy Exchange Limited (IEXL) w.e.f 01.04.2019.
- Before that APDCL did transaction of power through traders like APPCPL, TPTCL etc.
- Savings in terms of Trading Margin to the Traders:

FY	Buy (MU) in IEX	Sell (MU) in IEX	Savings (Lacs)	Annual Fee (Lacs)	Net Savings (Lacs)
2019-20	504.64	1506.26	39.87	5	34.87
2020-21	628.26	1288.58	49.63	5	44.63
2021-22	1073.57	937.28	84.81	5	79.81

- Operational Benefit

A Few Success Stories:

Participation in Real Time Market (RTM) :

- RTM has been started w.e.f 01.06.2020.
- With the concept of RTM coming, a full shift of 4 Junior Managers were posted from 22.04.19, much before RTM came to participate in RTM.
- Previously, power was available in TAM market from hrs from real time only.
- In RTM, procurement is nearer to real time, helping the gap after DAM more accurately and impact of sudden bad weather or tripping of generators can be tackled more efficiently.

FY	Buy (MU) in RTM	Sell (MU) in RTM
2020-21	155.11	57.84
2021-22	256.48	191.49

A Few Success Stories:

Participation in Green Day Ahead Market (GDAM) :

- APDCL's RPO target is 17% (solar 8% and non- solar 9%).
- With the existing agreements, APDCL's compliance would be around 24% in total solar RPO compliance and 55% in non solar RPO compliance.
- Also, trading of REC was suspended by Hon'ble APTEL since July'20 to Nov'21.
- GDAM has been started w.e.f 26.10.2021. Rate is similar to that in DAM.

Month	Buy (MU) in GDAM (solar)	Buy (MU) in GDAM (non solar)
Oct 21	0.173	0.002
Nov 21	5.391	0.139
Dec 21	6.466	0.659
Jan 21	10.48	14.861
Feb 21	10.839	31.007

Some Challenges:

- Sudden huge decrease in Load due to sudden adverse weather condition in Summer and input from Weather sites. RTM has helped now to some extent
- Change of Schedule of power from State GENCO, Intra State IPPs and actual drawal of Open Access Consumers.
- Rate of power from Bongaigaon Thermal Power Project of NTPC.
- Transmission charge rate of Assam.

THANK YOU



**Detailed Project Report (DPR)
for
Upgradation of Hardware, Software and
Associated Systems for SCADA-EMS in Load
Despatch Centres of North Eastern Region (NER)**

2022

North Eastern Regional Power Committee
NERPC Complex, Dong Parmaw
Lapalang, Shillong - 793006 (Meghalaya)
Website: www.nerpc.nic.in
email: nerpc@ymail.com

Summary of Proposal

For Official Use – To be filled by the Nodal Agency of PSDF	
Project Proposal Number: _____	Date of Receipt: _____

To be filled by the Applicant Organization / Utility		
1	Name of the requesting Organization/ Utility	<ul style="list-style-type: none"> • Department of Power, Arunachal Pradesh • Assam Electricity Grid Corporation Limited • Manipur State Power Company Limited • Meghalaya Power Transmission Corporation Limited • Power & Energy Department of Mizoram • Department of Power of Nagaland • Tripura State Electricity Corporation Limited
2	Short Summary of Project/ Scheme/ Activity	
a	Name of the Project/ Scheme/ Activity	Replacement of Upgradation of SCADA-EMS systems at State Load Despatch Centres (07 in nos.) of North Eastern Region of India with establishment of Main as well as Backup setup in new project.
b	Objective of the Project/ Scheme/ Activity	Replacement and Upgradation of SCADA-EMS systems at State Load Despatch Centres after its end of 7-years life cycle for deploying new state-of-the-art systems to ensure reliable and economical power system operation in the country.
c	Authorised Person for this Project/ Scheme/ Activity	<ul style="list-style-type: none"> • Arunachal Pradesh: Executive Engineer, SLDC Itanagar, DoP, 132kV Chimpu Substation, Itanagar, Arunachal Pradesh – 791111 • Assam: Chief General Manager, State Load Despatch Centre, Assam Electricity Grid Corporation Ltd., ASEB Colony, Power House, Kahilipara, Guwahati-781019 • Manipur: General Manager, State Load Despatch Centre, Yurembam Power House, Imphal West-795004, Manipur • Meghalaya: Superintending Engineer, State Load Despatch Centre, Meghalaya Power Transmission Corp. Ltd., Umjarain Mawkynroh, NEHU Campus, Shillong-793022, Meghalaya • Mizoram: Sr. Executive Engineer, State Load Despatch Centre Division, P&E Office Complex, North Block (III Floor), Electric Veng, Aizawl-796001, Mizoram

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

		<ul style="list-style-type: none"> • Nagaland: Executive Engineer, State Load Despatch Centre, Full Nagarjan, Dimapur, Nagaland – 797112 • Tripura: Dy. General Manager (System Operation), State Load Despatch Centre, TSECL, 79-Tilla, Agartala, Tripura (West) – 799006
d	Nature of the Project/ Scheme/ Activity: Inter-state/ Intra-state (Please specify)	Intra-state incident to state-level grid operation
e	Identified Beneficiaries	The state constituents of North Eastern Region of India
f	Merits of the Scheme	With implementation of the scheme, overall improvement in the Load Despatch functions will be achieved which is mission critical operation of national importance to manage the expanding power system network in North-Eastern region. Moreover, the current systems will be obsolete in near future leading to maintenance and Cyber Security issues which will be eliminated by upgrading the system through this proposal.
g	Limitations, if any	No limitation envisaged. Only parallel reporting of RTUs to existing system as well as new system needs to be ensured for the “Validation” and “System Availability” period.
h	Time frame for Implementation	The scheme is scheduled to be implemented within 24 months from the date of receipt of sanction of the fund/grant.
i	Estimated Cost of Project/ Scheme/ Activity	3,11,24,97,360 incl. GST
j	Category under which the project is classified (Please refer to para 5.1 of the Guidelines/ Procedure)	As per PSDF Guidelines issued vide MoP Office Memorandum ref. 10/1/2014-OM dated 18 th September 2014 (https://psdfindia.in/fund-disbursement/guidelines-for-disbursement/#) Clause 5.3 – Quote <i>Other Schemes benefitting large no. of utilities collectively and having a significant impact towards the power system development and grid operation shall also be considered for funding from PSDF, on case-to-case basis.</i> Unquote

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Detailed Proposal (DP)

1. Details of the Requesting Organization/ Entity

1.1 Details of Organization/ Entity

A1) Name of Organization / Entity	Department of Power, Arunachal Pradesh
A2) Acronym or Abbreviation (if applicable)	DoP-AP
B1) Name of Organization / Entity	Assam Electricity Grid Corporation Limited
B2) Acronym or Abbreviation (if applicable)	AEGCL
C1) Name of Organization / Entity	Manipur State Power Company Limited
C2) Acronym or Abbreviation (if applicable)	MSPCL
D1) Name of Organization / Entity	Meghalaya Power Transmission Corporation Limited
D2) Acronym or Abbreviation (if applicable)	MePTCL
E1) Name of Organization / Entity	Power & Energy Department of Mizoram
E2) Acronym or Abbreviation (if applicable)	P&ED-Mizoram
F1) Name of Organization / Entity	Department of Power of Nagaland
F2) Acronym or Abbreviation (if applicable)	DoP-Nagaland
G1) Name of Organization / Entity	Tripura State Electricity Corporation Limited
G2) Acronym or Abbreviation (if applicable)	TSECL

1.2 Details of Head of the Organization

- **DoP-AP**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief Engineer (Power), Western Electrical Zone
E-mail address	
Landline Number	
FAX No.	
Address	Department of Power, Govt. of Arunachal Pradesh, Vidyut Bhawan, O-Point Tinali, Itanagar, Arunachal Pradesh
City	Itanagar
Postal Code	791111

- **AEGCL**

Name (Mr./ Ms./ Mrs.)	Dhrubajyoti Hazarika
Designation	Managing Director (I/C)
E-mail address	
Landline Number	0361-2739520

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

FAX No.	
Address	Bijulee Bhawan, 1 st Floor, Paltan Bazar, Guwahati, Assam
City	Guwahati
Postal Code	781001

• **MSPCL**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief Secretary, Government of Manipur
E-mail address	
Landline Number	0385-2450050
FAX No.	
Address	Electricity Complex, Keishampat Junction, Imphal, Manipur
City	Imphal
Postal Code	795001

• **MePTCL**

Name (Mr./ Ms./ Mrs.)	Arunkumar Kembhavi
Designation	Chairman Cum Managing Director
E-mail address	
Landline Number	
FAX No.	
Address	Meghalaya Energy Corporation Limited, Lumjingshai, Short Round Road, Shillong, Meghalaya
City	Shillong
Postal Code	793001

• **P&ED-Mizoram**

Name (Mr./ Ms./ Mrs.)	
Designation	Engineer-In-chief
E-mail address	
Landline Number	
FAX No.	
Address	Power & Electricity Department, Kawlphetha Building, New Secretariat Complex, Khatla, Aizawl, Mizoram
City	Aizawl
Postal Code	796001

• **DoP-Nagaland**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief Engineer (Power)
E-mail address	cepower1helpdesk@gmail.com
Landline Number	0370-2243149
FAX No.	0370-2240178

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Address	Electricity House, A.G. Colony, Kohima, Nagaland
City	Kohima
Postal Code	797001

• **TSECL**

Name (Mr./ Ms./ Mrs.)	
Designation	Managing Director
E-mail address	
Landline Number	0381-2318001, 0381-2319427
FAX No.	
Address	Electricity House, A.G. Colony, Kohima, Nagaland
City	Kohima
Postal Code	797001

1.3 Details of Project In-Charge/ Project Manager (Authorized Person) for this project/ scheme/ activity (Not below the rank of Dy. Gen. Manager/ Superintending Engg.)

• **DoP-AP**

Name (Mr./ Ms./ Mrs.)	
Designation	Executive Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	SLDC Itanagar, DoP, 132kV Chimpu Substation, Itanagar, Arunachal Pradesh
City	Itanagar
Postal Code	791111

• **AEGCL**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief General Manager
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Assam Electricity Grid Corporation Ltd., ASEB Colony, Power House, Kahilipara, Guwahati
City	Guwahati
Postal Code	781019

• **MSPCL**

Name (Mr./ Ms./ Mrs.)	
Designation	General Manager
E-mail address	
Landline Number	

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Yurembam Power House, Imphal West, Manipur
City	Imphal
Postal Code	795004

• **MePTCL**

Name (Mr./ Ms./ Mrs.)	
Designation	Superintending Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Meghalaya Power Transmission Corp. Ltd., Umjarain Mawkyroh, NEHU Campus, Shillong, Meghalaya
City	Shillong
Postal Code	793022

• **P&ED-Mizoram**

Name (Mr./ Ms./ Mrs.)	
Designation	Sr. Executive Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre Division, P&E Office Complex, North Block (III Floor), Electric Veng, Aizawl, Mizoram
City	Aizawl
Postal Code	796001

• **DoP-Nagaland**

Name (Mr./ Ms./ Mrs.)	
Designation	Executive Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Full Nagarjan, Dimapur, Nagaland
City	Dimapur
Postal Code	797112

• **TSECL**

Name (Mr./ Ms./ Mrs.)	
-----------------------	--

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Designation	Dy. General Manager (System Operation)
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, TSECL, 79-Tilla, Agartala, Tripura (West)
City	Agartala
Postal Code	799006

Any change in above mentioned details will be notified to the Nodal Agency of PSDF immediately.

2. Justification of the Proposal

2.1 Analysis of the Objective

With the growth of transmission and generation systems in North-Eastern region, it is imperative to upgrade the existing monitoring and supervision facility at SLDCs which is functioning at state-level to coordinate the real-time operation of respective state-grids.

SLDCs in NER are catering to the need for a state-level Load Despatch Centre, to effectively monitor, supervise and coordinate the interconnected state grids on real-time basis. SLDCs also facilitates optimum use of resources by leveraging the benefits from diversity in load & generation profiles. Hence with the available resources across the power sector, the Peak deficit condition can be partially mitigated.

The existing SLDCs were upgraded in January 2017 and will complete its life-cycle of seven (07) years in January 2024 in compliance to the depreciation of 15% for IT Equipment and Software Systems specified by CERC. The project will replace existing SCADA/EMS system to latest SCADA/EMS control systems for State-Grids of NER to facilitate integrated power system operations at State-level. The project will facilitate effective monitoring and control of the power system network; activities for the same include monitoring power system conditions, scheduling tie-line interchanges, etc.

The overall project includes the planning, design, engineering and implementation of SCADA/EMS at SLDCs located in North Eastern region.

Under this project new SCADA/EMS system shall be established at existing locations of SLDCs in NER i.e. Itanagar, Guwahati, Imphal, Shillong, Aizawl, Dimapur and Agartala. The new system shall replace the existing system without affecting the operation of the existing system. The existing and new system shall be operated in parallel for maximum period of three (03) months before shifting the entire operation to the new system.

A joint upgradation of the SCADA-EMS in SLDCs (along with NERLDC i.e. Regional-level LDC of NER) will help in smooth integration, standardization of systems, reduction in cost due to bulk-order, etc.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

2.2 Identified Beneficiaries of the Project

The states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura in particular and the Nation in general.

With implementation of the scheme, all the stakeholders in the power sector of North Eastern Region will be able to run more efficiently and effectively. So, reliability of the NER grid can be achieved at desired level.

Further, it will also mitigate the risks of using obsolete systems with greater Cyber Security threats to the mission critical systems of Load Despatch Centres.

2.3 Identified Source of Funding

100% of the total project cost is to be funded through grant from PSDF.

2.4 Details of Activities for Project/ Scheme/ Activity

After getting approval of the project towards funding, the following activities will be undertaken to achieve desired results:

- a) Signing of MoU with POSOCO for Consultancy Works at NIL financial implications
- b) Pre-NIT Activities
 - BoQ finalization
 - Preparation of Qualification Requirement
 - NIT Cost-Estimate
 - Technical Specifications preparation
 - Preparation of General Conditions of Contract, Bid Proposal Sheet, Special Conditions of Contract and other Tender Documents
 - Issuance of NIT
 - Preparation of clarifications if any, required by the Bidder
 - Issuance of Clarifications
- c) Post-NIT Activities
 - Bid-Opening
 - Evaluation of Bids
 - Preparation of Recommendation Report
 - Approval of Recommendation Report
 - Post-Bid discussions with bidders
 - Preparation of Letter-of-Award and Contract Agreement
 - Placement of Letter-of-Intent
 - Placement of Letter-of-Award
 - Signing of Contract Agreement
- d) Post-Award activities – SCADA/EMS
 - Survey
 - Approval of Design Documents (FDS)
 - Approval of DRS
 - Submission of Data
 - Approval of Testing (FAT & SAT) Documents
 - Factory Acceptance Tests
 - Issuance of MICC/ CIP
 - Testing with existing ICCP and existing RTUs

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

- Database and Displays Development
- Engineering Inputs for Post-Contract Amendment
- Post-Contract Amendment
- Installation and Commissioning
- Site Acceptance Tests
- Issuance of Taking Over Certificate
- Payments

2.5 Executing Agencies

Projects will be executed in fork of different independent work-orders on state-wise basis and the state-utilities/ SLDCs will be the executing agencies for respective works. POSOCO will facilitate various activities in the project as part of its free-of-cost Consultancy works.

2.6 Timeline for implementation of Project/ Scheme/ Activity

Timeline for implementing this project/ scheme/ activity is given hereunder considering date of receipt of PSDF grant approval as zero-date:

- a) Issuance of Work-Order: 9 months
- b) Procurement of Equipment (Delivery of Material at site after FAT): 9 months
- c) Erection and Commissioning: 6 months

Timeline of the Project/ Scheme/ Activity	
Likely duration of Project (in months)	24 months
Start Date	Date of receipt of approval of PSDF Funding
Likely Completion Date	December 2025

Timeline of Activities

Project Implementation Schedule - 15 Months (Months after Letter of Award - LoA)																
S. No.	Task Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	<i>(Subject Package)</i>	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1	Letter of Award (LoA)															
2	Engineering	█	█	█	█	█	█									
3	Database Development				█	█	█	█	█							
4	Factory Testing of Equipment															
a	Auxiliary Power Supply System							█								
b	SCADA/EMS Control Centre								█	█						
5	Supply, Installation and Commissioning of Equipment															
a	Auxiliary Power Supply System								█							
b	SCADA/EMS Control Centre										█	█				
6	Site Acceptance Testing of Equipment															

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

a	Auxiliary Power Supply System																			
b	SCADA/EMS Control Centre																			
7	Parallel operation of existing & new system, availability test and taking-over																			

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Summary of Detailed Project Report (DPR)

Cost Break-up of various components

Sl. No.	Item Description	Total Price (in INR), incl. GST
	Price Implications for Main and Backup SLDCs as per Budgetary Quotations collected from M/s OSI, M/s GE and M/s Siemens (attached as Annexure)	
1	Software, A	14,37,08,000
2	Hardware (incl. Furniture), B	12,05,76,200
3	Services (incl. Training), C	7,24,52,000
4	Warranty of 1 year, D	71,15,400 *
5	Sub-total for one (01) SLDC incl. Main as well as Backup Setup, E = A + B +C +D	34,38,51,600
6	Total for Seven (07) SLDCs in NER incl. Main as well as Backup Setup, F = E x 7	2,40,69,61,200
7	In-built Comprehensive Maintenance part of Capex for 6 years, G <i>(after expiry of warranty period for 1 SLDC)</i>	10,07,90,880 **
8	In-built Comprehensive Maintenance part of Capex for 6 years, H = G x 7 <i>(after expiry of warranty period for 7 SLDCs)</i>	70,55,36,160 **

Note: * The systems may have one (01) year warranty period.

** The costing for In-built Comprehensive Maintenance portion of Capex for the period of six (06) years will be required in staggered manner by SLDCs over the period of 6 years' time after expiry of defect liability/warranty period.

Targets for financial Milestones

Description	Total Amount (in INR)	1 st Installment (09 th Month after sanction of Grant)	2 nd Installment (14 th Month after sanction of Grant)	3 rd Installment (15 th Month after sanction of Grant)
PSDF Grant	2,40,69,61,200	21,14,27,200	5,28,57,000	7,95,67,400
Internal Resource	NIL	NIL	NIL	NIL
Total	2,40,69,61,200	21,14,27,200 #	5,28,57,000 ##	7,95,67,400 ###

Note: # 80% of "software and Hardware" price may be released after FAT

20% of "Software and Hardware" price may be released after Parallel Operation

Amount to be paid for Warranty services

Description	Total Amount (in INR)	1 st Installment (1 st Month after expiry of Warranty period)	2 nd Installment (13 th Month after expiry of warranty period)	3 rd Installment (25 th Month after expiry of warranty period)	4 th Installment (37 th Month after expiry of Warranty period)	5 th Installment (49 th Month after expiry of warranty period)	6 th Installment (61 st Month after expiry of warranty period)
PSDF Grant	70,55,36,160	11,75,89,360	11,75,89,360	11,75,89,360	11,75,89,360	11,75,89,360	11,75,89,360
Internal Resource	NIL	NIL	NIL	NIL	NIL	NIL	NIL
Total	70,55,36,160	11,75,89,360	11,75,89,360	11,75,89,360	11,75,89,360	11,75,89,360	11,75,89,360

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Financial Implication of the Scheme

1. Summary

S. No.	Item	Amount (in INR) incl. GST
1	Total Cost Estimate	3,11,24,97,360
2	Funding Proposed from PSDF	3,11,24,97,360
3	Contribution from Internal Sources	Nil
4	External Borrowings	Nil

2. Details

2.1 Cost Estimate

The Unit rates for all equipment have been obtained from budgetary offers obtained from reputed vendors; attached as **Annexure-1**.

The detailed cost-estimate for implementing the project/ scheme/ activity has been under approval by higher management of SLDCs. The matter has been in-principle agreed in NETeST forum by all constituents.

The amount will be divided into the 7 state-utilities in NER in equal part i.e. $3,11,24,97,360/7 = 44,46,42,480$ INR (incl. GST) for Main and Backup SLDCs.

3. Funding

3.1 Funding proposed from PSDF

100% of the estimated cost is proposed to be funded from PSDF.

3.2 Contribution from Internal Resources

Nil.

3.3 External Borrowings

No external borrowings will be necessary.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Brief Details of the Project Appraisal by CTU/ STU/ RPC

Item	Details to be filled by Applicant Utility		
Appraisal By	CTU _____	STU ___✓___	RPC _____
Date of Submission to CTU/ STU/ RPC for approval	xx.xx.2021		
Name of the Scheme	Upgradation of Hardware, Software and Associated Systems for SCADA-EMS in Load Despatch Centres of North Eastern Region (NER)		
Copy of the Appraisal Report by CTU/ STU/ RPC (attached at Annexure)	Yes _____	No ___✓___	
Summary of observations from CTU/ STU/ RPC Appraisal Report	Summary of Proposal Appraised	<p>Replacement and Upgradation of SCADA-EMS system's Hardware and Software at SLDCs related proposal has been prepared based on CERC guidelines which mandates the life-cycle of SCADA-EMS at LDCs as seven (07) years from the date-of-commissioning.</p> <p>Its replacement needs to be considered in view of obsolescence of Hardware/Software in near future and increasing cyber security risks. Moreover, many new functionalities in terms of SCADA and EMS applications are available in market which should be made available at SLDCs for reliable grid operation.</p>	
	Technical Observations	<p>The proposed scheme fulfils the technical requirement as per relevant standards and fund to be in order.</p> <p>With implementation of the scheme, overall efficiency, reliability and cyber security of the systems will be improved and any contingency can be tackled.</p>	

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Item	Details to be filled by Applicant Utility	
	Financial Observations	The estimated cost arrived on the basis of earlier Letter-of-Awards appears to be right.
	Compliance of Grid Standards/ Codes by Applicant	Yes
	Limitations/ Shortcomings pointed out by CTU/ STU/ RPC, if any	No limitation envisaged. Only some intermittency may be observed due to configuration/integration of RTUs in new system which can be managed judiciously.
	Recommendations of CTU/ STU/ RPC	Recommended for immediate implementation and posing for 100% PSDF funding.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Undertaking

(On a Non-judicial Stamp paper of Rs.50 only duly notarized and attested)

I, Dr./ Mr./ Ms. son/daughter/wife of
resident of
(full address) and presently working as in
the
hereby undertake to comply with the following terms and conditions with regard to
funding of the (name of scheme) with
disbursement from PSDF:

- **No tariff shall be claimed for the portion of the scheme funded from PSDF.**
- **Amount of grant shall be refunded in case of transfer/disposal of the facility being created under this proposal to any other scheme for funding.**
- **Shall specifically mention if for the scheme under the proposal, the grant from any other agency is being taken / proposed to be taken.**
- **The grant shall be refunded back to PSDF in case of non-utilisation of the grant within one (01) year of release of installment.**

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Budgetary Quotation from OSI-For Replacement/Upgradation of SCADA-EMS Systems at SLDCs of NER

Vishwakarma, Pawan <Pawan.Vishwakarma@osii.com>

Wed 5/5/2021 3:17 PM

To: Akhil Singhal (अखिल सिंघल) <akhilsinghal@posoco.in>;

Cc: Gupta, Aman <Aman.Gupta@osii.com>; Narayana, Pradeep <Pradeep.Narayana@osii.com>;

Importance: High

 1 attachments (544 KB)

Budgetary Quote_NERLDC_OSI_05052021.pdf;

Dear Sir,

Hope you are safe and doing well in this critical pandemic situation.

As discussed please find budgetary quotation for establishment/replacement/upgradation of SCADA-EMS Systems in SLDCs of North Eastern region.

In case of any clarification please do call us.

Thanks & Regards,
Pawan Vishwakarma
OSI-International.
+91-8800994846

From: Akhil Singhal (अखिल सिंघल) <akhilsinghal@posoco.in>

Sent: 27 April 2021 03:56 PM

To: MV, Rudresha <Rudresha.MV@osii.com>

Cc: Narayana, Pradeep <Pradeep.Narayana@osii.com>

Subject: Budgetary Quotation for Replacement/Upgradation of SCADA-EMS Systems at SLDCs of NER - reg.

Sir,

As per telephonic discussion, please submit a **budgetary quotation for establishment/replacement/upgradation of SCADA-EMS Systems in SLDCs of North Eastern region.**



The Bill-of-Quantity (BoQ) is attached.

Thanking you.

Regards,
Akhil Singhal
Ch. Manager, NERLDC

* This e-mail is an official email of Power System Operation Corporation Ltd (POSOCO), is confidential and intended to use by the addressee only. If the message is received by anyone other than the addressee, please return the message to the sender by replying to it and then delete the message from your computer. Internet e-mails are not necessarily secure. The Power System Operation Corporation Ltd.(POSOCO) does not accept responsibility for changes made to this message after it was sent. Whilst all reasonable

care has been taken to avoid the transmission of viruses, it is the responsibility of the recipient to ensure that the onward transmission, opening or use of this message and any attachments will not adversely affect its systems or data. No responsibility is accepted by the POSOCO in this regard and the recipient should carry out such virus and other checks as it considers appropriate. Visit our website at www.posoco.in *

 OSI Logo	 Emerson Logo
Pawan Vishwakarma General Manager Business Development	We are proud to now be a part of Emerson.
OSI Digital Grid Solutions Unit No. 29, Lower Ground Floor International Tech Park Bangalore (ITPB) Whitefield, Bangalore 560066 Phone: 080 41265051 Email: Pawan.Vishwakarma@osii.com Website: www.osii.com	



Ref No: **NERLDC/OSI/Budgetary_Proposal/2021/0505/001**

Date: **May 05, 2021**

To,
Ch. Manager, NERLDC
North Eastern Load Despatch Centre (NERLDC)
Power System Operation Corporation Limited (POSOCO)
POWERGRID Complex, Lower Nongrah, Lapalang,
P.O: Rynjah, Shillong-793006 (Meghalaya), India
Email: akhilsinghal@posoco.in

Sub: Budgetary Quotation for Establishment / Replacement / Upgradation of SCADA-EMS Systems at SLDCs of NER - reg.

Dear Sir,

OSI is pleased to respond to the North Eastern Load Despatch Centre (NERLDC)'s mail reference dated 27 April 2021 for Budgetary Quotation for Establishment / Replacement / Upgradation of SCADA-EMS Systems at SLDCs of NER - reg.

OSI provides utility automation solutions based on industry standards with unmatched product openness, outstanding price performance and unsurpassed functionality and customer satisfaction. We propose our **monarch™** real-time architecture as the platform for meeting your current and future needs. This system is in use at over 500+ worldwide installations. Budgetary Quote for Establishment / Replacement / Upgradation of SCADA-EMS Systems at SLDCs of NER - reg is estimated based on our understanding of the requirement of North Eastern Load Despatch Centre (NERLDC).

The attached documentation provides a complete response and a thorough description for Work of items for North Eastern Load Despatch Centre (NERLDC)

1. Cover Letter
2. Budgetary Quote
3. Terms and Conditions

We thank you for your interest in OSI and we look forward to working with you and your team. If you have any questions, feel free to contact Mr. Pawan Vishwakarma via email: pawan.vishwakarma@osii.com, cell: +91 88009 94846.

Sincerely,
For OSI Energy Automation India Pvt Ltd.

Pawan Vishwakarma
General Manager

Budgetary Quotation for Establishment / Replacement / Upgradation of SCADA-EMS Systems in SLDCs of North Eastern region.									
BoQ of new SCADA-EMS (ULDC Phase-III) at SLDCs of North Eastern Region (NER)									
Bill of Quantity for SCADA/EMS System of SLDC									
Sl. No.	Item Description	Unit	Quantity			Unit Price (Rs.)	Total Price (Rs)	GST (%)	Total Price with GST (Rs.)
			Main CC	Backup CC	Total				
A	Software								
1.1	SCADA	Lot	1	1	2	60,000,000	60,000,000	18%	70,800,000
1.2	ICCP Communication	Lot	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
1.3	CFE Communication	Lot	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
1.4	Historian (Information Storage & retrieval) System								
(a)	Data Storage-Software	Lot	1	1	2	Not Quoted	Not Quoted	18%	Not Quoted
(b)	Data Historian Software	Lot	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
(c)	Software for SAN & NAS	Lot	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
1.5	EMS Functions					20,000,000	20,000,000		25,000,000
(a)	State Estimator	Lot	1	1	2	included in 1.5	included in 1.5	18%	included in 1.5
(b)	Contingency Analysis	Lot	1	1	2	included in 1.5	included in 1.5	18%	included in 1.5
(c)	Security Enhancement	Lot	1	1	2	included in 1.5	included in 1.5	18%	included in 1.5
(d)	Optimal Power Flow	Lot	1	1	2	included in 1.5	included in 1.5	18%	included in 1.5
(e)	Outage Scheduler	Lot	1	1	2	included in 1.5	included in 1.5	18%	included in 1.5
(f)	Transmission Line/Corridor Capability Monitor (TCM)	Lot	1	1	2	included in 1.5	included in 1.5	18%	included in 1.5
1.6	Dispatcher Training Simulator	Lot	1	0	1	8,000,000	8,000,000	18%	9,440,000
1.7	Database development system (PDS) cum test bench for SCADA and ICCP Integration	Lot	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
1.8	Network Management System	Lot	1	1	2	1,750,000	3,500,000	18%	4,130,000
1.9	SIEM (Security Information and Event management)	Lot	1	1	2	2,200,000	4,400,000	18%	5,192,000
1.10	Web Server Application								
(a)	Host based IDS for all machines	Lot	1	1	2	1,300,000	2,600,000	18%	3,068,000
(b)	Software for Data Replica server	Lot	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
(c)	E Mail and SMS Application	Lot	1	1	2	750,000	1,500,000	18%	1,770,000
(c)	Mobile Application App	Lot	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
(d)	Software for Web Server	Lot	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
(e)	Antivirus Server Software	Lot	1	1	2	1,500,000	3,000,000	18%	3,540,000
1.11	Application Whitelisting Tool	Lot	1	1	2	1,250,000	2,500,000	18%	2,950,000
1.12	Document Management System	Lot	1	0	1	2,000,000	2,000,000	18%	2,360,000
1.13	Identity Management Software	Lot	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
1.14	Report Development & Generation Software	Lot	1	1	2	2,000,000	4,000,000	18%	4,720,000
1.15	Server Backup Software	Lot	1	1	2	2,100,000	4,200,000	18%	4,956,000
1.16	Patch Management Software	Lot	1	1	2	1,250,000	2,500,000	18%	2,950,000
1.17	OPC (Open Platform Communication) client function in SCADA Server	No.	1	1	2	included in 1.1	included in 1.1	18%	included in 1.1
1.18	VAPT (Vulnerability Assessment and Penetration Testing) Tool	Lot	1	1	2	1,200,000	2,400,000	18%	2,832,000
B	Computer System Hardware								
2.1	SCADA/EMS Server	No.	2	2	4	1,500,000	6,000,000	18%	7,080,000
2.2	ICCP server	No.	2	2	4	750,000	3,000,000	18%	3,540,000
2.3	CFE Server	No.	2	2	4	800,000	3,200,000	18%	3,776,000
2.4	Data Storage Server	No.	2	2	4	850,000	2,600,000	18%	3,068,000
2.5	Data Historian Server								
2.6	Storage System								
(a)	SAN Bex Cluster Server for archival of Historian Data	No.	3	3	6	850,000	5,100,000	18%	6,018,000
(b)	SAN Management Server	No.	2	2	4	Not Quoted	Not Quoted	18%	Not Quoted
(c)	NAS Box	No.	1	1	2	1,200,000	2,400,000	18%	2,832,000
(d)	Tape Libraries	No.	1	1	2	900,000	1,800,000	18%	2,124,000
2.7	Workstation Console integrated with three nos. of 24" LED Monitors	No.	6	4	10	22,000	220,000	18%	259,600
2.8	DTS Server	No.	1	0	1	750,000	750,000	18%	885,000
2.9	DTS Workstation (Training Console)	No.	4	0	4	275,000	1,100,000	18%	1,298,000
2.10	NMS server	No.	2	2	4	750,000	3,000,000	18%	3,540,000
2.11	LAN Switch								
(a)	24 Port L3- LAN switch for SCADA/EMS LAN	No.	2	2	4	350,000	1,400,000	18%	1,652,000
(b)	24 Port L3- LAN switch for Historian & NMS LAN	No.	2	2	4	350,000	1,400,000	18%	1,652,000
(c)	24-port FC switch for SAN Switch	No.	2	2	4	Not Quoted	Not Quoted	18%	Not Quoted
(d)	24 Port L3- LAN switch for External DMZ LAN	No.	2	2	4	350,000	1,400,000	18%	1,652,000
(e)	48 Port L3- LAN Switch for Server Management LAN	No.	2	1	3	600,000	1,800,000	18%	2,124,000
(f)	24 Port L3- LAN Switch for ICCP LAN	No.	2	2	4	350,000	1,400,000	18%	1,652,000
(g)	24 Port L3- LAN Switch for Internal DMZ LAN	No.	2	2	4	350,000	1,400,000	18%	1,652,000
2.12	Laptop for maintenance	No.	2	2	4	275,000	1,100,000	18%	1,298,000
2.13	WAN Routers with Firewall								
(a)	WAN Router cum Firewall for ICCP Communication	No.	2	2	4	650,000	2,600,000	18%	3,068,000
(b)	WAN Router cum Firewall for External World Connectivity	No.	2	2	4	650,000	2,600,000	18%	3,068,000
(c)	WAN Router for RTU Communication	No.	2	2	4	650,000	2,600,000	18%	3,068,000
2.14	Printers							18%	-
(a)	Color Laser Printer	No.	2	2	4	450,000	1,800,000	18%	2,124,000
(b)	Multi Functional Printer	No.	2	2	4	450,000	1,800,000	18%	2,124,000
2.15	Time & Frequency System and External displays							18%	-
(a)	Time & Frequency System NavIC (with fallback to GPS) Based	Lot	1	1	2	280,000	560,000	18%	660,800
(b)	Digital Display for Date	No.	1	1	2	22,500	45,000	18%	53,100
(c)	Digital Display for Day	No.	1	1	2	22,500	45,000	18%	53,100
(d)	Digital Display for Time	No.	1	1	2	22,500	45,000	18%	53,100
(e)	Digital Display for Frequency	No.	2	2	4	22,500	90,000	18%	106,200
(f)	Surge Arrester for T & F Device	No.	1	1	2	12,500	25,000	18%	29,500
2.16	Web System							18%	-
(a)	Web Servers	No.	2	2	4	750,000	3,000,000	18%	3,540,000
(b)	External Firewall	No.	2	2	4	2,200,000	8,800,000	18%	10,384,000
(c)	Internal Firewall with NIPS	No.	2	2	4	2,100,000	8,400,000	18%	9,912,000
(d)	Firewall for RTU Communication	No.	2	2	4	2,100,000	8,400,000	18%	9,912,000
(e)	Data Replica Server	No.	2	2	4	750,000	3,000,000	18%	3,540,000

Budgetary Quotation for Establishment / Replacement / Upgradation of SCADA-EMS Systems in SLDCs of North Eastern region.									
BoQ of new SCADA-EMS (ULDC Phase-III) at SLDCs of North Eastern Region (NER)									
Bill of Quantity for SCADA/EMS System of SLDC									
Sl. No.	Item Description	Unit	Quantity			Unit Price (Rs.)	Total Price (Rs)	GST (%)	Total Price with GST (Rs.)
			Main CC	Backup CC	Total				
2.17	PDS for SCADA & ICCP integration testing System and development system as test bench for cyber security consisting of							18%	-
(a)	PDS Server	Lot	1	1	2	750,000	1,500,000	18%	1,770,000
(b)	Workstation	No.	1	1	2	275,000	550,000	18%	649,000
(c)	WAN Router cum firewall	No.	2	2	4	650,000	2,600,000	18%	3,068,000
(d)	Web Servers	No.	1	0	1	750,000	750,000	18%	885,000
(e)	Antivirus/Patch management Server	No.	1	0	1	650,000	650,000	18%	767,000
2.18 (a)	Video Projection System (LED based screen 4x2 with Aspect Ratio 16:09) for control room with rear projection display wall with DLP display technology with redundant LED blocks, liquid cooled, 100% sealed optical projection engine & uniform colours. Each VPS module size of T0" Diagonal, full HD Projection resolution, inter modular gap < 1.0 mm, no screen border, horizontal & vertical viewing angle +/- 160 degree, horizontal & vertical half gain angle +/- 30 degree with tolerance of +/- 5 degree, overall brightness of each module will be 750 ANSI Lumens, Centre to corner uniform brightness will be > 90 %, Contrast ratio will be 1600:1, operating temperature will be 10 degree C to 30 degree C & operating relative humidity will be 20-80%	No.	1	0	1	7,000,000	7,000,000	28%	8,960,000
(b)	Video Projection System (LED based screen 4x2 with Aspect Ratio 16:09) for control room with rear projection display wall with DLP display technology with redundant LED blocks, liquid cooled, 100% sealed optical projection engine & uniform colours. Each VPS module size of T0" Diagonal, full HD Projection resolution, inter modular gap < 1.0 mm, no screen border, horizontal & vertical viewing angle +/- 160 degree, horizontal & vertical half gain angle +/- 30 degree with tolerance of +/- 5 degree, overall brightness of each module will be 750 ANSI Lumens, Centre to corner uniform brightness will be > 90 %, Contrast ratio will be 1600:1, operating temperature will be 10 degree C to 30 degree C & operating relative humidity will be 20-80%	No.	0	0	0		-		-
2.19	Laptop for DTS	No.	1	1	2	275,000	550,000	18%	649,000
2.20	Remote Consoles (24" Screen)							18%	-
(a)	Monitor with CPU	No.	3	0	3	250,000	750,000	18%	885,000
(b)	Router	No.	3	0	3	450,000	1,350,000	18%	1,593,000
2.21	Identity Server	No.	2	1	3	750,000	2,250,000	18%	2,655,000
2.22	Server Mangement Console	No.	1	1	2	750,000	1,500,000	18%	1,770,000
2.23	Server Rack(Smart Rack PDU) with IP based KVM Switch	No.	4	4	8	450,000	3,600,000	18%	4,248,000
2.24	Weather Sensors for Server Room	Lot	1	1	2	125,000	250,000	18%	295,000
C	Services (Integration and supply) - Implementation	Nos.			1	35,000,000	35,000,000	18%	41,300,000
3.1	Integration with Control Centres on ICCP	Nos.	5	5	10	450,000	4,500,000	18%	5,310,000
3.2	Integration with other applications						-		
(a)	Market and Metering Applications	Lot	1	1	2	1,200,000	2,400,000	18%	2,832,000
(b)	Scheduling software	Lot	1	1	2	1,800,000	3,600,000	18%	4,248,000
3.3	Integration with WAMS and Power Exchange	Lot	1	1	2	1,800,000	3,600,000	18%	4,248,000
3.4	Existing RTU Integration	No.		60	60	75,000	4,500,000	18%	5,310,000
3.5	Cyber Security Audit by CERT -IN certified Auditors during FAT	Nos.	1	1	2	1,200,000	2,400,000	18%	2,832,000
3.6	Cyber Security Audit by CERT -IN certified Auditors during SAT	Nos.	1	1	2	1,200,000	2,400,000	18%	2,832,000
D	Training	Lot		1	1	3,000,000	3,000,000	18%	3,540,000
E	Comprehensive Annual Maintenance Contract								
5.1	Comprehensive Annual maintenance contract of SCADA/EMS System including all the equipment supplied in the project during 1 year Warranty	Lot		1	1	6,030,000	6,030,000	18%	7,115,400
5.2	Comprehensive Annual maintenance contract of SCADA/EMS System including all the equipment supplied in the project for 6 year after expiry of	Lot		1	1	43,416,000	43,416,000	18%	51,230,880
5.3	ICCP Integration for total AMC period	Nos.	10	10	20	450,000	9,000,000	18%	10,620,000
5.4	Half-Yearly Cyber Security Audit by Cert-IN certified Auditors	Nos.	14	14	28	550,000	15,400,000	18%	18,172,000
5.5	Patch Mangment including Signature updates for all Cyber Security equipment for seven (07) years	Lot	1	1	2	3,150,000	6,300,000	18%	7,434,000
5.6	Future RTU Integration	No.		60	60	75,000	4,500,000	18%	5,310,000
5.7	OPC client function (per user) in SCADA Server	No.	5	5	10	500,000	5,000,000	18%	5,900,000
5.8	Yearly Training on SCADA/EMS for 5 Days for 20 people	Lot		1	1	1,800,000	1,800,000	18%	2,124,000
							TOTAL :		450,058,680
In Words		Rupees Forty Five Crore Fifty Eight Thousand Six Hundred Eighty Only							

TERMS & CONDITIONS

Terms and Conditions	
1.	Budgetary Quote is subject to OSI's standard terms and conditions.
2.	Budgetary Quote is Ex-Works, Bangalore and includes Taxes and Duties. Present rate of GST is mentioned in Budgetary Quote.
3.	Completion schedule shall be approximately 18 months from the date of detailed Purchase order.
4.	<p>NERLDC will release payment to OSI no later than 30 days of the milestones per the below payment schedule.</p> <p>Proposed payment terms are as follows: 20% Advance Payment. 60% against completion of FAT 15% against completion of SAT 05% against taking over of the system</p>
5.	All payment transactions will be through Net Banking or Letter of Credit. OSI will share LC format during final discussions.
6.	The Budgetary Quote is valid for 1 month from the date of submission.
7.	Budgetary Quote does not include insurance, freight, and forwarding and will be charged extra at actuals.
8.	All Graphical User Interface displays are in English.
9.	All documentation is in English.
10.	Only program object code is provided. No source code is provided.
11.	NERLDC must execute the OSI software license agreement after acceptance of bid
12.	<p>Drawings and any other documents submitted by OSI to the Customer for approval shall be approved by the latter within the time period agreed upon in the Contract. Unless otherwise provided for in the Contract, the Customer shall approve the OSI documents within a fourteen (14) day time period from their submission date by OSI. Should the Customer fail to expressly approve, reject or make substantiated reservations to the said documents before the end of the agreed time period, the approval shall be considered as granted.</p> <p>In the event drawings and/or documents submitted by OSI do not comply with the technical specifications agreed upon in writing between the Parties, the Customer may require OSI to proceed with the necessary corrections within a period of time to be agreed upon between the Parties. Modified documents shall be resubmitted for approval under the same conditions.</p>
13.	<p>Limitation of Liability:</p> <p>OSI's liability shall be strictly limited to the obligations specified in the subcontract between OSI and bidder. The Supplier shall under no circumstances be liable to the Customer, whether based on Contract, statute, guarantee, tort (including negligence), legal theory or strict liability, indemnity, professional liability or otherwise, for any special, incidental, indirect or consequential damages or losses of any nature, including but not limited to loss of use, loss of production, loss of profits, loss of contracts or opportunities, loss resulting from cut or lack of energy supply, any financial or economical loss whether suffered by the Customer or by any third party. Under no circumstances may OSI be liable to the Customer for any punitive damages, nor may any arbitrator(s) or court of law award punitive damages against the Supplier. The total aggregate and cumulative liability of the Supplier to the Customer including its affiliates, parent company and shareholders, shall in no event exceed the Contract price.</p>
14.	<p>Consequential Damages:</p> <p>OSI shall not be made responsible / liable for any damages, whether direct or indirect, special, incidental or consequential and or losses, such as loss of profit, loss of production, loss of capacity usage etc. or any other kind not defined herein before including any expenses incurred or to be incurred, arising out any defect in or failure of the equipment of services thus supplied/provided.</p>

RE: Budgetary Quotation for Replacement/Upgradation of SCADA-EMS Systems at SLDCs of NER - reg.

Jha, Devesh (GE Digital) <devesh.jha@ge.com>

Thu 5/13/2021 10:03 AM

To: Akhil Singhal (अखिल सिंघल) <akhilsinghal@posoco.in>;

Cc: Pant, Mitesh (GE Digital) <mitesh.pant@ge.com>; Varshney, Abhishek (GE Digital) <abhishek.varshney@ge.com>; KUMAR, MANISH4 (GE Digital) <MANISH.KUMAR123@ge.com>;

📎 2 attachments (2 MB)

Budgetary Quote for Upgrade of ULDC NER_Phase III.pdf; BoQ_Quotation_NER_SLDCs_Apr'21_Rev2_GE.xlsx;

Dear Sir,

Please find attached budgetary offer for ULDC Phase III Upgrade at NER. Feel Free to contact for any further query.

Regards
Devesh

From: Akhil Singhal (अखिल सिंघल) <akhilsinghal@posoco.in>

Sent: Monday, May 10, 2021 5:47 PM

To: KUMAR, MANISH4 (GE Digital) <MANISH.KUMAR123@ge.com>

Cc: Pant, Mitesh (GE Digital) <mitesh.pant@ge.com>; Jha, Devesh (GE Digital) <devesh.jha@ge.com>; Varshney, Abhishek (GE Digital) <abhishek.varshney@ge.com>

Subject: EXT: RE: Budgetary Quotation for Replacement/Upgradation of SCADA-EMS Systems at SLDCs of NER - reg.

Sir,

Please refer to the trailing mail.

Please submit a **budgetary quotation for establishment/replacement/upgradation of SCADA-EMS Systems in SLDCs of North Eastern region** at the earliest so that things can be processed further by taking necessary administrative approvals and moving towards tendering works.

The Technical Specifications are attached as *Google-Drive* link mentioned below.

PDF Format: https://drive.google.com/file/d/1fZpXr5hhDzUEZADDQtxdMSAWMQ-3XS_a/view?usp=sharing

The Bill-of-Quantity (BoQ) is attached.

Thanking you.

Regards,
Akhil Singhal
Ch. Manager, NERLDC

From: [Akhil Singhal \(अखिल सिंघल\)](#)

Sent: 27 April 2021 15:51

To: [Jha, Devesh \(GE Renewable Energy\)](#); [Varshney, Abhishek \(GE Digital\)](#)

Cc: manish.kumar123@ge.com; mitesh.pant@ge.com; [Bisht, Neeraj \(GE Digital\)](#)

Subject: Budgetary Quotation for Replacement/Upgradation of SCADA-EMS Systems at SLDCs of NER - reg.

Sir,

As per telephonic discussion, please submit a **budgetary quotation for establishment/replacement/upgradation of SCADA-EMS Systems in SLDCs of North Eastern region.**

The Bill-of-Quantity (BoQ) is attached.

Thanking you.

Regards,
Akhil Singhal
Ch. Manager, NERLDC

Sir,

As per telephonic discussion, please submit a **budgetary quotation for establishment/replacement/upgradation of SCADA-EMS Systems in SLDCs of North Eastern region.**

The Bill-of-Quantity (BoQ) is attached.

Thanking you.

Regards,
Akhil Singhal
Ch. Manager, NERLDC

* This e-mail is an official email of Power System Operation Corporation Ltd (POSOCO), is confidential and intended to use by the addressee only. If the message is received by anyone other than the addressee, please return the message to the sender by replying to it and then delete the message from your computer. Internet e-mails are not necessarily secure. The Power System Operation Corporation Ltd.(POSOCO) does not accept responsibility for changes made to this message after it was sent. Whilst all reasonable care has been taken to avoid the transmission of viruses, it is the responsibility of the recipient to ensure that the onward transmission, opening or use of this message and any attachments will not adversely affect its systems or data. No responsibility is accepted by the POSOCO in this regard and the recipient should carry out such virus and other checks as it considers appropriate. Visit our website at www.posoco.in *



GE T&D India Limited

L31102DL1957PLC193993

A 225, Sector 83
Noida, Uttar Pradesh
India 201305

T +91 120 6366 700
F +91 120 6366 711

GE Ref No.: GE/NER/OP21POWIN0000424922
Date: 12th May 2021

To,
North Eastern Regional Load Despatch Centre (NERLDC),
Power System Operation Corporation Limited (POSOCO)
POWERGRID Complex, Dongteih, Lower Nongrah, Lapalang,
Shillong - 793006, Meghalaya, India

Kind Attention: Akhil Singhal

Subject: Budgetary Proposal for replacement of the main & back up SLDC systems at NER

Reference: Mail dated 27th April 2021

Dear Sir,

We acknowledge with thanks, the receipt of your enquiry for subject Package and are pleased to submit you our Budgetary Proposal as follows:

1. SCOPE OF WORK:

Scope of Work is purely based on bill of material and hardware sizing provided by you.

2. BUDGETARY PRICES:

Replacement of the main & back up SLDC systems NER (Including Taxes and Duties)	₹ 673,179,340
---	---------------

3. COMMERCIAL TERMS & CONDITIONS:

- Price Basis: Proposal pricing is budgetary, for your planning purposes. This is not an offer to contract. We look forward to giving you a firm proposal including detailed technical and commercial assumptions as these become more firmly defined.
- Taxes and Duties: Included
- Validity: Not Applicable. Prices given under this proposal are only for Budget Estimation purpose and not valid for the execution of the contract.

Proposal is solely based on details provided herein. We hope you shall find the above in order. For any further clarification please feel free to contact us.

Thanking you & assuring you of our best attention always.



**For and on behalf of
GE T&D India Limited**



Devesh Jha
Manager Sales (GE Digital)

BoQ of new SCADA-EMS (ULDC Phase-III) at SLDCs of North Eastern Region (NER)

Bill of Quantity for SCADA/EMS System of SLDC

Sl. No.	Item Description	Unit	Quantity			Unit Price (Rs.)	Total Price (Rs)	GST (%)	Total Price with GST (Rs.)
			Main CC	Backup CC	Total				
A	Software								
1.1	SCADA	Lot	1	1	2	5,300,000	10,600,000	18%	12,508,000
1.2	ICCP Communication	Lot	1	1	2	2,700,000	5,400,000	18%	6,372,000
1.3	CFE Communication	Lot	1	1	2	3,000,000	6,000,000	18%	7,080,000
1.4	Historian (Information Storage & retrieval) System								
(a)	Data Storage Software	Lot	1	1	2	4,500,000	9,000,000	18%	10,620,000
(b)	Data Historian Software	Lot	1	1	2	17,500,000	35,000,000	18%	41,300,000
(c)	Software for SAN & NAS	Lot	1	1	2	1,200,000	2,400,000	18%	2,832,000
1.5	EMS Functions						-		
(a)	State Estimator	Lot	1	1	2	2,900,000	5,800,000	18%	6,844,000
(b)	Contingency Analysis	Lot	1	1	2	Incl above	Incl above	18%	Incl above
(c)	Security Enhancement	Lot	1	1	2	2,200,000	4,400,000	18%	5,192,000
(d)	Optimal Power Flow	Lot	1	1	2	Incl above	Incl above	18%	Incl above
(e)	Outage Scheduler	Lot	1	1	2	4,900,000	9,800,000	18%	11,564,000
(f)	Transmission Line/Corridor Capability Monitor (TCM)	Lot	1	1	2	1,400,000	2,800,000	18%	3,304,000
1.6	Dispatcher Training Simulator	Lot	1	0	1	3,000,000	3,000,000	18%	3,540,000
1.7	Database development system (PDS) cum test bench for SCADA and ICCP Integration	Lot	1	1	2	Incl above	Incl above	18%	Incl above
1.8	Network Management System	Lot	1	1	2	1,200,000	2,400,000	18%	2,832,000
1.9	SIEM (Security Information and Event management)	Lot	1	1	2	3,000,000	6,000,000	18%	7,080,000
1.10	Web Server Application								
(a)	Host based IDS for all machines	Lot	1	1	2	1,800,000	3,600,000	18%	4,248,000
(b)	Software for Data Replica server	Lot	1	1	2	2,000,000	4,000,000	18%	4,720,000
(c)	E Mail and SMS Application	Lot	1	1	2	1,600,000	3,200,000	18%	3,776,000
(c)	Mobile Application App	Lot	1	1	2	2,220,000	4,440,000	18%	5,239,200
(d)	Software for Web Server	Lot	1	1	2	2,600,000	5,200,000	18%	6,136,000
(e)	Antivirus Server Software	Lot	1	1	2	400,000	800,000	18%	944,000
1.11	Application Whitelisting Tool	Lot	1	1	2	2,000,000	4,000,000	18%	4,720,000
1.12	Document Management System	Lot	1	0	1	1,400,000	1,400,000	18%	1,652,000
1.13	Identity Management Software	Lot	1	1	2	1,100,000	2,200,000	18%	2,596,000
1.14	Report Development & Generation Software	Lot	1	1	2	300,000	600,000	18%	708,000
1.15	Server Backup Software	Lot	1	1	2	1,800,000	3,600,000	18%	4,248,000
1.16	Patch Management Software	Lot	1	1	2	1,200,000	2,400,000	18%	2,832,000
1.17	OPC (Open Platform Communication) client function in SCADA Server	No.	1	1	2	450,000	900,000	18%	1,062,000
1.18	VAPT (Vulnerability Assessment and Penetration Testing) Tool	Lot	1	1	2	10,000,000	20,000,000	18%	23,600,000
B	Computer System Hardware								
2.1	SCADA/EMS Server	No.	2	2	4	700,000	2,800,000	18%	3,304,000
2.2	ICCP server	No.	2	2	4	700,000	2,800,000	18%	3,304,000
2.3	CFE Server	No.	2	2	4	700,000	2,800,000	18%	3,304,000
2.4	Data Storage Server	No.	2	2	4	1,000,000	4,000,000	18%	4,720,000
2.5	Data Historian Server						-		
2.6	Storage System								
(a)	SAN Box	No.	2	2	4	4,530,000	18,120,000	18%	21,381,600

BoQ of new SCADA-EMS (ULDC Phase-III) at SLDCs of North Eastern Region (NER)

Bill of Quantity for SCADA/EMS System of SLDC

Sl. No.	Item Description	Unit	Quantity			Unit Price (Rs.)	Total Price (Rs)	GST (%)	Total Price with GST (Rs.)
			Main CC	Backup CC	Total				
(b)	SAN Management Server	No.	2	2	4	900,000	3,600,000	18%	4,248,000
(c)	NAS Box	No.	1	1	2	2,500,000	5,000,000	18%	5,900,000
(d)	Tape Libraries	No.	1	1	2	1,400,000	2,800,000	18%	3,304,000
2.7	Workstation Console integrated with three nos. of 24" LED Monitors	No.	6	4	10	350,000	3,500,000	18%	4,130,000
2.8	DTS Server	No.	1	0	1	700,000	700,000	18%	826,000
2.9	DTS Workstation (Training Console)	No.	4	0	4	325,000	1,300,000	18%	1,534,000
2.10	NMS server	No.	2	2	4	700,000	2,800,000	18%	3,304,000
2.11	LAN Switch							18%	
(a)	24 Port L3- LAN switch for SCADA/EMS LAN	No.	2	2	4	150,000	600,000	18%	708,000
(b)	24 Port L3- LAN switch for Historian & NMS LAN	No.	2	2	4	150,000	600,000	18%	708,000
(c)	24 port FC switch for SAN Switch	No.	2	2	4	150,000	600,000	18%	708,000
(d)	24 Port L3- LAN switch for External DMZ LAN	No.	2	2	4	150,000	600,000	18%	708,000
(e)	48 Port L3- LAN Switch for Server Management LAN	No.	2	1	3	250,000	750,000	18%	885,000
(f)	24 Port L3- LAN Switch for ICCP LAN	No.	2	2	4	150,000	600,000	18%	708,000
(g)	24 Port L3- LAN Switch for Internal DMZ LAN	No.	2	2	4	150,000	600,000	18%	708,000
2.12	Laptop for maintenance	No.	2	2	4	150,000	600,000	18%	708,000
2.13	WAN Routers with Firewall						-	18%	-
(a)	WAN Router cum Firewall for ICCP Communication	No.	2	2	4	1,200,000	4,800,000	18%	5,664,000
(b)	WAN Router cum Firewall for External World Connectivity	No.	2	2	4	1,600,000	6,400,000	18%	7,552,000
(c)	WAN Router for RTU Communication	No.	2	2	4	1,200,000	4,800,000	18%	5,664,000
2.14	Printers						-	18%	-
(a)	Color Laser Printer	No.	2	2	4	450,000	1,800,000	18%	2,124,000
(b)	Multi Functional Printer	No.	2	2	4	550,000	2,200,000	18%	2,596,000
2.15	Time & Frequency System and External displays						-	18%	-
(a)	Time & Frequency System NavIC (with failback to GPS) Based	Lot	1	1	2	650,000	1,300,000	18%	1,534,000
(b)	Digital Display for Date	No.	1	1	2	Incl above	Incl above	18%	Incl above
(c)	Digital Display for Day	No.	1	1	2	Incl above	Incl above	18%	Incl above
(d)	Digital Display for Time	No.	1	1	2	Incl above	Incl above	18%	Incl above
(e)	Digital Display for Frequency	No.	2	2	4	Incl above	Incl above	18%	Incl above
(f)	Surge Arrester for T & F Device	No.	1	1	2	Incl above	Incl above	18%	Incl above
2.16	Web System						-	18%	-
(a)	Web Servers	No.	2	2	4	-	-	18%	-
(b)	External Firewall	No.	2	2	4	1,500,000	6,000,000	18%	7,080,000
(c)	Internal Firewall with NIPS	No.	2	2	4	1,500,000	6,000,000	18%	7,080,000
(d)	Firewall for RTU Communication	No.	2	2	4	1,500,000	6,000,000	18%	7,080,000
(e)	Data Replica Server	No.	2	2	4	700,000	2,800,000	18%	3,304,000
2.17	PDS for SCADA & ICCP integration testing System and development system as test bench for cyber security consisting of						-	18%	-
(a)	PDS Server	Lot	1	1	2	700,000	1,400,000	18%	1,652,000
(b)	Workstation	No.	1	1	2	325,000	650,000	18%	767,000
(c)	WAN Router cum firewall	No.	2	2	4	650,000	2,600,000	18%	3,068,000
(d)	Web Servers	No.	1	0	1	-	-	18%	-
(e)	Antivirus/Patch management Server	No.	1	0	1	700,000	700,000	18%	826,000

BoQ of new SCADA-EMS (ULDC Phase-III) at SLDCs of North Eastern Region (NER)

Bill of Quantity for SCADA/EMS System of SLDC

Sl. No.	Item Description	Unit	Quantity			Unit Price (Rs.)	Total Price (Rs)	GST (%)	Total Price with GST (Rs.)
			Main CC	Backup CC	Total				
5.1	Comprehensive Annual maintenance contract of SCADA/EMS System including all the equipment supplied in the project during 1 year Warranty Period	Lot		1	1	21,581,000	21,581,000	18%	25,465,580
5.2	Comprehensive Annual maintenance contract of SCADA/EMS System including all the equipment supplied in the project for 6 year after expiry of Warranty Period	Lot		1	1	129,486,000	129,486,000	18%	152,793,480
5.3	ICCP Integration for total AMC period	Nos.	10	10	20	1,000,000	20,000,000	18%	23,600,000
5.4	Half-Yearly Cyber Security Audit by Cert-IN certified Auditors	Nos.	14	14	28	540,000	15,120,000	18%	17,841,600
5.5	Patch Management including Signature updates for all Cyber Security equipment for seven (07) years	Lot	1	1	2	1,700,000	3,400,000	18%	4,012,000
5.6	Future RTU Integration	No.		60	60	350,000	21,000,000	18%	24,780,000
5.7	OPC client function (per user) in SCADA Server	No.	5	5	10	250,000	2,500,000	18%	2,950,000
5.8	Yearly Training on SCADA/EMS for 5 Days for 20 people	Lot		1	1	1,500,000	1,500,000	18%	1,770,000
6.0	Freight and Insurance	Lot	1	1	2	650,000	1,300,000	18%	1,534,000
7.0	Installation testing and commissioning	Lot	1	1	2	13,933,000	27,866,000	18%	32,881,880
TOTAL :									673,179,340

Note:

- 1) Mandatory Spares are identified as part of the Contractor's Maintenance Responsibility (Refer *Section 4 of Part-A*). However, they will be supplied along with the main equipment of each control centre.
- 2) Special terms & conditions and Detail Technical Specifications of for SITC of new SCADA is enclosed in *Annexure-A* & *Annexure-B* respectively.



DIGITAL ENERGY SCADA SOLUTIONS

ge.com/power/software

SCADA Overview

SCADA at the core of power systems monitoring and control

Power systems monitoring requires increasing amounts of information coming from multiples sources, manually or automatically, and at different points in time, each with their own resolution and quality.

SCADA collects all this information in real time to:

- Process in terms of validity, usability, and accuracy and store them for future analysis.
- Combine into a flexible, simple or complex calculation.
- Provide operators and other control systems with flags and alarms, which are valuable for action and control.
- Feed advanced applications such as network security and generation dispatch.

Within data parameters, phasor measurement units generate a huge flow of points due to high scanning resolution (1ms). SCADA can now integrate phasor data.



SCADA: the critical block for EMS

SCADA is the core of any monitoring and control system. This is where all information captured from the field via manual reading, automated control systems in substations and power plants, and from other control centers is processed in real time before being made available for further analysis and action by operators. Without SCADA running, EMS and operators have reduced network vision and cannot operate at full capacity. SCADA reliability is built-in by design with one or multiple redundancy levels to ensure 100% availability.



Incorporating WAMS technology for increased awareness and network flexibility

Traditionally, SCADA receives data points scanned at 1s or higher resolution depending on communication bandwidth and local scanning capabilities such as RTU, a substation automation system, or a power plant control system. The latest WAMS technology, under deployment for the last 10 years, has reached a level of reliability and performance enabling it to manage a large number of phasor measurement units (PMUs) data scanned at 1ms from thousands of PMUs implemented across the network. Phasor Data Concentrator (PDC) and PhasorProcessor are also now part of the SCADA solutions GE offers to its customers.

Coupling existing EMS applications with a Phasor application inside an Advanced Energy Management System (AEMS) unlocks additional network flexibility in terms of blackout prevention and network power capacity required as intermittent renewable generation grows.



SCADA Scalability

Originally, SCADA was designed to handle approximately tens of thousands of points, captured from multiple sources in the field. As transmission network instrumentation proliferates, SCADA can reach as high as one hundred thousand points. As utilities merge with larger networked areas, there is more instrumentation in power systems and distribution systems connecting to transmission systems. The interchanges with neighbor network control systems and the introduction of WAMS PMU points pushes SCADA solutions toward a million points or above. GE's SCADA has the capacity to handle above a million data points in real time.



Advanced Applications for Network Monitoring and Control

GE's SCADA solutions offer a valuable set of applications which give insight to the state of the electrical network, even without advanced power systems applications. Applications such as Topology, Area of Control, Load Shedding and the ability to integrate WAMS and PMUs are extremely valuable, allowing grid operators to monitor, anticipate and improve the performance of transmission and distribution networks.



SCADA access control and Cyber Security

SCADA is a critical component of any EMS, and access control is by design, a feature which allows operators to share network operating areas. Additionally, the login procedure (SSO authentication and certification) is embedded within SCADA IT software to prevent any unwanted intrusion. It logs, tracks, and reports all user access for auditing purposes, and meets NERC CIP 003 requirements.

SCADA Applications: Monitoring

Real-Time Data Acquisition and Processing

- Remote Terminal Units (RTUs) wired to specific devices are scanned in real time, at a specified rate. The RTUs send the raw data to the Front End, which performs conversion and checking. Data points can be measurements (analog), status (on-off, open-close), and count (pulse).
- Data scans are periodic and/or on demand.
- Data source tracking: field RTU, other SCADA, operator entry, calculation, state estimation result, or any EMS applications.
- Measurement processing: conversion in engineering unit (MW, Volt, etc.); multiple limits violation checking: normal, reasonability, forbidden range, deadband, rate of change; oscillation detection (unexpected changes during a defined time); stale detection and peak measurement storage.
- Status point processing: state change with time resolution (local or from RTUs if available) with Sequence Of Events processing (SOE).
- Count point processing: count the total changes, engineering unit conversion (Mwh, etc.).
- Calculated points: data calculated from any points combination.
- Data quality: flag data that may not be reliable (old, bad, un-initialized, not in service); Composite data flags (bad, suspect, replaced, and good); and remote site data flag (suspect, replace). The flag can also be inherited from a global substation flag or a bay flag in a substation. When remote site data changes, the new value and its associated data quality indicators are transferred to the receiving site.

Operator and application control on data processing

Operators and applications can change the way SCADA processes and displays data.

For example, an operator can enter a value for a device where measurement is not retrieved from an RTU. Available actions:

- Removing or restoring a point from service: disabling, or enabling the scanning process.
- Entering a value manually for devices whose measurements are not telemetered.
- Overriding a telemetered value with a manually entered value.
- Manually entering limit values for an analog point.
- Inhibiting and enabling activities associated with alarmed and abnormal events.
- Operator acknowledgment of alarms.

KEY BENEFITS

- Rapidly gain access to information and insight into any anomalies
- Power system control is shared with authorized operators
- Powerful and customizable calculations
- Standard displays set and adapt to real-case scenarios
- Historical replays for improvement and audits

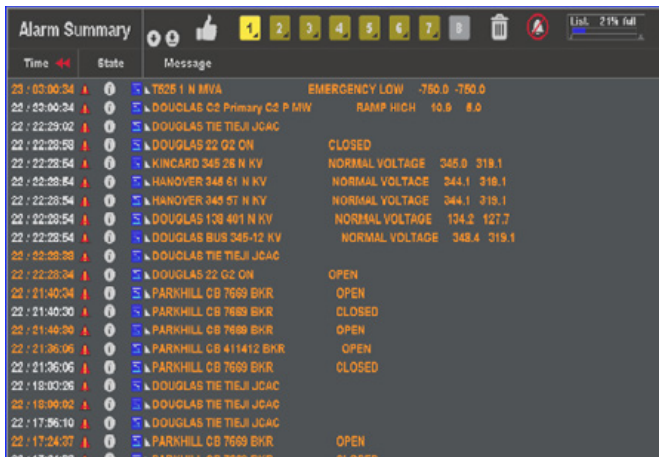
KEY FEATURES

- Real-time performance
- Flexible calculations adapt to each situation
- Comprehensive processing aligned with network management and control site interactions
- Full operator control
- Integration with power system operation procedures (load-shed, topology, tagging, SBO, etc.)
- A complete catalog of RTU protocols
- Inter-site communication system standards (ICCP, ELCOM)
- NERC CIP compliant
- Full electric connectivity view in real time
- Tagging and safety procedure enforcement

SCADA Applications: Events and Calculations

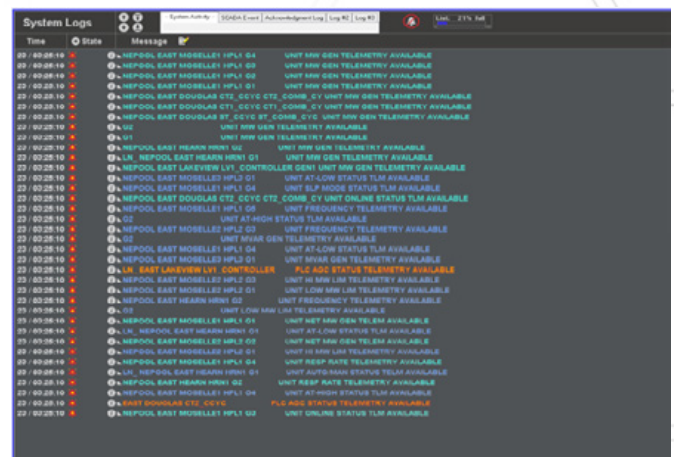
Events and Alarms

SCADA detects and notifies operators of events and conditions in the monitored system that can lead to operational problems associated with a change of state of a status point, measurements, and counts, as well as communication system issues and topology issues. A return-to-normal status may also be alerted. Alerts are provided on displays, the exception list, the system activity log, and the alarm list (and audible alerts if needed).



Time	State	Message
23:03:00:34	EMERGENCY LOW	-760.0 -760.0
23:03:00:34	RAMP HIGH	10.9 8.0
22:22:23:02	CLOSED	DOUGLAS TIE TIE#8 JCAC
22:22:23:53	CLOSED	DOUGLAS 22 Q2 ON
22:22:23:54	NORMAL VOLTAGE	345.0 318.1
22:22:23:54	NORMAL VOLTAGE	344.1 318.1
22:22:23:54	NORMAL VOLTAGE	344.1 318.1
22:22:23:54	NORMAL VOLTAGE	134.2 127.7
22:22:23:54	NORMAL VOLTAGE	348.4 319.1
22:22:23:33	OPEN	DOUGLAS TIE TIE#8 JCAC
22:22:23:34	OPEN	DOUGLAS 22 Q2 ON
22:21:40:34	OPEN	PARKHILL CB 7659 BHR
22:21:40:30	CLOSED	PARKHILL CB 7689 BHR
22:21:40:30	OPEN	PARKHILL CB 411412 BHR
22:21:36:05	OPEN	PARKHILL CB 7659 BHR
22:21:36:05	CLOSED	PARKHILL CB 7659 BHR
22:18:00:26	CLOSED	DOUGLAS TIE TIE#8 JCAC
22:18:00:02	CLOSED	DOUGLAS TIE TIE#8 JCAC
22:17:56:10	CLOSED	DOUGLAS TIE TIE#8 JCAC
22:17:24:37	OPEN	PARKHILL CB 7659 BHR

ALARM LIST



Time	State	Message
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 04
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 03
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 02
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 01
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST DOUGLAS CT1_C01VE_CTE_COMB_C1
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST DOUGLAS CT1_C01VE_CTE_COMB_C2
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST DOUGLAS CT1_C01VE_CTE_COMB_C3
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST HEARN HHR1 02
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST HEARN HHR1 01
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST LANESVIEW LV1_CONTROLLER 03H1
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 01
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 02
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 03
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 04
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 05
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 06
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 07
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 08
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 09
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 10
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 11
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 12
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 13
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 14
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 15
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 16
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 17
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 18
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 19
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 20
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 21
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 22
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 23
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 24
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 25
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 26
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 27
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 28
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 29
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 30
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 31
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 32
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 33
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 34
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 35
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 36
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 37
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 38
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 39
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 40
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 41
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 42
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 43
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 44
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 45
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 46
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 47
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 48
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 49
23:03:00:19	UNIT MW GEN TELEMETRY AVAILABLE	NEPOOL EAST MOSELLE1 HPL1 50

SYSTEM LOGS

Area of Responsibility

SCADA allocates the control of monitored devices to specific control sites and to an individual operator. This allocation limits which control sites – and which operator consoles – can respond to alarms and events. One or more areas of responsibility are assigned to each device. It can be applied to inter-site data and voltage level.

Calculations

Calculations can be defined and modified by users based on inputs from SCADA involving mathematical, logical, and comparative functions, as well as conditional branching. Calculated results can replace values from real-time data points.

Historical data recording

SCADA records and stores data from selected status, analog, or accumulator points, devices, bays, and substations in historical files. Data from these files can later be retrieved in order to reconstruct the SCADA situation at a specific time in the past – or to display measurements for selected values over a specified period. Short-term history can also be saved for selected analog, count or status points.

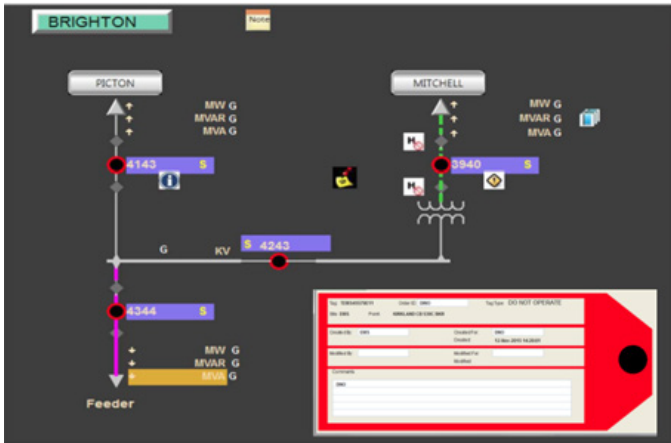
SCADA Applications: Topology and Tagging

Topology processing

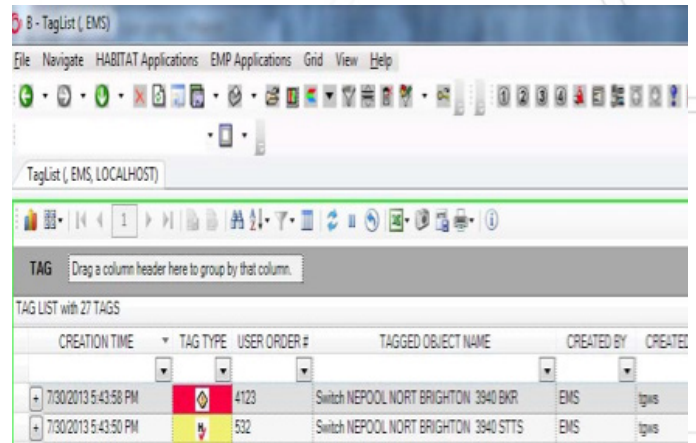
Topology processing is a determination in real time of electrical connectivity. As input, topology processing uses the static model stored in its database – along with the real-time status of switches and breakers – to compute how they connect to each other. Topology processing results can be used in real time to alert operators in case of a loss of connectivity or de-energization of electrical devices, as well as to show such conditions on one-line displays.

Tagging: a fundamental application for security

Tagging enables operators to label a device such as a breaker in order to constrain operation of the device – or to alert operators of special conditions in the power system such as maintenance. Tags can be used to alter processing (such as blocking supervisory controls), or they can be informational only. If configured, tags can be inherited from the parent bay and substation. Multiple tags can be configured on one object. Tags are visible and manageable on one-line displays, tabular displays and lists. Tag groups provide additional information on multiple tags (for instance, on a substation).



RED TAG SYMBOL ON SCADA DISPLAY

A screenshot of a 'TagList (EMS)' application window. The window title is 'B - TagList (EMS)'. It has a menu bar with 'File', 'Navigate', 'HABITAT Applications', 'EMP Applications', 'Grid View', and 'Help'. Below the menu bar is a toolbar with various icons. The main area shows a 'TAG' section with a prompt: 'Drag a column header here to group by that column.' Below this is a table titled 'TAG LIST with 27 TAGS'. The table has columns for 'CREATION TIME', 'TAG TYPE', 'USER ORDER #', 'TAGGED OBJECT NAME', 'CREATED BY', and 'CREATED'. Two rows are visible in the table.

CREATION TIME	TAG TYPE	USER ORDER #	TAGGED OBJECT NAME	CREATED BY	CREATED
7/30/2013 5:43:58 PM	🔴	4123	Switch NEPOOL NORT BRIGHTON 3940 BKR	EMS	tpus
7/30/2013 5:43:50 PM	🟡	532	Switch NEPOOL NORT BRIGHTON 3940 STTS	EMS	tpus

TAG LIST SYSTEM LOGS

Safety documents

A “safety document” is a report that confirms it is safe to perform work on a device in the field, for example, in the case of a line outage. A safety document guarantees that the safety rules have been applied for securing a portion of the network for field work. No work can start until a safety document is issued.

The safety document application tracks the following clearance points:

- When crews are authorized to work in protected areas.
- When crew authorizations have been returned to the dispatcher.
- The status of all tags associated with safety documents.

Key Benefits

- Full electric connectivity view in real time.
- Tagging and safety procedure enforcement.

SCADA Applications: Controls, Load-Shedding

Supervisory control

SCADA allows operators and applications to issue commands to field equipment (RTU, substation automation system, etc.) to move the operating state of a device. Controls can be sent from one-line and tabular displays through a pop-up box. Control can be switching a device (on-off, open-close) or tap control (e.g., raise/lower controls to transformer tap changer). Multiple Controls can be grouped into a single action via a Control Group.

Select Before Operate (SBO) is the standard control sequence for device control:

- Select: designate the device to be controlled. Checks for communication availability, associated points are in service, no blocking tag is placed, device is not in local mode, no control is pending on the same device, and any interlocks are not placed.
- Before: Command is issued to the command chain, but not to the device. Same checks as above apply.
- Operate: the command is sent to the device.

PID Setpoint Controller

This application provides the ability to control external process control devices – without a setpoint controller – to specific setpoints using SCADA standard outputs.

Control Sequence Scheduler

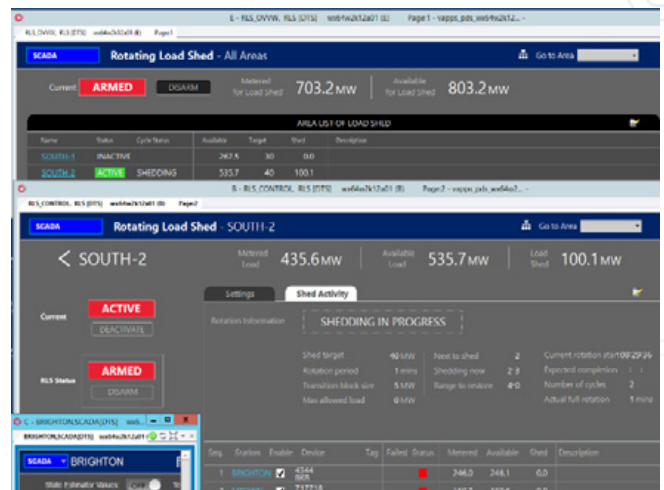
The Control Sequence Scheduler application is used to provide the ability to add, modify, and execute sequences of supervisory controls at scheduled times.

Load Shed and Rotating Load Shed

The Load Shed application is used to quickly shed and restore load in the power system with many different combinations of loads. Load Shed records all actions and their consequences. Loads are grouped together for shedding or restoring by area, level, and group.

Multiple load-shedding options are available:

- Shed and restore all voltage reduction loads, called “Emergency Voltage Reduction.”
- Individual device shedding and restoration.
- An operator specifies the MW amount to be shed, and Load Shed decides which loads are to be shed.
- Rotating Load Shed allows the load to be shed and restored automatically from a group of loads on a rotating basis at an operator-specified cycle time.
- Rotational Load Shed

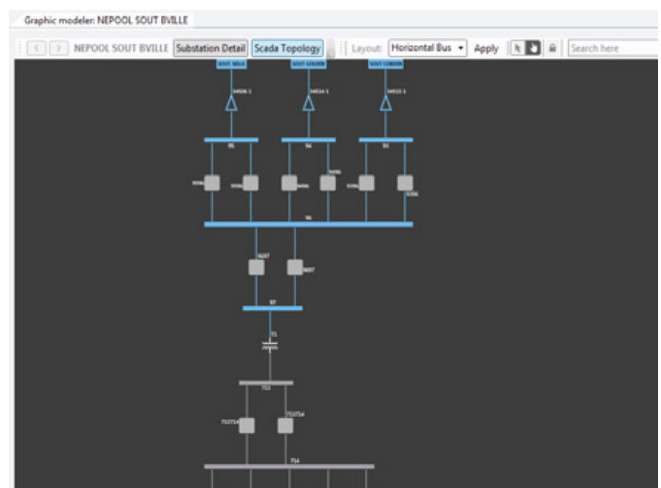


ROTATING LOAD SHED

SCADA Applications: Modeling

SCADA Modeling

SCADA data can be modeled using Source (Network Model Manager) or with the online database editor that allows configuration changes to the SCADA database directly on the online production system.



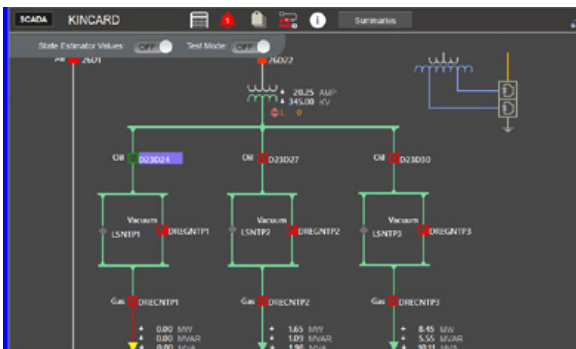
DISPLAY MODELING IN SOURCE

SCADA User Interface

Substation displays

SCADA presents substation data in a graphical one-line diagram, displays, and tabular displays.

Both provide operators the current view of the operating state of the devices and allows the operator to issue commands to move devices (such as breakers) or to control the way data is displayed.



SUBSTATION ONE-LINE

Equip Group	Name	ID	Value	Data Quality	Alarm	Set Pt	Test Mode	Min Tag	Max Tag
BRK	345-148	EV	...	Exchange	...	...	...	...	...
BRK	345-148	RV	...	Exchange	...	...	...	...	...
BRK	345-148	RA	...	Exchange	...	...	...	...	...
BRK	345-148	RVV	...	Exchange	...	...	...	...	...
CB	145-148	BRV	...	Exchange	...	...	...	...	...
CB	145-148	D1	...	Exchange	...	...	...	...	...
CB	145-148	D2	...	Exchange	...	...	...	...	...
CB	145-148	STV	...	Exchange	...	...	...	...	...
CB	145-148	BRV	...	Exchange	...	...	...	...	...
CB	145-148	D1	...	Exchange	...	...	...	...	...

SUBSTATION TABULAR

Related displays

From an exception list and summary displays, an operator can navigate to related displays in order to facilitate access to information.

Operator Notes

Notes are free text that an operator can enter on a one-line display, tabular display and exception list. Notes are attached to a point and can be visible or hidden on demand. The Notes application exists in two sets: Full Notes and Notes Light. Full Notes requires advanced service framework and infrastructure, while Notes Light does not and is limited to displays with no attachment. Notes can be comments entered in a comments field, or in a URL field for navigation to a web page or document management system. Notes are replicated on a backup system if configured.



User ID	Created	Display	Note Type	Color
& USERNAME	12-Jan-2017 15:44:36	SCADA	HAZTANK	RED
& USERNAME	12-Jan-2017 15:44:47	SCADA	HAZTANK	RED
& USERNAME	12-Jan-2017 15:44:58	SCADA	OPFALLS	BLUE
& USERNAME	13-Jan-2017 15:44:59	SCADA	OVERALL	GREEN
& USERNAME	09-Jan-2017 12:42:39	SCADA	KIRKLAND	RED

SCADA Alarms

Alarms are presented to operators who acknowledge an alarm or inhibit/enable alarms from an exception list, alarm display, one-line display, or tabular display. The operator can inhibit/enable an entire bay or substation. Main alarms include Analog limit violation alarms, Point status change alarms, Site communication alarms, Control, Setpoint timeout alarms, Substation, Bay, Device topology alarms, and Remote site or Front End communication alarms.

SCADA Front End

Gathering data from the field

The front end's main functions are to manage RTU communications and communication lines, concentrate RTU data, allow data gathering to continue if a SCADA fails, and initiate reporting alarms upon abnormal communications conditions. For SCADA, the acquisition front end provides RTU data acquisition, raw to engineering unit conversion, communications management, and abnormal communications list management. Scalability: each front end can support up to 100,000 measurements and 256 serial device connections.

Front End RTU Communications and protocols

The Front End application supports both serial and network (TCP/IP) communications with RTUs.

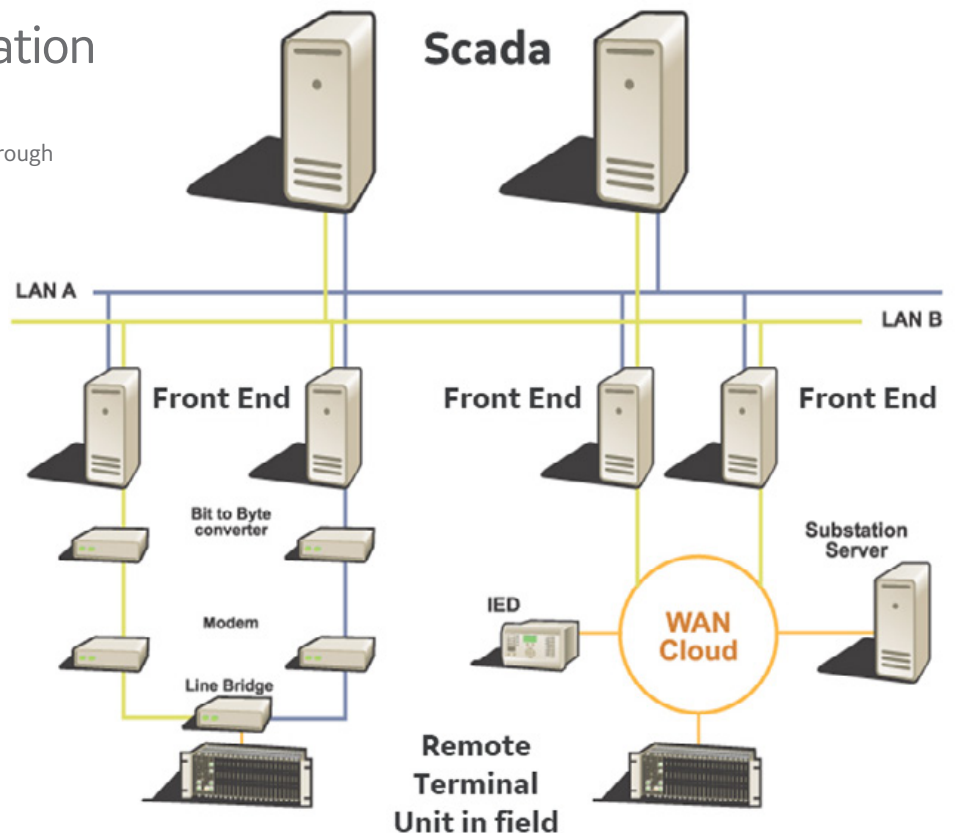
Serial I/O functions are provided by standard asynchronous commercial I/O modules. Isosynchronous RTU communications are provided by an external bit-to-byte (isosynchronous bit-oriented frame to asynchronous bytes) converter module.

Standard data exchange protocols:

- IEC 60870-5-101 Master & Slave (Serial)
- IEC 60870-5-103 (Serial)
- IEC 60870-5-104 Master & Slave (TCP/IP)
- IEC 60870-6 TASE.2 (ICCP) {TLS Security Option}
- IEC 61850 (TCP/IP)
- DNP 3.0 Master & Slave (TCP/IP & Serial)
- Modbus Master & Slave (TCP/IP & Serial)
- Additional 30 proprietary serial RTU protocols

Front end communication with SCADA

The front end communicates with SCADA through InterSite Data (ISD) protocol.





Contact Us
gepower.com/contact

© 2018, General Electric Company. GE Proprietary Information - This document contains General Electric Company (GE) proprietary information. It is the property of GE and shall not be used, disclosed to others or reproduced without the express written consent of GE, including, but without limitation, in the creation, manufacture, development, or derivation of any repairs, modifications, spare parts, or configuration changes or to obtain government or regulatory approval to do so, if consent is given for reproduction in whole or in part, this notice and the notice set forth on each page of this document shall appear in any such reproduction in whole or in part. The information contained in this document may also be controlled by the US export control laws. Unauthorized export or re-export is prohibited. This presentation and the information herein are provided for information purposes only and are subject to change without notice. NO REPRESENTATION OR WARRANTY IS MADE OR IMPLIED AS TO ITS COMPLETENESS, ACCURACY, OR FITNESS FOR ANY PARTICULAR PURPOSE. All relative statements are with respect to GE technology unless otherwise noted.



Digital Energy

Advanced EMS – Platform

Optimal, Reliable Transmission Network Operation
Maximize Renewable Energy with Full Generation Control

THE EMS REFERENCE

EMS-WAMS, renewables and analytics integration increases network optimization, improves system security and capacity and enhances operator and analyst decision making.



KEY OUTCOMES

- Increased Network Reliability and Capacity
- High Renewable mix
- Look Ahead analysis
- Optimal Generation Control
- Full WAMS integration
- Data Analytics ready



KEY FEATURES

- Control rooms, field staff, planning, energy and trading
- CIM based modeling with full validation of power system
- Inter-utilities. Model exchange
- Fast, secure switching
- Market interoperability

Master renewable energy

Utilities face new challenges and additional network stress due to increased renewables penetration. GE's Advanced EMS, Platform, has been in use for over 30 years with leading utilities worldwide, and successfully tested with WAMS technology over the last 10 years. The digital transformation of utilities requires full mobilization of network assets in a reliable way to ensure maximum transmission of energy from multiple sources. High renewable energy penetration, intermittency and low inertia generate an increased level of threats, which require a full understanding of real-time and future network status, to allow a fast response as rapid changes occur. Platform, the GE Advanced EMS, has a full set of powerful applications, which enable operators to deliver the best operation performance, minimizing risk and increasing flexibility, in multiple generation mix systems.

The Heart of Your Network Management

GE Platform Advanced EMS is the brain of network management. It integrates with all utilities functions, such as planning and field management, asset and maintenance management, IT internal services, security services as well as substation automation system, HVDC line control, power plant control systems, and other EMS interchanges.

GE Platform Advanced EMS implements a CIM data model standard from the modeling stage to real-time optimization results. Its modular design is flexible to match your future challenges. It supports multiple redundant and resilient configurations, from simple redundancy, to multiple backups and ultimate recovery systems, as well as test and training systems.

Customer profiles

- Transmission System Operations
- Regional Transmission Organization (RTOs, ISOs)
- Integrated utilities (generation, transmission, distribution)

Digital Energy

Advanced EMS – Platform

Optimal, Reliable Transmission Network Operation
Maximize Renewable Energy with Full Generation Control

Platform components

GE Platform Advanced EMS integrates multiple components which can be implemented in a modular approach according to the utilities demand. This applies to main real time systems, as well as to back-ups (in same or separate locations) and Dispatcher Training system (DTS).



Experience UI UX- WEB UI – Browser - Vision



WAMS



Renewable and DER



Network Generation



Analytics

Real-Time Data Across the Enterprise

Network Model

Scada

Intelligent Alarming

Outage Switching

Cyber Security

Data House

Network Model

- Time-based models, within the enterprise.
- Full business process automation for importing, aggregating, validating, exporting models in different formats, including CIM-16/CGMES.
- Models validation from a Network Security or Market perspective, as well as in short and mid-term time points.

Scada

- Processes real time data from the field.
- Detects abnormal status and alarm them as per operating rules. Includes a topology processor.
- Scalability over million points.

Intelligent Alarming

- IA processing suppresses nuisance alarms, creating one synthetic alarm and generating a diagnosis indicating a faulty device.

Data House

- Manage real time and historian data, and integrate with corporate IT systems.
- Feature a set of power tools, such as SOA adapter, and webservice. Any data is accessible in real-time across the enterprise.

Cyber Security

- GE Platform Advanced EMS embeds in its original design cyber security rules for software development: IP architecture, access control and logging. It delivers required logs to comply with the latest NERCIP regulations.
- Additional services can complement the standard delivery.

Advanced EMS – Platform

Optimal, Reliable Transmission Network Operation
Maximize Renewable Energy with Full Generation Control

Power System Modular Applications and Analytics

Wide Area Management System

The Advanced EMS enabler

WAMS Monitoring

- Angle difference
- Oscillation Stability
- Islanding
- Short Circuit capacity
- Sub Synchronous Resonance
- System disturbance

Stability Assessment

- Alarm management
- Angle-based Enhanced Island
- Enhanced disturbance

Online Stability

- WAMS coupled with
- Dynamic Stability Analysis

Dynamic DTS

Network Security and Optimization

Flexible to match your network

- Topology Processor
- Quick Network Analysis
- State Estimation
- Load flow calculation
- Contingency Analysis
- Operator Guide
- Security Enhancement
- Security Constraint Dispatch
- Contingency Planning
- Voltage/VAR dispatch
- Volt-Var Control (VVC)
- Loss Minimization
- Corrective Controls
- Look-ahead Network Analysis
- Short-Circuit Analysis
- Optimal Power flow
- Line Outage Distribution Factor
- Special Protection Schemes (RAS)
- Topology Estimator
- Dynamic Line Rating
- Voltage Stability
- Transient Stability
- Small Signal Stability
- Real Time & Study environments

Outage Switching Management

Make your switching efficient and secure

- Outage Switching Management integrates with power system applications to analyze requests, and ensure secure and reliable operations.
- SCADA executes and verifies switching steps, as well as placing tags and locking equipment for personnel safety.

Analytics

Extract the value of your data

- Machine learning, Artificial intelligence, and big data technologies will serve the increased data volume from asset sensors, weather prediction, and consumer behavior, in order to drive outcomes in network operations.
- Use cases include: Fault and event analysis, inertia prediction, transmission constraint, and state estimation errors.

Renewable and DER

Master renewable deployment

- Assesses renewable generation in real-time, in location, by type, and by utilization factor.
- Estimates renewable generation from multiple forecast sources and evaluates ramp and stability levels.
- Assesses risk and provides recommendations for remedial actions to operators.
- Smart dispatch controls intermittency and renewal generation low inertia.
- Automatic generation control covering storage, central and distributed renewables.

Generation Control & Optimization

Ready for renewable & storage management

Generation Control and Grid Economy

- Load Forecast
- Transaction scheduling
- Unit Commitment
- Economic Dispatch
- Multi-Area Load-Frequency Control
- Automatic Generation Control
- Reserve Monitor
- Real Time and Study Modes
- Advanced Generation
- Impact of DER
- Impact of Demand Response
- Curtailment
- HVDC control
- Smart Dispatch
- Generation Scheduling
- Generation Schedule Import/Export
- Market Interfaces

Dispatch Training Simulator

- Perfect replication of your EMS including WAMS (Dynamic DTS).
- Initialization from real-time and Historian.

Contact Us

www.gepower.com/contact

GE (NYSE: GE) is the world's Digital Industrial Company, transforming industry with software-defined machines and solutions that are connected, responsive and predictive. GE is organized around a global exchange of knowledge, the "GE Store," through which each business shares and accesses the same technology, markets, structure and intellect. Each invention further fuels innovation and application across our industrial sectors. With people, services, technology and scale, GE delivers better outcomes for customers by speaking the language of industry.

© 2018 General Electric. All rights reserved. *Trademark of General Electric. All other brands or names are property of their respective holders. Specifications are subject to change without notice.

Budgetary Estimates for Upgradation of LDCs in NER

Das, Jayeeta <jayeeta.das@siemens.com>

Fri 5/21/2021 8:10 PM

To: Akhil Singhal (अखिल सिंघल) <akhilsinghal@posoco.in>;

Cc: K S, Srinivasan <srinivasan.k_s@siemens.com>; Dixit, Anshul Kumar <dixit.anshul@siemens.com>; Khode, Amol <amol.khode@siemens.com>; Muley, Girish <girish.muley@siemens.com>; Kulkarni, Harshad <harshad.kulkarni@siemens.com>;

 1 attachments (243 KB)

BoQ_Quotation_NER_SLDCs_Apr'21.pdf;

Dear Akhil,

Thanks for your esteemed enquiry and for arranging a detailed technical discussion to understand your requirement.

For the enclosed BOQ (1 MCC + 1 BCC), the tentative estimate will be approximately **INR. 78.5 CR** (inclusive of GST/SAC).

Please feel free to reach the undersigned for any queries.

Thanks & Regards,
Jayeeta

BoQ of new SCADA-EMS (ULDC Phase-III) at SLDCs of North Eastern Region (NER)

Bill of Quantity for SCADA/EMS System of SLDC

	Item Description	Unit	Quantity			Unit Price (Rs.)	Total Price (Rs)	GST (%)	Total Price with GST (Rs.)
			Main CC	Backup CC	Total				
A	Software								
1.1	SCADA	Lot	1	1	2			18%	-
1.2	ICCP Communication	Lot	1	1	2			18%	-
1.3	CFE Communication	Lot	1	1	2			18%	-
1.4	Historian (Information Storage & retrieval) System								
	(a) Data Storage Software	Lot	1	1	2			18%	-
	(b) Data Historian Software	Lot	1	1	2			18%	-
	(c) Software for SAN & NAS	Lot	1	1	2			18%	-
1.5	EMS Functions							-	
	(a) State Estimator	Lot	1	1	2			18%	-
	(b) Contingency Analysis	Lot	1	1	2			18%	-
	(c) Security Enhancement	Lot	1	1	2			18%	-
	(d) Optimal Power Flow	Lot	1	1	2			18%	-
	(e) Outage Scheduler	Lot	1	1	2			18%	-
	(f) Transmission Line/Corridor Capability Monitor (TCM)	Lot	1	1	2			18%	-
1.6	Dispatcher Training Simulator	Lot	1	0	1			18%	-
1.7	Database development system (PDS) cum test bench for SCADA and ICCP Integration	Lot	1	1	2			18%	-
1.8	Network Management System	Lot	1	1	2			18%	-
1.9	SIEM (Security Information and Event management)	Lot	1	1	2			18%	-
1.10	Web Server Application								
	(a) Host based IDS for all machines	Lot	1	1	2			18%	-
	(b) Software for Data Replica server	Lot	1	1	2			18%	-
	(c) E Mail and SMS Application	Lot	1	1	2			18%	-
	(c) Mobile Application App	Lot	1	1	2			18%	-
	(d) Software for Web Server	Lot	1	1	2			18%	-
	(e) Antivirus Server Software	Lot	1	1	2			18%	-
1.11	Application Whitelisting Tool	Lot	1	1	2			18%	-
1.12	Document Management System	Lot	1	0	1			18%	-
1.13	Identity Management Software	Lot	1	1	2			18%	-
1.14	Report Development & Generation Software	Lot	1	1	2			18%	-
1.15	Server Backup Software	Lot	1	1	2			18%	-
1.16	Patch Management Software	Lot	1	1	2			18%	-
1.17	OPC (Open Platform Communication) client function in SCADA Server	No.	1	1	2			18%	-
1.18	VAPT (Vulnerability Assessment and Penetration Testing) Tool	Lot	1	1	2			18%	-
B	Computer System Hardware								
2.1	SCADA/EMS Server	No.	2	2	4			18%	-
2.2	ICCP server	No.	2	2	4			18%	-
2.3	CFE Server	No.	2	2	4			18%	-
2.4	Data Storage Server	No.	2	2	4			18%	-
2.5	Data Historian Server								
2.6	Storage System								
	(a) SAN Box	No.	2	2	4			18%	-

BoQ of new SCADA-EMS (ULDC Phase-III) at SLDCs of North Eastern Region (NER)

Bill of Quantity for SCADA/EMS System of SLDC

	Item Description	Unit	Quantity			Unit Price (Rs.)	Total Price (Rs)	GST (%)	Total Price with GST (Rs.)
			Main CC	Backup CC	Total				
(b)	SAN Management Server	No.	2	2	4			18%	-
(c)	NAS Box	No.	1	1	2			18%	-
(d)	Tape Libraries	No.	1	1	2			18%	-
2.7	Workstation Console integrated with three nos. of 24" LED Monitors	No.	6	4	10			18%	-
2.8	DTS Server	No.	1	0	1			18%	-
2.9	DTS Workstation (Training Console)	No.	4	0	4			18%	-
2.10	NMS server	No.	2	2	4			18%	-
2.11	LAN Switch							18%	
(a)	24 Port L3- LAN switch for SCADA/EMS LAN	No.	2	2	4			18%	-
(b)	24 Port L3- LAN switch for Historian & NMS LAN	No.	2	2	4			18%	-
(c)	24 port FC switch for SAN Switch	No.	2	2	4			18%	-
(d)	24 Port L3- LAN switch for External DMZ LAN	No.	2	2	4			18%	-
(e)	48 Port L3- LAN Switch for Server Management LAN	No.	2	1	3			18%	-
(f)	24 Port L3- LAN Switch for ICCP LAN	No.	2	2	4			18%	-
(g)	24 Port L3- LAN Switch for Internal DMZ LAN	No.	2	2	4			18%	-
2.12	Laptop for maintenance	No.	2	2	4			18%	-
2.13	WAN Routers with Firewall						-	18%	-
(a)	WAN Router cum Firewall for ICCP Communication	No.	2	2	4			18%	-
(b)	WAN Router cum Firewall for External World Connectivity	No.	2	2	4			18%	-
(c)	WAN Router for RTU Communication	No.	2	2	4			18%	-
2.14	Printers						-	18%	-
(a)	Color Laser Printer	No.	2	2	4			18%	-
(b)	Multi Functional Printer	No.	2	2	4			18%	-
2.15	Time & Frequency System and External displays						-	18%	-
(a)	Time & Frequency System NavIC (with failback to GPS) Based	Lot	1	1	2			18%	-
(b)	Digital Display for Date	No.	1	1	2			18%	-
(c)	Digital Display for Day	No.	1	1	2			18%	-
(d)	Digital Display for Time	No.	1	1	2			18%	-
(e)	Digital Display for Frequency	No.	2	2	4			18%	-
(f)	Surge Arrester for T & F Device	No.	1	1	2			18%	-
2.16	Web System						-	18%	-
(a)	Web Servers	No.	2	2	4			18%	-
(b)	External Firewall	No.	2	2	4			18%	-
(c)	Internal Firewall with NIPS	No.	2	2	4			18%	-
(d)	Firewall for RTU Communication	No.	2	2	4			18%	-
(e)	Data Replica Server	No.	2	2	4			18%	-
2.17	PDS for SCADA & ICCP integration testing System and development system as test bench for cyber security consisting of						-	18%	-
(a)	PDS Server	Lot	1	1	2			18%	-
(b)	Workstation	No.	1	1	2			18%	-
(c)	WAN Router cum firewall	No.	2	2	4			18%	-
(d)	Web Servers	No.	1	0	1			18%	-
(e)	Antivirus/Patch management Server	No.	1	0	1			18%	-

BoQ of new SCADA-EMS (ULDC Phase-III) at SLDCs of North Eastern Region (NER)

Bill of Quantity for SCADA/EMS System of SLDC

	Item Description	Unit	Quantity			Unit Price (Rs.)	Total Price (Rs)	GST (%)	Total Price with GST (Rs.)
			Main CC	Backup CC	Total				
5.1	Comprehensive Annual maintenance contract of SCADA/EMS System including all the equipment supplied in the project during 1 year Warranty Period	Lot	1		1			18%	-
5.2	Comprehensive Annual maintenance contract of SCADA/EMS System including all the equipment supplied in the project for 6 year after expiry of Warranty Period	Lot	1		1			18%	-
5.3	ICCP Integration for total AMC period	Nos.	10	10	20			18%	-
5.4	Half-Yearly Cyber Security Audit by Cert-IN certified Auditors	Nos.	14	14	28			18%	-
5.5	Patch Mangment including Signature updates for all Cyber Security equipment for seven (07) years	Lot	1	1	2			18%	-
5.6	Future RTU Integration	No.	60		60			18%	-
5.7	OPC client function (per user) in SCADA Server	No.	5	5	10			18%	-
5.8	Yearly Training on SCADA/EMS for 5 Days for 20 people	Lot	1		1			18%	-
TOTAL :									-

Note:

- 1) Mandatory Spares are identified as part of the Contractor's Maintenance Responsibility (Refer *Section 4 of Part-A*). However, they will be supplied along with the main equipment of each control centre.
- 2) Special terms & conditions and Detail Technical Specifications of for SITC of new SCADA is enclosed in *Annexure-A* & *Annexure-B* respectively.



**Detailed Project Report (DPR)
for
Establishment of VSAT Communication System in
Stations at Hilly and Remote Terrain locations of
North Eastern Region (NER)**

2022

North Eastern Regional Power Committee
NERPC Complex, Dong Parmaw
Lapalang, Shillong - 793006 (Meghalaya)
Website: www.nerpc.nic.in
email: nerpc@ymail.com

Summary of Proposal

For Official Use - To be filled by the Nodal Agency of PSDF	
Project Proposal Number: _____	Date of Receipt: _____

To be filled by the Applicant Organization / Utility		
1	Name of the requesting Organization/ Utility	<ul style="list-style-type: none"> • Department of Power, Arunachal Pradesh • Assam Electricity Grid Corporation Limited • Manipur State Power Company Limited • Meghalaya Power Transmission Corporation Limited • Power & Energy Department of Mizoram • Department of Power of Nagaland • Tripura State Electricity Corporation Limited
2	Short Summary of Project/ Scheme/ Activity	
a	Name of the Project/ Scheme/ Activity	Establishment of VSAT Communication System in Stations at Hilly and Remote Terrain locations of North Eastern Region (NER).
b	Objective of the Project/ Scheme/ Activity	Supply, Installation, Testing and Commissioning of VSAT Communication System in selected stations at Hilly and Remote Terrain locations of North Eastern Region (NER) for Real-Time Data Telemetry purposes.
c	Authorised Person for this Project/ Scheme/ Activity	<ul style="list-style-type: none"> • Arunachal Pradesh: Executive Engineer, SLDC Itanagar, DoP, 132kV Chimpu Substation, Itanagar, Arunachal Pradesh - 791111 • Assam: Chief General Manager, State Load Despatch Centre, Assam Electricity Grid Corporation Ltd., ASEB Colony, Power House, Kahilipara, Guwahati-781019 • Manipur: General Manager, State Load Despatch Centre, Yurembam Power House, Imphal West-795004, Manipur • Meghalaya: Superintending Engineer, State Load Despatch Centre, Meghalaya Power Transmission Corp. Ltd., Umjarain Mawkynroh, NEHU Campus, Shillong-793022, Meghalaya • Mizoram: Sr. Executive Engineer, State Load Despatch Centre Division, P&E Office Complex, North Block (III Floor), Electric Veng, Aizawl- 796001, Mizoram • Nagaland: Executive Engineer, State Load Despatch Centre, Full Nagarjan, Dimapur, Nagaland - 797112 • Tripura: Dy. General Manager (System Operation), State Load Despatch Centre, TSECL, 79-Tilla, Agartala, Tripura (West) - 799006

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

d	Nature of the Project/ Scheme/ Activity: Inter- state/ Intra-state (Please specify)	Intra-state incident to state-level grid operation
e	Identified Beneficiaries	The state constituents of North Eastern Region of India
f	Merits of the Scheme	<p>With implementation of the scheme, overall real-time data telemetry from the grid-connected stations will improve which will help is secure and reliable grid operation and load despatch functions in NER. The improvement in the Load Despatch functions through data-visibility of all the grid connected stations is of utmost importance to perform mission critical operation of national importance related to management of expanding power system network in North-Eastern region.</p> <p>It can act as a redundant path of communication in case of no alternate physical path available in Fiber-Optic infrastructure.</p> <p>The VSAT technology, if implemented, can be utilized for needs of various other schemes, which require data from remote locations such as SAMAST, AMR, etc.</p>
g	Limitations, if any	No limitation envisaged.
h	Time frame for Implementation	The scheme is scheduled to be implemented within 18 months from the date of receipt of sanction of the fund/grant.
i	Estimated Cost of Project/ Scheme/ Activity	8,29,95,243 INR incl. GST
j	Category under which the project is classified (Please refer to para 5.1 of the Guidelines/ Procedure)	<p>As per PSDF Guidelines issued vide MoP Office Memorandum ref. 10/1/2014-OM dated 18th September 2014 (https://psdfindia.in/fund-disbursement/guidelines-for-disbursement/#) Clause 5.3 –</p> <p>Quote <i>Other Schemes benefitting large no. of utilities collectively and having a significant impact towards the power system development and grid operation shall also be considered for funding from PSDF, on case-to-case basis.</i> Unquote</p>

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Detailed Proposal (DP)

1. Details of the Requesting Organization/ Entity

1.1 Details of Organization/ Entity

A1) Name of Organization / Entity	Department of Power, Arunachal Pradesh
A2) Acronym or Abbreviation (if applicable)	DoP-AP
B1) Name of Organization / Entity	Assam Electricity Grid Corporation Limited
B2) Acronym or Abbreviation (if applicable)	AEGCL
C1) Name of Organization / Entity	Manipur State Power Company Limited
C2) Acronym or Abbreviation (if applicable)	MSPCL
D1) Name of Organization / Entity	Meghalaya Power Transmission Corporation Limited
D2) Acronym or Abbreviation (if applicable)	MePTCL
E1) Name of Organization / Entity	Power & Energy Department of Mizoram
E2) Acronym or Abbreviation (if applicable)	P&ED-Mizoram
F1) Name of Organization / Entity	Department of Power of Nagaland
F2) Acronym or Abbreviation (if applicable)	DoP-Nagaland
G1) Name of Organization / Entity	Tripura State Electricity Corporation Limited
G2) Acronym or Abbreviation (if applicable)	TSECL

1.2 Details of Head of the Organization

- **DoP-AP**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief Engineer (Power), Western Electrical Zone
E-mail address	
Landline Number	
FAX No.	
Address	Department of Power, Govt. of Arunachal Pradesh, Vidyut Bhawan, O-Point Tinali, Itanagar, Arunachal Pradesh
City	Itanagar
Postal Code	791111

- **AEGCL**

Name (Mr./ Ms./ Mrs.)	Dhrubajyoti Hazarika
Designation	Managing Director (I/C)
E-mail address	
Landline Number	0361-2739520

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

FAX No.	
Address	Bijulee Bhawan, 1 st Floor, Paltan Bazar, Guwahati, Assam
City	Guwahati
Postal Code	781001

• **MSPCL**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief Secretary, Government of Manipur
E-mail address	
Landline Number	0385-2450050
FAX No.	
Address	Electricity Complex, Keishampat Junction, Imphal, Manipur
City	Imphal
Postal Code	795001

• **MePTCL**

Name (Mr./ Ms./ Mrs.)	Arunkumar Kembhavi
Designation	Chairman Cum Managing Director
E-mail address	
Landline Number	
FAX No.	
Address	Meghalaya Energy Corporation Limited, Lumjingshai, Short Round Road, Shillong, Meghalaya
City	Shillong
Postal Code	793001

• **P&ED-Mizoram**

Name (Mr./ Ms./ Mrs.)	
Designation	Engineer-In-chief
E-mail address	
Landline Number	
FAX No.	
Address	Power & Electricity Department, Kawlphetha Building, New Secretariat Complex, Khatla, Aizawl, Mizoram
City	Aizawl
Postal Code	796001

• **DoP-Nagaland**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief Engineer (Power)
E-mail address	cepower1helpdesk@gmail.com
Landline Number	0370-2243149
FAX No.	0370-2240178

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Address	Electricity House, A.G. Colony, Kohima, Nagaland
City	Kohima
Postal Code	797001

• **TSECL**

Name (Mr./ Ms./ Mrs.)	
Designation	Managing Director
E-mail address	
Landline Number	0381-2318001, 0381-2319427
FAX No.	
Address	Electricity House, A.G. Colony, Kohima, Nagaland
City	Kohima
Postal Code	797001

1.3 Details of Project In-Charge/ Project Manager (Authorized Person) for this project/ scheme/ activity (Not below the rank of Dy. Gen. Manager/ Superintending Engg.)

• **DoP-AP**

Name (Mr./ Ms./ Mrs.)	
Designation	Executive Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	SLDC Itanagar, DoP, 132kV Chimpu Substation, Itanagar, Arunachal Pradesh
City	Itanagar
Postal Code	791111

• **AEGCL**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief General Manager
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Assam Electricity Grid Corporation Ltd., ASEB Colony, Power House, Kahilipara, Guwahati
City	Guwahati
Postal Code	781019

• **MSPCL**

Name (Mr./ Ms./ Mrs.)	
Designation	General Manager
E-mail address	
Landline Number	

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Yurembam Power House, Imphal West, Manipur
City	Imphal
Postal Code	795004

Tripura: Dy. General Manager (System Operation), State Load Despatch Centre, TSECL, 79-Tilla, Agartala, Tripura (West) – 799006

• **MePTCL**

Name (Mr./ Ms./ Mrs.)	
Designation	Superintending Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Meghalaya Power Transmission Corp. Ltd., Umjarain Mawkynroh, NEHU Campus, Shillong, Meghalaya
City	Shillong
Postal Code	793022

• **P&ED-Mizoram**

Name (Mr./ Ms./ Mrs.)	
Designation	Sr. Executive Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre Division, P&E Office Complex, North Block (III Floor), Electric Veng, Aizawl, Mizoram
City	Aizawl
Postal Code	796001

• **DoP-Nagaland**

Name (Mr./ Ms./ Mrs.)	
Designation	Executive Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Full Nagarjan, Dimapur, Nagaland
City	Dimapur
Postal Code	797112

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

- **TSECL**

Name (Mr./ Ms./ Mrs.)	
Designation	Dy. General Manager (System Operation)
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, TSECL, 79-Tilla, Agartala, Tripura (West)
City	Agartala
Postal Code	799006

Any change in above mentioned details will be notified to the Nodal Agency of PSDF immediately.

2. Justification of the Proposal

2.1 Analysis of the Objective

The power system network of North-Eastern Region has a big inter-connected transmission network operating at various voltage levels such as - ± 800 kV HVDC, 400kV AC, 220kV AC, 132kV AC, 66kV AC, etc. The current installed generation capacity in NER is around 4373 MW, transmission lines are spanning over a large circuit-kilometres and a high total transformation capacity of the substations. Many transmission and generation projects are under implementation, which are expected to be completed within few years leading to a more complex, meshed and interconnected network. Keeping the vast scope and possibility of the expansion in the generation and transmission sector in NER, government has established dedicated State Load Despatch Centres in all the seven (07) states of NER and NERLDC at the regional level to ensure reliable and secure operation of the grid.

One of the main factors in functioning of State/Regional Load Despatch Centres is the real-time data from stations under its control area; failing of which can lead to formation of blind spots in the power system, which are non-monitored and can lead to major grid disturbances, which may subsequently propagate to other regions as well. At present, the real-time data availability in NER is less than 50% most of the times which is primarily due to non-availability or disruption in communication links. Hence, establishment of reliable and redundant communication links is need-of-the-hour for improvement and stability of the power system operation in NER.

Various technologies available in the communication systems are Optical Fiber, Power Line Carrier Communication, Radio Communication like VHF/UHF, GPRS, etc. All such technologies have its own advantages, disadvantages and needs to be adopted based on its feasibility and economy for the operations in power sector of India. At present, the communication system planning in NER is based on the Fiber-Optic related projects, which are majorly being executed, by POWERGRID-NERTS and POWERGRID-NERPSIP. However, most of the area of NER being hilly terrains, the site conditions are not suitable for easy laying of Optical Fiber and further restoration in case of any fiber cut can take many days. Moreover, the

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Right-of-Way (RoW) issues are also getting faced by all utilities in North-Eastern region.

The major backbone of transmission in NER is at 132kV voltage level which needs to be monitored and operated in a secure manner by the SLDCs and NERLDC. But for monitoring and operation of the power system in NER, the real-time data availability from the stations in NER has been quite low of the order of 30%-50% in the past few years majorly due to communication related issues.

The Power Line Carrier Communication (PLCC) systems are primarily working in Assam and Meghalaya states and are not available for data transfer at majority of the places in other states. Many Fiber-Optic laying works under Fiber-Optic Expansion Project and Microwave Vacation Project are under progress in NER but getting delayed due to tough/hilly terrain, weather conditions, natural calamities, critical law-and-order situations, RoW issues, etc. Several stations in NER are tail-end stations (with radial feeders) for which no alternate communication path has been planned yet.

Due to non-availability of a reliable and suitable communication system in NER, the state constituents under various commercial mechanisms are paying heavily towards penalty against Zero Crossing Violations (ZCV), Deviation Settlement Mechanisms (DSM), etc. If the data availability gets improved, then the corresponding SLDCs of the states will be able to monitor respective over-drawl/under-drawl and can significantly maintain its actual drawl close to the entitles schedule leading to significant cost savings. The **heavy penalties of the order of 141 crores** were paid by state-utilities of NER in the period from 31-December-2018 to 10-February-2020.

Seamless uninterrupted connectivity is the cornerstone for ensuring success of real-time data acquisition for mission critical power system operation in any part of the country. As power system is growing, any disruption in connectivity of communication system leading to non-availability of real-time data for monitoring in the Load Despatch Centres, can potentially be a threat to the safety and security of the grid. It is also imperative that all voice communications are also dependent on reliable and redundant communication links. Moreover, the economic and commercial aspects play major role in power system operation these days.

In addition, the North Eastern Region faces unique challenges due to the hilly terrain and geographical location of the substations; lack of adequate network connectivity remains a major challenge for providing real-time data to the load despatchers at state level as well as regional level in North Eastern Region. As most NER States have hilly terrain, in many places laying optical fiber cable (OFC) is difficult and even if it is executed further maintenance and rectification in case of outages is a major challenge for the utilities. Hence, the satellite communication technology such as VSAT should be considered as a communication media for the substations of NER. It should also be considered for substations with an optical fiber connectivity as a redundant communication channel so as to meet the criteria of 100% availability of real-time data for main and redundant data channel as mandated by the Hon'ble Commission.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Various pilot projects with VSAT as communication medium have been installed-and-tested in North Eastern Region in recent past with satisfactory results; some of such locations are Tezu, Dikshi, Tenga and Killing. Many new projects of VSAT technology deployment for getting the real-time data from sub-stations such as Roing, Tezu, Namsai, etc. are under pipeline and expected to be installed in near future.

The VSAT bandwidth connectivity charges have fallen in the past few years making it viable for being used in the power sector for the utilities. Hence, by adopting a reliable and easy-to-install communication technology such as VSAT will remove the communication related issues which is the single most major hurdle resulting in non-availability of real-time data to the Load Despatchers in North-Eastern region.

The VSAT technology, if implemented, can be utilized for needs of various other schemes, which require data from remote locations such as SAMAST, AMR, etc.

2.2 Identified Beneficiaries of the Project

The states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura in particular and the Nation in general.

With implementation of the scheme, all the stakeholders in the power sector of North-Eastern Region will be able to run more efficiently and effectively. So, reliability of the NER grid can be achieved at desired level. Further, it will also mitigate the risks of losing data-availability in case of any Optical-Fiber cut which generally takes many days to get restored due to difficult hilly terrains in NER.

2.3 Identified Source of Funding

100% of the total project cost is to be funded through grant from PSDF.

2.4 Details of Activities for Project/ Scheme/ Activity

After getting approval of the project towards funding, the following activities will be undertaken to achieve desired results:

- Tendering Activities with award of work to qualified L1 Bidder.
- Site Survey
- Factory Acceptance Tests (FAT)
- Supply, Installation and Commissioning of VSAT Equipment along with associated Hardware suitable for integration with respective LDCs.
- Integration of data with existing SCADA/EMS system for transfer of real-time data from the substations to the associated State Load Dispatch Centre (SLDC) on IEC-101 or IEC-104 protocol as found suitable.

List of stations to be covered under this project are mentioned in ***Appendix-1***.

2.5 Executing Agencies

Projects will be executed in fork of different independent work-orders on state-wise basis and the state-utilities/ SLDCs will be the executing agencies for respective works. Necessary guidance, if required, can be taken from NERPC, NERLDC and POWERGRID-NERTS in various forums such as Operation

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Coordination Committee (OCC), North-Eastern Telecommunication, SCADA and Telemetry (NETeST), etc.

All the technical specifications required for the execution works and material procurement works will be prepared as per the guidelines in applicable IS standards and CEA recommendations by calling open tenders on e-procurement platforms.

2.6 Timeline for implementation of Project/ Scheme/ Activity

Timeline for implementing this project/ scheme/ activity is given hereunder considering date of receipt of PSDF grant approval as zero-date:

- a) Issuance of Work-Order: 7 months
- b) Procurement of Equipment (Delivery of Material at site after FAT): 4 months
- c) Erection and Commissioning: 7 months

Timeline of the Project/ Scheme/ Activity	
Likely duration of Project (in months)	18 months
Start Date	Date of receipt of sanction of PSDF Grants
Likely Completion Date	18 months from date of sanction of PSDF Grants

Timeline of Activities

Project Implementation Schedule - 18 Months (Months after Letter of Award - LoA)																			
S. No.	Task Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	<i>(Subject Package)</i>	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█	█
1	Engineering	█	█																
2	Tendering Activities			█	█	█	█												
3	Letter of Award							█											
4	Site Survey							█	█	█									
5	Factory Acceptance Tests and Drawing DRS Approvals										█	█	█						
6	Supply of Equipment													█					
7	Installation and Commissioning														█	█	█		
8	Integration with SLDCs																	█	█

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Summary of Detailed Project Report (DPR)

Cost Break-up of various components

- **Opex Type of financial model for establishment VSAT communication set-up in NER on hiring (hub services) basis**

In the Opex type of model, the hub services can be taken on hiring basis from the service provider of VSAT communication. Some tentative figures corresponding to the associated financial implications are mentioned in *table* below.

Tentative financial implications of VSAT communication in case of hiring of hub (for 129 sites)				
VSAT CAPEX for Real Time SCADA data for 129 Sites – With 1 year Warranty and 2 year AMC				
Sl. No.	Details	Quantity	Unit Price (in INR)	Total Cost (in INR)
1	VSAT Equipment including: HT Modem with 4 LAN Port,1.2 M INSAT-C Band Tx/Rx Antenna, 2W INSAT C-Band BUC with LNB, Integration Material, Freight Charges with 1 Year Warranty	129	85,500	1,10,29,500
2	VSAT Equipment including: HT Modem with 4 LAN Port,1.8M INSAT-C Band Tx/Rx Antenna 5W INSAT C-Band BUC with LNB Integration Material, Freight Charges with 1 Year Warranty	7	2,65,595	18,59,165
3	Installation and Commissioning for 1.2 Mtr Antenna+ License liasioning charges for WPC/SACFA Clearance	129	8,950	11,54,550
4	Installation and Commissioning for 1.8 Mtr Antenna+ License liasioning charges for WPC/SACFA Clearance	7	16,761	1,17,327
5	DC Power Supply -48VDC	136	13,667	18,58,712
6	VSAT Platform Charges	136	18,595	25,28,920
Capital Expenditure				1,85,48,174

VSAT OPEX for Real Time SCADA data for 129 Sites - Per Annum				
Sl. No.	Details	Quantity	Unit Price (in INR)	Total Cost (in INR)
1	XC band, Upto 128 Kbps site-wise bandwidth plan (64kbps upload/download speeds) for NERs per annum	129	27,535	35,52,015
2	XC band ,Upto 512 Kbps sitewise bandwidth plan (256kbps upload/download speeds) for SLDCs per annum	7	75,091	5,25,637

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

3	AMC support at 1.2m remote per annum (from 2nd year onwards)	129	7,895	10,18,455
4	AMC support at 1.8m SLDC per annum (from 2nd year onwards)	7	16,867	1,18,069
5	NMS Charges	1	0	0
Operational Expenditure for 6 Years (6 year Bandwidth & 5 Year AMC)				3,01,48,532

Miscellaneous CAPEX				
Sl. No	Description	Unit	Unit Price (in INR)	Total Price (in INR)
1	IEC 101 to 104 Protocol Converter	129	30,000	38,70,000
2	Session Initiated Protocol Phones	129	5,500	7,09,500
Miscellaneous Capital Expenditure				45,79,500

Note: a) Total amount will be 5,32,76,206 INR excl. GST. for around 129 nos. of stations and 7 nos. of SLDCs locations.

b) Due to some additional request from DoP-AP, the station list has increased to around 157; which makes the price as 6,48,40,033.66 INR excl. GST.

Targets for financial Milestones

Description	Total Amount (in INR) incl. GST @ 28%	1st Installment of 80% amount (12th Month after sanction of Grant)	2nd Installment of 20% amount (18th Month after sanction of Grant)
PSDF Grant	8,29,95,243	6,63,96,194.47	1,65,99,048.62
Internal Resource	NIL	NIL	NIL
Total	8,29,95,243	6,63,96,194.47	1,65,99,048.62

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Financial Implication of the Scheme

1. Summary

S. No.	Item	Amount (in INR)
1	Total Cost Estimate	6,48,40,033.66 + 28% GST = 8,29,95,243
2	Funding Proposed from PSDF	8,29,95,243
3	Contribution from Internal Sources	Nil
4	External Borrowings	Nil

2. Details

2.1 Cost Estimate

The rates for all equipment have been obtained on the basis of the Budgetary Quotations collected from reputed VSAT OEMs and attached herewith as **Appendix-2** which has been slightly increased on pro-rata basis as per subsequent addition of some remote locations by DoP-Arunachal Pradesh.

3. Funding

3.1 Funding proposed from PSDF

100% of the estimated cost is proposed to be funded from PSDF.

The funding is to be divided among state-utilities on the basis of quantum of VSAT installation in the respective substations.

MePTCL (Meghalaya): 6 VSATs plus VSAT at SLDC i.e. ₹ 31,71,792.69 (incl. GST)

MSPCL (Manipur): 8 VSATs plus VSAT at SLDC i.e. ₹ 42,29,057 (incl. GST)

P&ED (Mizoram): 17 VSAT plus VSAT at SLDC i.e. ₹ 89,86,746 (incl. GST)

DoP (Arunachal Pradesh): 42 VSAT plus VSAT at SLDC i.e. ₹ 2,22,02,549 (incl. GST)

DoP (Nagaland): 51 VSATs plus VSAT at SLDC i.e. ₹ 2,69,60,238 (incl. GST)

AEGCL (Assam): 18 VSATs plus VSAT at SLDC i.e. ₹ 95,15,378 (incl. GST)

TSECL (Tripura): 15 VSATs plus VSAT at SLDC i.e. ₹ 79,29,482 (incl. GST)

3.2 Contribution from Internal Resources

Nil.

3.3 External Borrowings

No external borrowings will be necessary.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Brief Details of the Project Appraisal by CTU/ STU/ RPC

Item	Details to be filled by Applicant Utility		
Appraisal By	CTU _____	STU _____	RPC _____ ✓ _____
Date of Submission to CTU/ STU/ RPC for approval	xx.xx.2021		
Name of the Scheme	Procurement and Installation of Remote Terminal Units in selected stations of North-Eastern Region (NER) for Real-Time Data Telemetry purposes.		
Copy of the Appraisal Report by CTU/ STU/ RPC (attached at <i>Annexure</i>)	Yes _____ Ref. No.: Date:	No ____ ✓ ____	
Summary of observations from CTU/ STU/ RPC Appraisal Report	Summary of Proposal Appraised	Establishment of VSAT Communication System in Stations at Hilly and Remote Terrain locations of North-Eastern Region (NER).	
	Technical Observations	Technical Specifications attached as Appendix-3.	
	Financial Observations	The estimated cost arrived on the basis of budgetary quotations collected from reputed VSAT OEMs.	
	Compliance of Grid Standards/ Codes by Applicant	Yes	
	Limitations/ Shortcomings pointed out by CTU/ STU/ RPC, if any	No limitation envisaged. Only some intermittency may be observed due to configuration/integration of RTUs with new communication system which can be managed judiciously.	
	Recommendations of CTU/ STU/ RPC	Recommended for immediate implementation and posing for 100% PSDF funding.	

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Undertaking

(On a Non-judicial Stamp paper of Rs.50 only duly notarized and attested)

I, Dr./ Mr./ Ms. son/daughter/wife of
resident of
(full address) and presently working as in
the
hereby undertake to comply with the following terms and conditions with regard to
funding of the (name of scheme) with
disbursement from PSDF:

- **No tariff shall be claimed for the portion of the scheme funded from PSDF.**
- **Amount of grant shall be refunded in case of transfer/disposal of the facility being created under this proposal to any other scheme for funding.**
- **Shall specifically mention if for the scheme under the proposal, the grant from any other agency is being taken / proposed to be taken.**
- **The grant shall be refunded back to PSDF in case of non-utilisation of the grant within one (01) year of release of installment.**

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Appendix-1

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
1	Mendipathar	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
2	Khliehriat	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
3	Lumshnong	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
4	Killing	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
5	Umtru	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
6	Umiam Stage IV	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
7	Rengpang	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
8	Tipaimukh	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
9	Thanlon	132	MSPCL, Manipur	--	--	--	Real-time operational

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							data to be telemetered for grid monitoring.
10	Hundung	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
11	Karong	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
12	Chandel	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
13	Tamenglong	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
14	Moreh	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
15	Champhai	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
16	Khawzawl	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
17	Saitual	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
18	Bukpui	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
19	Khawiva	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
20	E.Lungdar	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
21	Lawngtlai	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
22	Bairabi	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
23	Mamit	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
24	W.Phaileng	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
25	Marpara	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
26	Lungsen	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							d for grid monitoring.
27	Sihhmui	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
28	Melriat	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
29	Zuangtui	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
30	Luangmual	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
31	Bawktlang	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
32	Lekhi Industry	33	DoP, Arunachal Pradesh	--	--	--	Located in Papum Pare District. Drawing power from Grid Lekhi S/s.
33	Bandardawa Industry	33	DoP, Arunachal Pradesh	--	--	--	Located in Papum Pare District. Drawing power from Grid Nirjuli S/s.
34	Holongi Industry	33	DoP, Arunachal Pradesh	--	--	--	Located in Papum Pare District.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							Drawing power from Grid Chimpu S/s.
35	Tippi Industry	33	DoP, Arunachal Pradesh	--	--	--	Located in West Kaming District. Drawing power from Grid Tippi S/s.
36	Liker MHP, Kamba, Aalo	33	DoP, Arunachal Pradesh	--	--	--	Located in West Siang District. Power being injected in grid.
37	Tago MHP, Ziro	33	DoP, Arunachal Pradesh	--	--	--	Located in Lower Subansiri District. Power to be injected in grid.
38	Nuranang MHS, Jung	33	DoP, Arunachal Pradesh	--	--	--	Located in Tawang District. Power to be injected in grid.
39	Mukto MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in Tawang District. Power to be injected in grid.
40	Sippi MHS, Daporijo	33	DoP, Arunachal Pradesh	--	--	--	Located in Upper Subansiri District. Power to be injected in grid.
41	Liromoba MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in West Siang District. Power to

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							be injected in grid.
42	Kitpi Ph-II MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in Tawang District. Power to be injected in grid.
43	Subung MHS, Boleng	33	DoP, Arunachal Pradesh	--	--	--	Located in Siang District. Power to be injected into Grid.
44	Jengging MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in Upper Siang District. Power to be injected into Grid.
45	Paciha MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in East Kameng District. Power to be injected into Grid.
46	Gerukamukh (Kamle District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no provision of redundant communication links.
47	Ziro (New)/Yachuli (Lower Subansiri District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no provision of redundant

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							communication links.
48	Basar (Lepa Rada District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
49	Seppa (East Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
50	Rilo (Pakke Kessang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
51	Bameng (East Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							communication links.
52	Seijosa (Pakke Kessang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
53	Naharlagun (Papum Pare District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
54	Banderdewa (Papum Pare District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
55	Sagali (Papum Pare District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							communication links.
56	Holongi (Papum Pare District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
57	Kambang (West Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
58	Likabali (Lower Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
59	Koloriang (Kurung Kumey District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							communication links.
60	Palin (Kra Daadi District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no provision of redundant communication links.
61	Niglok (East Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no provision of redundant communication links.
62	Pasighat (East Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no provision of redundant communication links.
63	Miao (Changlang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no provision of redundant

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							communication links.
64	Jairampur (Changlang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
65	Changlang (Changlang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
66	Khonsa (Tirap District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
67	Dambuk (Lower Dibang Valley District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							communication links.
68	Halaipani (Anjaw District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
69	Yingkiong (Upper Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
70	Bomdila (West Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
71	Tawang (Tawang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							communication links.
72	Kalaktang (West Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
73	Tenga (West Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
74	Sanis	132/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
75	Kiphire	132/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
76	Zadima	220/132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
77	Philimi, Zunheboto	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
78	Chiephobozou, Kohima	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							path diversity
79	Nagaland University, Kohima	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
80	Pfutsero, Phek	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
81	Wokha	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
82	Meluri	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
83	Power House	66/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
84	Ganeshnagar	66/33	DoP-Nagaland	No	No	Existing	Tail-End station with no path diversity
85	Tuli	66/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
86	Tuensang	66/33	DoP-Nagaland	No	No	Existing	Tail-End station with no path diversity
87	Mon	66/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
88	Zunheboto	66/33	DoP-Nagaland	No	No	Existing	Tail-End station with no path diversity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
89	Chumukedima	66/33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
90	Sovima	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
91	Dairy Farm	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
92	Nito Farm	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
93	Tizit	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
94	Naginimora	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
95	Mon Power House	66/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
96	Likimro HEP	Nov-66	DoP-Nagaland	No	No	Existing	Tail-End station with no path diversity
97	Forest	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
98	Supermarket	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
99	Padampukhuri	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
100	Medziphema	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
101	Peren	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
102	Jalukie	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
103	Referral	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
104	Rangapahar	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
105	Dhansiripahar	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
106	Niuland	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
107	Lerie	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
108	Keyake	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
109	Jakhama	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
110	New Secretariat Complex	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
111	IG Stadium	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
112	ITI	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
113	Naga Bazar	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
114	Pungro	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
115	Kiphire Town	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
116	Zubza	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
117	Sataka	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
118	Tuensang Town PH	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
119	3rd NAP Camp	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
120	Noklak	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
121	Mokokchung	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
122	Amphuto	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
123	Longnak	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
124	Hospital Power House Mokokchung	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
125	CTPS	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
126	Hailakandi	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
127	Hatsingimari	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
128	Narengi	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							d for grid monitoring.
129	Pavoi	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
130	Rangia	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
131	Khaloigaon	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
132	Umrangshu	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
133	Haflong	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
134	Dullavcherra	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
135	Ghoramari	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
136	Matia	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
137	Dispur (Capital)	132	AEGCL, Assam	--	--	--	Real-time operational

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							data to be telemetered for grid monitoring.
138	APM	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
139	Jorhat West	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
140	Bokakhat	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
141	Sibsagar (Betbari)	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
142	Sonapur	220	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
143	Dharmanagar	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
144	Ambassa	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
145	Dhalabil	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
146	Baramura (GTP)	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
147	Rokhia	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
148	Monarchak GS	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
149	Kanchanpur	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
150	Gandacherra	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
151	Ompi	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
152	Gokulnagar	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
153	Sabroom	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
154	Satchand	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							d for grid monitoring.
155	Bogafa	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
156	Belonia	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
157	Gumi HEP	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Quotation by M/s Hughes Communication (dated 02nd November 2021)

RE: Budgetary Quotation and Technical Assistance - Establishment of a VSAT Network in NER - Google Chrome

mail.posoco.in/owa/projection.aspx

Reply all | Delete Junk | ...

RE: Budgetary Quotation and Technical Assistance - Establishment of a VSAT Network in NER

Ashutosh Kundan <ashutosh.kundan@hughes.in> Tue 11/2, 10:03 AM
Akhil Singhal (अखिल सिंघल)

Inbox

To help protect your privacy, some content in this message has been blocked. To re-enable the blocked features, [click here](#).

To always show content from this sender, [click here](#).

You replied on 11/9/2021 4:05 PM.

Draft_Technical_Specific... 1 MB

Show all 1 attachments (1 MB) Download

Please find updated proposal

With Regards-
Ashutosh Kundan
Segment Manager – Business Development (Govt. & PSU)
Email: ashutosh.kundan@hughes.in | Website: www.hughes.in
Handheld Device - +91- 964 31 333 04 | Landline - +91 0124-7132519

From: Akhil Singhal (अखिल सिंघल) <akhilsinghal@posoco.in>
Sent: 27 October 2021 15:47
To: ashutosh.kundan@hughes.in
Subject: Re: Budgetary Quotation and Technical Assistance - Establishment of a VSAT Network in NER

Tentative financial implications of VSAT communication in case of hiring of hub (for 129 sites)				
VSAT CAPEX for Real Time SCADA data for 129 Sites – With 1 year Warranty and 2 year AMC				
Sl. No.	Details	Quantity	Unit Price (in INR)	Total Cost (in INR)
1	VSAT Equipment including: HT Modem with 4 LAN Port, 1.2 M INSAT-C Band Tx/Rx Antenna, 2W INSAT C-Band BUC with LNB, Integration Material, Freight Charges with 1 Year Warranty	129	85,500	1,10,29,500

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

2	VSAT Equipment including: HT Modem with 4 LAN Port,1.8M INSAT-C Band Tx/Rx Antenna 5W INSAT C-Band BUC with LNB Integration Material, Freight Charges with 1 Year Warranty	7	2,65,595	18,59,165
3	Installation and Commissioning for 1.2 Mtr Antenna+ License liasioning charges for WPC/SACFA Clearance	129	8,950	11,54,550
4	Installation and Commissioning for 1.8 Mtr Antenna+ License liasioning charges for WPC/SACFA Clearance	7	16,761	1,17,327
5	DC Power Supply -48VDC	136	13,667	18,58,712
6	VSAT Platform Charges	136	18,595	25,28,920
Capital Expenditure				1,85,48,174
VSAT OPEX for Real Time SCADA data for 129 Sites - Per Annum				
Sl. No.	Details	Quantity	Unit Price (in INR)	Total Cost (in INR)
1	XC band, Upto 128 Kbps site-wise bandwidth plan (64kbps upload/download speeds) for NERs per annum	129	27,535	35,52,015
2	XC band ,Upto 512 Kbps sitewise bandwidth plan (256kbps upload/download speeds) for SLDCs per annum	7	75,091	5,25,637
3	AMC support at 1.2m remote per annum (from 2nd year onwards)	129	7,895	10,18,455
4	AMC support at 1.8m SLDC per annum (from 2nd year onwards)	7	16,867	1,18,069
5	NMS Charges	1	0	0
Operational Expenditure for 6 Years (6 year Bandwidth & 5 Year AMC)				3,01,48,532
Miscellaneous CAPEX				
Sl. No	Description	Unit	Unit Price (in INR)	Total Price (in INR)
1	IEC 101 to 104 Protocol Converter	129	30,000	38,70,000
2	Session Initiated Protocol Phones	129	5,500	7,09,500
Miscellaneous Capital Expenditure				45,79,500

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Quotation by M/s Nelco (dated 22nd November 2021)

Re: Draft technical specification for VSAT - Some clarifications

Nabajyoti Deka <nabajyoti.deka@nelco.in>
 Today, 9:36 AM
 Akhil Singhal (अखिल सिंघल); Saugata Ghosh <saugata.ghosh@nelco.in>; S P Barnwal (एस पी बर्नवाल); Sakal Deep (सकल दीप); 4 ४

Inbox

Budgetary Proposal_NE...
 12 KB

Show all 1 attachments (12 KB) Download

Dear Sir,

Please find the budgetary proposal for your your requirement. Kindly check and for any query feel free to reach out to me. We are sorry for getting delayed.

With Regards
 Nabajyoti Deka
 Tata Nelco
 Mob: 9954293854

From: Akhil Singhal (अखिल सिंघल) <akhilsinghal@posoco.in>
Sent: Tuesday, November 16, 2021, 10:29
To: Nabajyoti Deka
Cc: Saugata Ghosh; S P Barnwal (एस पी बर्नवाल); Sakal Deep (सकल दीप); Ashutosh Kumar (आशुतोष कुमार); Kshitij Goel
Subject: Re: Draft technical specification for VSAT - Some clarifications

Sir,

As discussed, please **submit the budgetary quotation** for the proposal attached.
 Remarks in the trailing mail will be considered at the time of tendering.
 Thanking you.

Regards,
 Akhil Singhal
 Ch. Manager, NERLDC

Tentative financial implications of VSAT communication in case of hiring of hub (for 129 sites)				
VSAT CAPEX for Real Time SCADA data for 129 Sites – With 1 year Warranty and 2 year AMC				
Sl. No.	Details	Quantity	Unit Price (in INR)	Total Cost (in INR)
1	<u>VSAT Equipment including:</u> HT Modem with 4 LAN Port,1.2 M INSAT-C Band Tx/Rx Antenna, 2W INSAT C-Band BUC with LNB, Integration Material, Freight Charges with 1 Year Warranty	129	97,920	1,26,31,680

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

2	VSAT Equipment including: HT Modem with 4 LAN Port,1.8M INSAT-C Band Tx/Rx Antenna 5W INSAT C-Band BUC with LNB Integration Material, Freight Charges with 1 Year Warranty	7	1,74,350	12,20,450
3	Installation and Commissioning for 1.2 Mtr Antenna+ License liasioning charges for WPC/SACFA Clearance	129	21,850	28,18,650
4	Installation and Commissioning for 1.8 Mtr Antenna+ License liasioning charges for WPC/SACFA Clearance	7	28,000	1,96,000
5	DC Power Supply -48VDC	136	23,715	32,25,240
6	VSAT Platform Charges – 1.2m Antenna	129	38,470	49,62,630
7	VSAT Platform Charges – 1.8m Antenna	7	53,850	3,76,950
Capital Expenditure				2,54,31,600
VSAT OPEX for Real Time SCADA data for 129 Sites - Per Annum				
Sl. No.	Details	Quantity	Unit Price (in INR)	Total Cost (in INR)
1	XC band, Upto 128 Kbps site-wise bandwidth plan (64kbps upload/download speeds) for NERs per annum	129	58,570	75,55,530
2	XC band ,Upto 512 Kbps sitewise bandwidth plan (256kbps upload/download speeds) for SLDCs per annum	7	1,64,300	11,50,100
3	AMC support at 1.2m remote per annum (from 2nd year onwards)	129	31,540	40,68,660
4	AMC support at 1.8m SLDC per annum (from 2nd year onwards)	7	33,350	2,33,450
5	NMS Charges	1	10,98,500	10,98,500
Operational Expenditure for 6 Years (6 year Bandwidth & 5 Year AMC)				8,78,50,570
Miscellaneous CAPEX				
Sl. No	Description	Unit	Unit Price (in INR)	Total Price (in INR)
1	IEC 101 to 104 Protocol Converter	129	1,40,000	1,80,60,000
2	Session Initiated Protocol Phones	129	10,000	13,60,000
Miscellaneous Capital Expenditure				1,94,20,000

Date: _____

Signature: _____

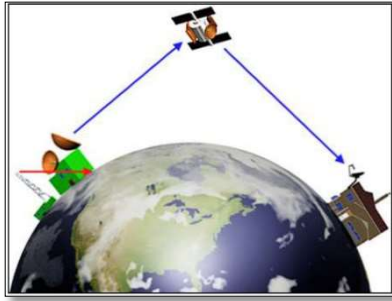
Name: _____

(Authorized Representative)

Technical Specifications for VSAT Project (State Sector Stations) in North-Eastern Region

1.0 Introduction

This VSAT scheme is for Telemetry voice & data from various sub-stations of state-utilities in NER to respective State Load Despatch Centres (SLDCs).



The VSAT communication scheme (based on Extended C Band technology) is proposed for State-Utilities of NER for 129 nos. of stations to respective SLDCs to facilitate connectivity for Power system telemetry (data on IEC-60870-5-104 & Voice) using third-party (Vendor/Contractor) Hub. This Hub shall act as a communication media to communicate with respective SLDCs and remote locations in different places of NER. Its major application will be mainly for real-time data and voice (Telemetry data & voice) from various stations to respective SLDCs. The list of stations with reporting to specific SLDCs is attached with this document.

Transport protocol will be TCP/IP and UDP/IP supporting unicast and multicast routing. The system shall be in compliance to the *Central Electricity Authority (Technical Standards for Communication System in Power System Operation) Regulations, 2020* available at <https://cea.nic.in/regulations-category/technical-standards-for-communication-system-in-power-system-operation/?lang=en>.

The Project requires establishment of satellite network with the following key requirements:

- VSAT based voice and data network operating on Indian satellite will be leased from a licensed Telecom Service Provider (TSP).
- The network will operate in Extended C band frequencies for reliable operations.
- VSATs will be installed at all State-Utilities of NER for 129 nos. of stations to respective 7 SLDCs to facilitate connectivity.
- VSAT links will be used for real-time data and voice (Telemetry data & voice) from various stations to respective SLDCs.
- The supply, installation and maintenance of VSAT equipment as well as lease of necessary satellite spectrum, as well as satisfactory operations during Defect Liability Period (i.e. 12 months) and subsequent C-AMC period (i.e. 06 years) of operation of the network will be under the scope of the VSAT service provider.

2.0 Technology & Bandwidth

It shall be state-of-the-art TDMA technology or equivalent in line with approved Detailed Project Report (DPR) to cater requirements of state-utilities for connecting specified nos. of remote locations/sub-stations with its respective SLDCs over the following bandwidths –

- 512kbps (Ext-C at SLDCs)

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

- 128kbps (Ext-C at each remote site).

The solution shall be robust and stable, while offering better performance than any other technologies. The proposed solution is designed to cater to support Data (SCADA) traffic. This scheme facilitates supply, installation and maintenance of Ext-C band TDMA (or equivalent) VSAT using the following –

- a) The network proposed shall be fully IP compliant and shall operate on XC Band of ISRO Satellite
- b) Service shall be provided from Service-Provider's Central Site (Hub) which shall be working on 9m or above XC Band antenna system in India catering for the different applications of the network.
- c) The Baseband system shall cater for the MF-TDMA links.
- d) Remote locations shall run on 1.2 m XC Band antenna terminal with 2W BUC and LNB.
- e) The SLDCs site shall have 1.8m Antenna setup with a 5W BUC to cater remote site traffic.
- f) Total power consumption of VSAT terminals shall be in the range of 80-100W.
- g) Latency of ≤ 750 ms (less than or equal to) shall be maintained for single-hop and ≤ 1700 ms (less than or equal to) for double-hop.

Extended C Band is useful for all-weather conditions. It will have more than 99.5% uptime on quarterly basis for VSAT connectivity. There shall be an online portal to know the VSAT Up/Down status & Single Point of Contact (SPoC) for Project Management purposes.

The average latency per site shall be around 700-750ms. The remote to HO/remote no-load latency shall be max 1,700ms. The remote sites LAN shall be able to communicate with SLDC LAN (SCADA) servers over IP connectivity at output of IDU connected to switch/router at each remote-site location & respective SLDCs.

[Note: During successful Demo at Tezu in Arunachal Pradesh done in 2020, the bandwidth utilization is found to be up to 37-50kbps usage at low peak traffic hours and get up to 100kbps at maximum. Hence, the SCADA-RTU application shall work fine over Ext-C VSAT hardware and 128Kbps satellite bandwidth from each of the remote site locations should be taken.]

The Bandwidth for SIP voice link will be as per requirement & usage w.r.t. matrix/SIP exchange connected Vendor/Contractor Hub. For voice, one SIP hardware (Telephone set) and one voice channel per location shall be required. There will be maximum fourteen (14) concurrent active SIP at any instant which implies that if there is all 7 SLDCs making simultaneous calls to one of its associated substations, then other substations shall not attempt to make call.

The Contractor will be responsible for overall designing, managing, maintaining & securing State-Utilities VSAT system for remote site locations.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

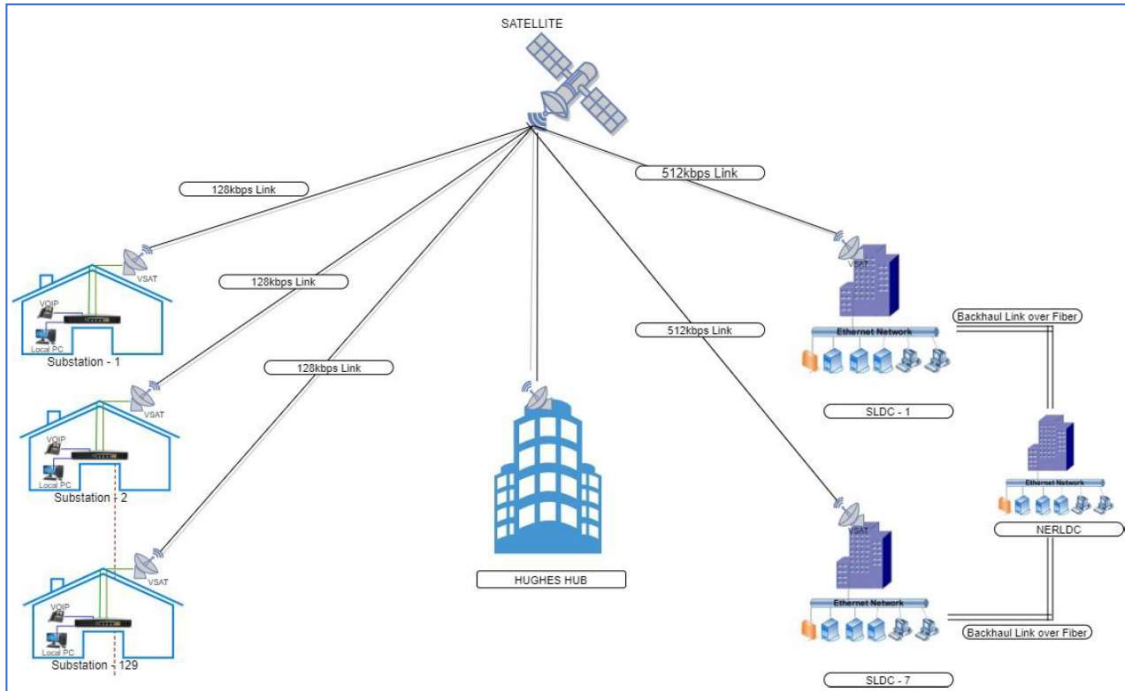


Figure 1: General illustration of connectivity diagram

In *figure* above, back-haul connectivity can be direct or through VSAT again as 2nd hop. The proposed applications to be used are SCADA data and SIP only.

All remote sub-stations' VSATs will operate at 128Kbps (64kbps In-route and 64kbps Out-route per site) link and all SLDCs will operate at 512kbps (256 kbps In-route and 256kbps Out-route per site) link and the data traffic (SCADA) from remote sites will first come to Service Provider's Hub and subsequently routed to SLDCs through VSAT. The return traffic will also flow through same path. The traffic travelling on the VSAT link/SIP phone connection shall be highly secured as it will be within the CUG network on a private Network.

3.0 Components of VSAT

It has some basic components as mentioned below.

- The FSS (Fixed Satellite System) VSAT antenna comes with NPM base which is installed & fixed on terrace with proper cement casting or ballast. This provides proper stability to antenna system. Hence, this will not be portable.
- Pole mounting is not feasible, non-penetrating roof mount will be provided to mount on RCC roof.
- 1.2m antenna with 2W EXT-C can generally upload upto 220 kbps maximum.
- 1.8m antenna with 5W EXT-C can generally upload upto 768 kbps maximum as per current configurations.
- Wind survival upto 200kmph under standard conditions.
- Reflector material shall be Compression Molded GFRP (glass-fiber-reinforced-polymer) latest technology.
- **Indoor Unit (IDU) and Outdoor Unit (ODU):** IDU shall provide Ethernet RJ-45 interface between the VSAT and the customer's Equipment. The signal strength of the ODU unit shall be checked at IDU unit before IDU unit is connected to the SCADA Server/RTU/Gateway via

Date: _____

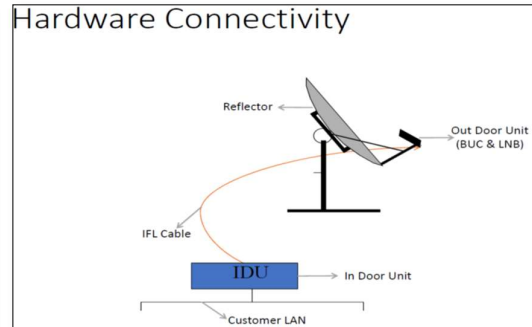
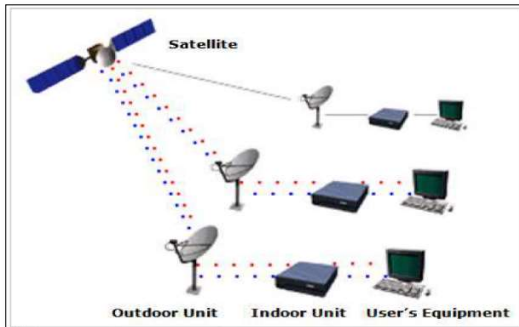
Signature: _____

Name: _____

(Authorized Representative)

L2 LAN Switch via router. The IDU unit will be connected over Ethernet LAN to Existing LAN switch/Router of the SCADA System/RTU/Gateway for reporting of the data at SCADA Server. IDU shall be mounted such that its connectors shall not get damaged due to disturbance of co-axial cable.

- Space Segment namely satellite.



4.0 Traffic Flow

The data traffic (SCADA) from remote sites will first come to Vendor/Contractor Hub and subsequently routed to SLDCs through dedicated backhaul link or through VSAT. As Vendor/Contractor Hub is not in NER, hence VSAT link is to be established between Vendor/Contractor Hub to SLDCs. The return traffic will also flow through same path. The traffic travelling on the Backhaul link/VSAT link/SIP phone connection shall be highly secured as it will be within the CUG network on a private cloud. Logical separation shall be provided to keep the traffic segregated and secured.

5.0 Support

Vendor/Contractor shall have 365 x 24 x 7 Network Operating Centre (NOC), which enables centralized remote network monitoring and management of VSAT network(s) with the help of experienced and skilled network & technology experts, and state of the art monitoring tool-sets and devices. Vendor/Contractor uses a combination of self-developed and open-source software tools to provide advanced monitoring and management services. N+1 redundancy for Hub equipment shall be available and provide 99.5% quarterly uptime SLA with exclusions of special conditions like force majeure, planned downtime etc.

6.0 Trouble Ticket management and Call handling

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

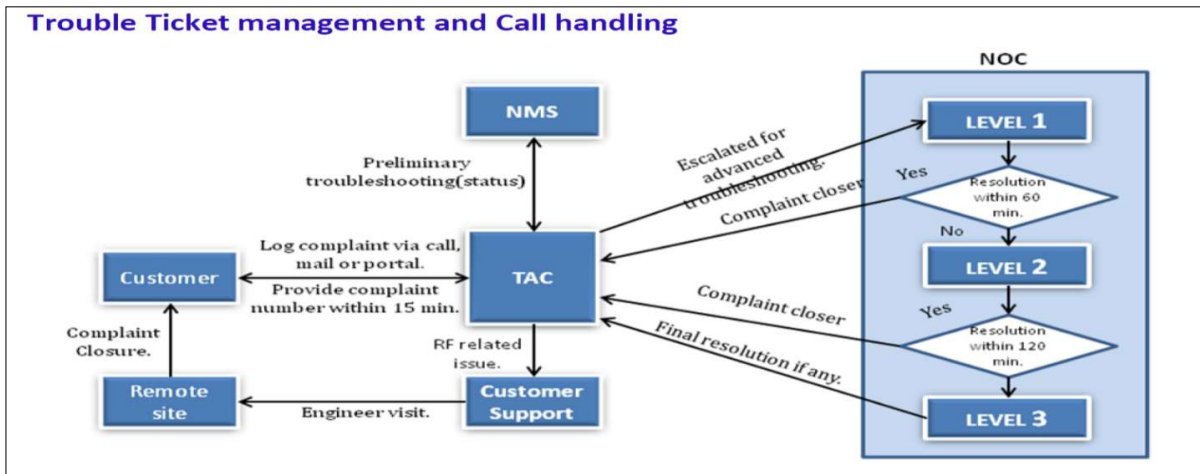


Figure 2: Trouble Ticket Management and Call Handling

- a) Vendor/contractor provides different access for call logging –
 - Through Mail
 - Through Telephone
- b) Customer will have to log a call with VENDOR/contractor if they face any issue related to VSAT connectivity.
- c) Once the call is logged with VENDOR/contractor on its call management portal, it is assigned to L1 shift engineer.
- d) The L1 engineer does the basic troubleshooting and tries to fix the issue. If the issue is resolved, it will confirm the same with customer and then close the complaint.
- e) If the L1 engineer is not able to resolve the call within 1 hr., it is escalated to L2 engineer who does a detailed diagnosis of the issue and resolves it.
- f) If the L2 engineer is not able to resolve the issue remotely then he escalates the call to field support team for filed visit to the site for rectification of the issue.
- g) The support team assigns the JOB to the field engineer who is nearer to the remote location.
- h) The field engineer will attend the site within the stipulated timelines and rectify the problem onsite.
- i) The field engineer then co-ordinates with the NOC team for resolution.
- j) Then the same is confirmed with customer before closure of the call.
- k) Vendor shall station its dedicated Engineer(s) at Guwahati which shall be mobilized for attending Fault-Ticket (FT). The vendor will attend the site as & when technically required and as required, scheduled visit will be planned during AMC.

Vendor shall establish the following –

- a) Vendor/Contractor Portal should be available to check the VSAT site status (UP /Down).
- b) Vendor/Contractor Customer Portal for Service Desk and Trouble Ticket Management.
- c) There will be one fault ticket logging portal for TT logging and getting ticket status. Username/password shall be provided to allow access portal.

7.0 Proposed Connectivity for Data & Voice

Data and Voice related connectivity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

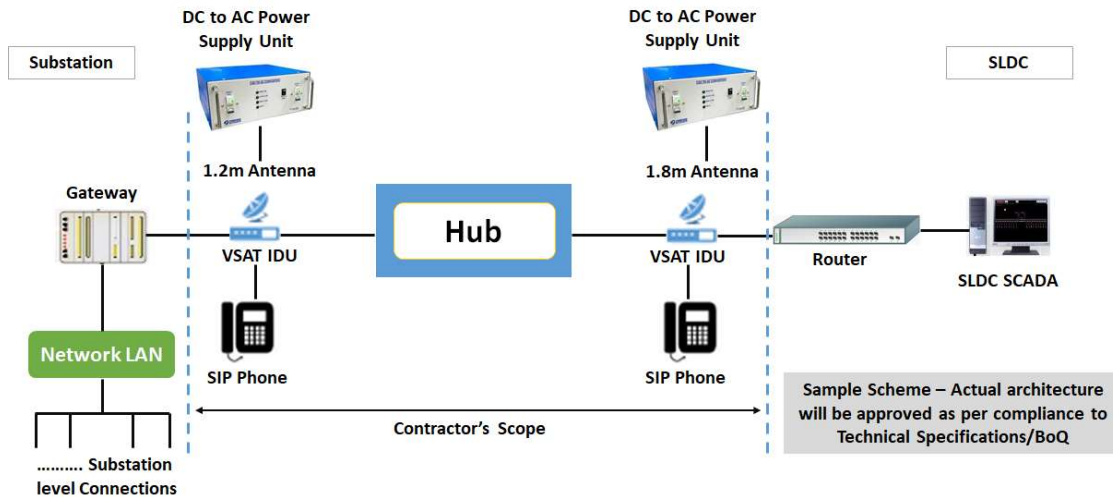


Figure 3: Proposed data/voice related connectivity

The detailed architecture, BoQ, Data Requirement Sheets, Model Types, etc. shall be approved by SLDCs in later stages.

8.0 Scope of Work

A. Contractor's Scope:

- a) The scope of work under this contract shall include Supply, Delivery to site, Unloading, Insurance till handing over, Handling, transportation to final locations, supervision on Installation-Termination-Testing and Commissioning including configuration/integration of VSAT communication system for communicating of 129 nos. of Gateways/RTU locations in NER with total seven (07) nos. of VSAT communication system at SLDCs so that the telemetry data of the respective site can be reported to existing SCADA communication server at SLDCs. The scope shall be limited to VSAT link connectivity only and same shall be demonstrated by pinging from remote LAN-SCADA server. Any issues pertaining to SCADA application not working during integration or O&M phase shall be taken care by respective SLDCs.
- b) The scope also includes establishment of Voice communication (SIP) of stations over VSAT network with respective SLDCs. One SIP hardware and one voice channel per location as per Bandwidth requirement shall be provided by the Contractor. The configuration of SIP phone of the stations in NER along with one nos. at each SLDC over the VSAT Communication network shall be done by the Contractor. The SIP phone at remote stations can be connected directly to modem (or via switch with minimum 5 ports which is to be provided by Contractor free-of-cost) . Other ports in Modem (or additional switch provided by Contractor) will be connected to Primary-RTU-GW and Backup-RTU-GW. One port will connect to SIP phone and rest of the ports for future maintenance part. SIP Phone at SLDCs will be connected to 1*Port GE NIM Card supplied.
- c) The contractor shall suggest route and length for connection of IDU unit with the existing RTU/SCADA server after site survey. For bidding purpose, bidder to quote for 30 Mtr length per site with "per meter charges" also in case extra cable at any site is required. Advance intimation is to be given by Contractor to complete work within a specific time frame (15-21 days) to make site/front ready. Laying, clamping, conduiting and termination at both ends shall also be done by Contractor. The Contractor shall deploy

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

adequate & experienced manpower to achieve the project completion within the stipulated time frame. The VSAT equipment shall be well tied/fixed/mounted while installation.

- d) The contractor should also ensure proper earthing of all the equipments installed under VSAT Communication network by connecting all equipment with nearest earthing point.
- e) **Power supply requirement:** Normally, 230V AC Power Supply input shall be required for IDU, router, SIP etc. DC-AC convertor shall be provided by the Contractor to keep the setup simple and less point of power failures. Input of 48V DC shall be provided by Owner.
- f) **Site Survey:** The Contractor shall carry out survey of all stations at least 2 months in advance before installation for the following –
 - To check the site conditions
 - To check the location of placement for installation of IDU as well as ODU unit
 - To check the proper route for cable laying, to measure the exact cable requirement
 - Feasibility of using existing power supply source as available at site
 - To check the earthing connection point

Survey report would be through a format which is to be submitted & proposed by supplier/integrator/party and same would be approved by Employer/Owner before survey begins. Survey shall also cover the requirement of Cables (type, length, route) for connection of IDU unit with the existing RTU (for remote locations) and with SCADA Server/Gateway /Router etc. (at SLDCs ends). For bidding purpose, bidder is required to quote for 5 mtr CAT cable per SLDC. Bidder also need to provide per meter quote in case extra length is required, accordingly customer will place the order on successful bidder. Any requirement of prerequisite like furniture/space etc. is to be intimated during survey.

- g) **Power/Communication Cable/Co-axial cable:** All cables (Power supply cable, Communication cable, Co-axial cable) and wires shall be supplied & installed as required for the scheme. The Contractor will provide 3-pin AC power cord of 5 meter length with Operating voltage 240 V AC and upto 5A current rating. The communication cable shall be STP Cat 6 cable and IFL cable will be standard RG-6 or RG-11 cable used for VSAT. Proper cabling, cable dressing, cable tagging/ferruling, conduiting of cable, cable connector shall be provided and done by the party.
- h) **Submission of Test report:** Some mandatory test reports for supplied electronic equipment shall be submitted by the Contractor as follows –
 - Submission of ATP test procedure at site
 - Routine test report
 - OEM test report for supplied equipment

If test reports are not provided by OEM, any authenticated proof from OEM/Bidder to be shared with Employer/Owner for exclusions. The Contractor shall submit Internal TRC (Testing Requirements Checklist) Certificate report.

As Cisco-make products are already approved make in POWERGRID (holding CTU status), hence test reports are not required for this device. The contractor shall share its internal test certificate.

- i) **Submission of SAT reports:** Site Acceptance Test (SAT) commissioning format for the whole scheme (from remote site-RTU site & to SLDCs SCADA) site is to be developed by party and on approval by Employer/Owner, same shall be followed in all locations. On successful installation and integration of all VSAT communication system equipment with existing system, Contractor shall arrange/conduct SAT in the presence of

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Employer/Owner's Engineer & submit SAT reports for approval of Employer/Owner. The Contractor shall submit the routine test report of all items supplied.

- j) **Documentation:** For all schemes, after commissioning, the contractor shall submit as-built drawing, as-built connection details, cable termination schedule including earthing termination & power supply connection, network topology, etc. After the completion of the work at the respective sites, the Contractor shall do & get sign in all required documents from the respective site of state-utilities as well. The party shall also submit the material reconciliation report (signed by both Contractor & respective site) for all the site locations.

All technology/architecture/routing method/path/channel/networking scheme, etc. as adopted for this scheme shall be shared by Contractor with Employer/Owner.

- k) **Statutory Clearance:** Necessary clearance, License, etc. from all applicable statutory authority shall be taken care by Contractor. However, if any fees to be deposited in govt. authority, the same would be re-imbursed by employer/Owner based on documentary evidence. Contractor shall study the same and intimate to Employer/Owner in advance.
- l) **Annual Maintenance Contract:** The scope also includes AMC for 7 years (including AMC under warranty period/defect liability period) for maintenance of VSAT equipment and Bandwidth in all sites. AMC after defect liability period shall start after completion of 12 months from the date of issuance of TOC (Taking Over Certificate). TOC will be issued within 2 weeks of signed SAT report submission for start of billing. The 12 months period from date of TOC will be considered as defect liability period or warranty period. AMC methodology including remote support & site support shall be approved by Employer/Owner (after submission by vendor as per Technical Specifications) before commissioning of system. It is the responsibility of Contractor to keep authorised representative in NER who can attend in case of physical defects to be attended at site during warranty & AMC period.
- m) During the defect liability period, the manufacturing defect will be under Contractor's scope. AMC will be limited to Contractor supplied equipment/link itself. During AMC period, if any VSAT equipment along with cable is found faulty or not working, the Contractor shall replace/repair the equipment/cable as per availability of spares. Hardware damage due to issues not attributable to Contractor or Owner attributed issues like mishandling, theft, power, short circuit, etc. shall be replaced on chargeable basis. Hindrance Register/Records shall be maintained by Contractor in this regard.
- n) The Contractor shall give the remote support through Teamviewer/Anydesk/any other software in case of issue in the VSAT network system & through video-call support or as required when physical access to site is not possible.
- o) There shall not be any other network or LAN traffic connected to VSAT Network apart from data & voice.
- p) The Contractor shall provide 99.5% uptime for VSAT connectivity. Link availability percentage report shall be provided on quarterly-basis for all sites.
- q) The Contractor shall provide Online portal to check the site uptime / online status, etc.
- r) Necessary SACFA/ other DOT/WPC permission/Govt. clearance will be required which shall be arranged by Contractor. Necessary cost shall be included in the bid itself.
- s) Any defect found in equipment/item/material shall be replaced by a new one of same model/type/specification.
- t) Road-Permit shall be arranged by the Contractor for the supply of required items/materials/equipment as per the scheme as per new GST regime rule.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

- u) Contractor shall have to use all required licensed Software & hardware.
- v) Monthly reporting format (VSAT data & voice link availability percentage or similar) shall be developed by vendor which would be sent to Employer/Owner e-mail during AMC.
- w) While raising invoice for payment purposes, place of supply/service shall be clearly mentioned.
- x) Earthing requirement (i.e. limited to connection with existing earthing) points shall be clearly mentioned during survey at initial stage. Further any spike guard/earthing protection required shall be taken up by Contractor under miscellaneous item head of BoQ, if required.
- y) High quality DC to AC converters shall be provided for all locations. The type model shall be suggested by vendor for approval.
- z) The commissioning works/troubleshooting method shall be shared by Contractor with Employer/Owner.
 - aa) All LAN cables to be supplied by Contractor and STP/FSTP (individual shielded and overall shielded cable will be used).
 - bb) Vendor shall not share any data of system in use/adopted/approved for Employer/Owner with any external agency without approval of Employer/Owner. Cyber security norms as required for VSAT system & associated networking shall be fulfilled by vendor.

B. Employer/Owner's Scope:

- a) The Power supply for IDU shall be given from existing UPS power supply output available at the site. The power supply shall be provided by the employer/Owner but feasibility of power supply shall be checked during site-survey by the Contractor.
- b) In case of any change in application or module addition, Employer/Owner shall inform/test the module on VSAT.
- c) The material and civil work activity shall be carried out by Employer/Owner; however, Contractor shall provide Engineer on field for specifying design and location of platform in advance (preferably during material verification on delivery, survey shall be done by Contractor) in advance. Some time of approx. 15-21 working days time to be provided for platform preparation by site technicians. Space/platform for placement of IDU, ODU unit and earthing connection point (if required) shall be provided by the customer. The space has to be decided during joint survey with the party.
- d) The IP address defined in SCADA site/RTU or Gateway of Remote stations (different subnet) which will be required during the configuration of VSAT network system shall be discussed and shared between Employer/Owner and Contractor during the execution of work.
- e) Based on site-survey, if additional/separate LAN switch/LAN Cable is required, the employer/Owner shall provide the same.

9.0 Technical parameters related general requirements

In the VSAT Network, VSAT based voice and data network operating on Indian Satellite shall be leased from a licensed Telecom Service Provider (TSP). The network shall operate in Extended C band frequencies for reliable operations even during heavy rains normally associated with cyclonic conditions.

VSATs shall be installed at respective sub-stations' and VSAT links shall be used for telemetry data of the respective site can be reported to existing SCADA communication server at SLDCs of NER. The average latency per site shall be around 700-750ms for single-hop and around 1500-1700ms for double-hop..

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Nominal Diameter of Extended-C band VSAT antenna shall be 1.2 meter, RF equipment and modem shall be designed by VSAT service provider, keeping in view very high reliability (better than 99.5%) requirement of the network. Structure of VSAT antenna and foundation should be designed to withstand peak wind speed of 200 Kilometres/ hour.

VSAT at SLDCs shall operate with MF-TDMA technology and will operate at 512 Kbps data rate. Substations will also be connected with 128 Kbps data rate at each site.

For the Network Monitoring System (NMS), the Telecom Service Provider shall do proactive monitoring and fault management of the network on an End-to-End basis remotely from its own Network Operations Centre (NOC) and provide the following link wise report on monthly basis incl. the following –

- Link downtime / Uptime analysis calculation to be available online via portal.
- Bandwidth utilization report with committed information rate for all links
- Network availability reports as per Service Level Parameters defined.
- Throughput, Latency, Jitter for all the locations

Note: The Service Provider shall allocate to SLDCs, with separate User-ID & Password for web-access to monitor in real time all network statistics and reports as mentioned above.

The minimum requirement has been mentioned below for which the Contractor shall quote in such a way that all requirements of the scheme are fulfilled and best quality of the items available in market are offered. Any item left to be mentioned but required for best & optimised performance of system shall be offered by bidder at its own cost.

- i) All the hardware units shall work in all weather conditions and the parts shall be rust proof.
- ii) This is minimum requirement and higher or better shall be acceptable in it. Technical approval shall be taken for each model/type.

1. Antenna: Minimum specifications mentioned in *table* below in which same or better or higher shall be offered by Contractor.

S. No.	Particulars for 1.2 m Antenna	Specifications
A.	Electrical Performance	
1	Band of Operation	Antenna shall operate in INSAT XC band
2	Reflector Size	1.2 metre
3	Operating Frequency	Tx: 6.725 – 7.025 GHz Rx: 4.500 – 4.800 GHz
4	Polarization Sense	Linear Orthogonal Orientable
5	VSWR	Tx – 1.3 : 1 Rx – 1.33 : 1
6	Mid-band Gain (± 0.5dB)	Tx: 36.8 dbi Rx: 33.2 dbi
7	Antenna Noise Temperature	50°K @ 30°EL
8	Antenna Cross Polarization on Axis (dB)	30db
9	Feed Interface Port	Tx: Coaxial N-Female o WR137 Rx: WR229

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Particulars for 1.2 m Antenna	Specifications
B. Mechanical Performance		
1	Reflector Material	Glass Fibre Reinforced Polyester
2	Antenna Optics	Prime Focus, Offset Fed
3	Mount Type	Elevation Over Azimuth
4	Steerability Azimuth	±360° Coarse, ±20° fine
5	Elevation	5° to 90° fine
C. Environmental Performance		
1	Wind Speed Operation/ Survival	The mechanical structure shall be suitable to operate within specifications in wind-speed upto 70km/hr and survive upto 200km/hr
2	Temperature Operational	-40°C to 60°C
3	Temperature Survival	-50°C to 70°C
4	Rain Operational	½"/hr
5	Solar Radiation	360 BTU/h/ft ²
6	ITU recommendations	Antenna shall meet ITU recommendations

Table 1: Specifications for 1.2m Antenna

S. No.	Particulars for 1.8 m Antenna	Specifications
A. Electrical Performance		
1	Band of Operation	Antenna shall operate in INSAT C band
2	Reflector Size	1.8 metre
3	Operating Frequency	Tx: 6.725 – 7.025 GHz Rx: 4.5 – 4.8 GHz
4	Polarization Sense	Polarization of antenna shall support either circular polarization (in case of international satellite) or linear polarization (in case of working with INSAT satellites) as per service provider's satellite requirements. However, bidder need to quote antenna with any one option.
5	VSWR	The VSWR shall be 1.3:1 Max
6	Mid-band Gain (± 0.5dB)	The mid-band gain shall be 35.5.9 dBi (Rx) and 39.4dBi (Tx)
7	Antenna Noise Temperature	10° Elevation - 56K 20° Elevation - 49K 30° Elevation - 47K
8	Feed Interface Port	Rx CPR229F, WR229 Tx CPR 137 or Type N, WR137
B. Mechanical Performance		
1	Reflector Material	Glass Fibre Reinforced Polyester SMC
2	Antenna Optics	Prime Focus, One-Piece Offset Feed
3	Mount Type	Elevation Over Azimuth
C. Environmental Performance		

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Particulars for 1.8 m Antenna	Specifications
1	Wind Speed Operation/ Survival	The mechanical structure shall be suitable to operate within specifications in wind-speed upto 70km/hr and survive upto 200km/hr.
2	Temperature Operational	-40°C to 60°C
3	Climate Condition	The antenna shall not corrode due to effect of Salt, Pollutants and Contaminants as encountered in coastal or industrial areas.
4	Rain Operational	½"/hr
5	Solar Radiation	360 BTU/h/ft ²
6	ITU recommendations	Antenna shall meet ITU recommendations

Table 2: Specifications for 1.8m Antenna

2. **Outdoor Unit (ODU):** Minimum specifications mentioned in *table* below in which BUC shall be same or better or higher model. Its mode shall be compatible model with the Antenna-2W/5W.

S. No.	Description of Parameters	Specification
1	RF Frequency	6.725-7.025 GHz/ 6.725-7.025 GHz
2	LO Frequency	4.90 / 5.76 GHz
3	IF Frequency	965 to 1,265MHz MHz/ 965 to 1,265MHz MHz
4	Output Power	Minimum 2W / Ref. (10MHz from modem) Input: F-type, Female Connector
5	DC Power Input	IF Connector
6	Input Impedance	75 ohms nom<F-type Model>

Table 3: Specifications for Outdoor Unit (ODU)

3. **Low Noise Block (LNB):** Minimum specifications mentioned in *table* below under which LNB shall be same or better or higher model.

S. No.	Description of Parameters	Specification
1	Model	AN1395 or Higher or equivalent RF Frequency: 4.5 to 4.8 GHz
2	Local Oscillator	5.95 GHz, Total Frequency Accuracy: ±1 MHz max
3	Input/Output Connector	Waveguide WR-229G with groove with gasket/F-Type
4	Supply Voltage	DC through IF cable from IDU
5	Operating Temperature	-40°C to +60°C (operating)
6	Outdoor Relative Humidity	upto 90%

Table 4: Specifications for Low Noise Block (LNB)

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

4. Indoor Unit (IDU) Modem: Minimum specifications mentioned in *table* below under which LNB shall be same or better or higher model.

S. No.	Particulars	Specifications
A. Forward Channel		
1	Technology	DVB-S2/DVB-S2X with Adaptive Coding and Modulation (ACM)
2	Frequency	IDU Should operate in INSAT C Band
3	Modulation	QPSK, 8PSK, 16APSK, 32APSK, 64APSK
4	Encapsulation	GSE / Equivalent
5	Symbol Rates	Up to 235 Msps
B. Return Channel		
1	Communication Network	Shall be designed based on MFTDMA
2	Modulation	OQPSK/QPSK, 8PSK/16APSK/16QAM
3	Symbol Rates	256 Ksps to 12 Msps
C. Network Interfaces		
1	LAN Ports	4 GigE LAN ports
2	USB	1 USB
D. Power Supply		
1	Input Voltage Range	The system should work with nominal A/C 230 volts single phase input or DC voltage of +/-48VDC
2	Power Consumption	The input power requirement of the VSAT system shall not be more than 200 Watts
E. Environmental		
1	Operating Temperature	0°C to 50°C
2	Relative Humidity	0 to 90% (non-condensing)
F. Regulatory		
1	Safety	UL/CSA/EN 60950-1
2	EMC	FCC Part 15 Class B, ICES-003
3	RoHS	RoHS-2 compliant
4	IP Features	Modem should support below features: <ul style="list-style-type: none"> • Dual stack IPv4/IPv6 • Static and Dynamic Addressing • NAT/PAT • RIPv2, RIPNG • VLAN tagging • VRRP • Access Control List (ACL) • DNS Caching • SIP Call Proxy • Advanced Web Acceleration

Table 5: Specifications for Indoor Unit (IDU) Modem

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

5. **SIP Phones:** Minimum specifications mentioned in *table* below under which phones shall be same or better or higher model. SIP Phones to be supplied shall be compatible with the VSAT network system. It shall enable high quality SIP. The proposed IP phones shall comply with the following features –

- 12-part keypad
- Graphical display
- Navigator keys (min 3)
- Message waiting with LED
- Speaker with LED
- Freely programmable keys (min 8)
- Open listening
- Full duplex
- Hands-free speaking
- Integrated Ethernet switch for PC connection
- Power over Ethernet IEEE 802.3af class 1
- LAN interface, 10/100 MBit/s autosensing,
- Mute function
- Directory access and dial by name
- Display of call ID by name and number
- Option for wall mounting
- LAN Cable length shall support upto 60 m

10.0 Special Technical Conditions of Contract

- a) In the SCADA Control Room (SLDCs end), the configuration/integration of the IDU unit (A fixed IP address should be allocated in the IP series of the existing SCADA LAN switch or SCADA Router) is to be done by the Contractor after deciding the mutually accepted IP addresses during the execution of the work. Approval for configuration of IP will be taken by Employer/Owner.
- b) AMC criteria will be as per mutually agreed upon between the Contractor and Employer/Owner.
- c) Procedure to check/rectify the issue in respect of SIP phone; in case the phone is not working, same shall be handed over to respective site.
- d) After supply of materials, the materials shall be jointly verified in comparison to Technical Specifications/BoQ. All materials to be approved by Employer/Owner.
- e) **Delivery Schedule & Installation Completion schedule:** 9 months from date of Notification of Award/Letter of Award. Break-up of activities (as per L2 Schedule) w.r.t. 9 months shall be given by the Contractor before award.
- f) **Freight and Insurance:** Materials shall be sent through reputed party & documentary evidence to be shared during supply invoicing.
- g) **Quantity Variation:** 30% (Thirty percentage) of total contract price.
- h) **Warranty:** 1 year from date of VSAT commissioning for manufacturing defect. Any replacement/repair of any item including to-and-fro transportation cost is in scope of bidder. Replacement/repair to be done within one month during warranty period.
- i) **After Sales and Service Support:** Contractor shall have after-sales and service support in NER India for next 7 years and it will be responsibility of Contractor to provide contact details, email id, service support center details at the time of bidding.
- j) **Project In Charge:** To be appointed by Employer/respective Owners.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

- k) Consignee details will be provided by Employer/Owner.
- l) All the Contractor supplied equipment/devices shall be of reputed make or any other Employer/Owner approved brand. If the Contractor offers any other brand, then same shall comply all technical requirements and shall have been type-tested & supplied in any other Employer/Owner/NTPC/SAIL or similar Central PSU project.
- m) The time-frame break up/schedule is as follows –
 - Scheme Approval by 15 days - 30 days.
 - Survey & report submission within 3 months of LoA/NoA.
 - Supply readiness/ prototype demo & Inspection by 6th month of LoA/NoA, if required.
 - Drawing/DRS/Item approval by 6th month from date of LoA/NoA.
 - Delivery by 7th month w.r.t. NoA/LoA.
 - Supervision/Commissioning & Installation & others by 8th-10th month w.r.t. NoA/LoA.
 - Integration with SLDCs by 11th-12th month w.r.t. NoA/LoA.
- n) The Contractor shall deploy adequate manpower to achieve the project completion within the stipulated time frame. Wherever site is not ready, Contractor will simulate/supply the item in other locations with full details of installation procedure by employer/state representative at later stage with full-remote support or as required from Contractor.
- o) Respective site in-charge shall sign the SAT (approved Site Acceptance Report Template after commissioning) and based on same TOC will be issued per site.

11.0 Annual Maintenance Contract Scope & Agreement

These Technical Specifications of Annual Maintenance Contract is extension of Scope of AMC as mentioned in brief in initial part of the document. Contractor shall be responsible for comprehensive maintenance of all the VSAT equipment and Bandwidth of all sites. This Contract also includes AMC of 7 years (including AMC under warranty period/defect liability period) for maintenance of VSAT equipment and Bandwidth at all sites.

Defect liability period for twelve (12) months shall start from the date of TOC (Taking Over Certificate) along with operational acceptance after completion of the contract. During the defect liability period and AMC period, if any VSAT equipment along with associated cables, Bandwidth/Hub/Link issues are found faulty/damaged/burnt or not working or down, the Contractor shall replace/repair/rectify the equipment/cable free-of-cost and resolve the issues at minimum possible time. Contractor shall have to make their own assessment of the network and deploy manpower accordingly. The details of AMC procedure shall be submitted by Contractor & approved by Employer/Owner after award of Contract.

The Contractor shall give the remote support through Team-Viewer/Anydesk/any other software whenever there is issue in the VSAT network system. It is to be ensured that fault shall be attended within the specified response time. Contractor shall arrange for adequate transportation for their staff as per the demand of works.

Contractor’s staff (at all locations) shall be equipped with necessary tool kits, mobile phones, vehicle, etc. The Maintenance of the system supplied & installed by the Contractor shall be comprehensive in nature and all the spares (if any) required during maintenance period shall be provided by the Contractor at no additional cost to the Employer/Owner.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

a) Resource Deployment

In order to cover the entire network, it is imperative that Contractor’s maintenance engineers are strategically located so as to reach the site within shortest possible time frame to maintain required system availability of more than 99.5% for VSAT Network System. Accordingly, Contractor shall access the actual manpower requirement and place them suitably. The exact location for deploying engineer shall be finalized during detailed engineering.

b) Monitoring

The network will be monitored by Employer/Owner at respective SLDCs. Network Monitoring Team (NMT), whenever, notices any fault/abnormality in the system shall notify to the Contractor’s maintenance Co-ordinator, over phone with an unique event number. An event report shall be generated by Employer/Owner as per the enclosed formats. On issuance of Event report (may be recorded over phone in case of non-availability of Contractor’s representative) by NMT, corrective action(s) shall be carried out by Contractor’s maintenance personnel for rectification. Contractor’s representative must report within four (04) hours at locations where Contractor’s engineers are stationed and within reasonable time at all other location which shall in no case exceed more than 12 hours (including travel time). Time mentioned here is irrespective of normal working hours or holidays. The NMT shall co-ordinate and control any site visits to ensure that communication network is operating with a minimum of disruption during these visits. The NMT will inform the relevant Owner Constituent to facilitate the access to the site/equipment where fault is suspected.

The main responsibilities of the Employer/Owner’s Network Monitoring Team are as follows –

- Telemetry of data/Voice communication monitoring.
- Detect faults, prioritizing them and notifying to the Contractor for immediate corrective actions.
- Follow up on corrective actions to verify that the agreed time frames are met.
- Record all faults in the fault record sheet and summary of action taken for fault rectifications.
- Co-ordinate all planned / breakdown site visits to minimize disturbance of service.
- Update status information of operated network to user’s communication network.

c) Maintenance

The maintenance activities are either Event Based (Fault/breakdown maintenance,) or planned site visits (Semi-annual site visit, testing of link/channels, augmentation and modification in the network if end equipment for data/speech does not communicate with corresponding equipment as and when required. Planned visits shall mainly carried out during working days.

Event based work is to be carried out round-the-clock seven (07) days a week, A start status shall be jointly filled by Employer/Owner & Contractors representative at 10:00 Hrs. of commencement date of maintenance contract.

Planned site visits shall be carried out once in a year (annually) at all the sites in the network or time-to-time if speech is affected at a particular site. Thus, in a year, not less than one (01) planned site visit to all locations will be undertaken.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Contractor will maintain record of events during the maintenance services; simultaneously Employer/Owner Constituent shall also record the events in the respective log-books available in the SLDCs.

The tasks during the planned site visits for the system include but are not limited to following:

- Updating of log records
- Measurement of earth resistance (to be measured by respective site in charge during Preventive Maintenance visits)

The works to be taken up during annual site visits is given in enclosed Format.

Fault/Breakdown maintenance is a process of fault correction/troubleshooting as per the fault reported by NMT. Contractor shall maintain a log of activities carried out at all locations and necessary History will include site name, visit date, actions taken and site condition. A detailed report in this respect shall be submitted by the Contractor in the monthly meeting.

The representatives of Employer/Owner Constituents will associate in trouble shooting, change of unit as per programme notified/intimated by the contractor; however, due to any reason if Employer/Owner cannot depute their representative then Contractor will proceed for the work so as to attend the breakdown/testing as per their scheduled programme.

The scope of corrective maintenance is as follows –

- Troubleshooting on a network element and its interfaces as and when required and directed by NMT, engineer/coordinator of Employer/Owner.
- Diagnostics on interfaces to locate problems in network. If required, the Contractor shall depute maintenance engineer for joint inspection with other vendors for pin-pointing the fault.
- Identification of the faulty hardware unit and replacing it.
- Performance of function verification in co-ordination with the NMT operators.
- Handing over of faulty unit to Employer/Owner at site or respective SLDC.

d) Hardware Services

In case any failure or malfunction is discovered, the maintenance team shall identify the problem, organize to promptly attend the fault, replace the faulty equipment/card/module or any other hardware component with a spare unit and ship the faulty unit to specified location. Each faulty unit shall be accompanied with correctly filled-out Event Report.

The Contractor shall carry out the following tasks for hardware services –

- Faulty spare will be taken back by the Contractor.
- Replace faulty units from their own spares stock. However, in case of hardware replacement with refurbished unit, the Contractor shall give self-declaration for warranty. In general, otherwise, new item (may be from store or so) shall be provided by Contractor.

e) Hub Uptime Availability

The party will provide quarterly Hub uptime of 99.5% with exclusions of force majeure, sun outage, satellite failure and planned maintenance. Link availability percentage report

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

should be provided on quarterly basis for 24 x 7 x 365 days operation meeting Network performance. The Hub Uptime will be calculated based on the following formula –
Hub Uptime (HU) in % = $((\text{Hub}_{\text{POT}} - \text{Hub}_{\text{DT}}) / \text{Hub}_{\text{POT}}) * 100$ Where,
Hub_{POT} = Hub power on time, Hub_{DT} = Hub down time

- **For high capacity MFTDMA / DVB-S2 latest technology VSAT links**
 - MFTDMA / DVB-S2 latest technology VSAT link availability = 99.5% (averaged on quarterly basis)
 - Maximum Time To Repair/Replace (MTTR) the items of MFTDMA VSAT link (at remote side) = 24 hours from the time of reporting of fault.
 - Maximum Time To Repair (MTTR) MFTDMA = 05 hours from the time of reporting of fault (using redundant items if any supplied with VSAT)
 - In case, the contractor is unable to meet any of the above condition, the contractor shall pay penalty of ₹ 2,000 per day.

f) MFTDMA / DVB-S2 latest technology VSATs Uptime / Availability

The contractor should guarantee that each Ext C-Band remote VSAT Uptime of 99.5%. VSATs should meet Network Performance as mentioned in the tender.

- Individual VSAT downtime refers to the time for which the VSAT equipment is unable to support the satellite link with the Hub, due to failure of the VSAT IDU, RFT/BUC, LNB, Antenna system, IFL cable, connectors, etc. The VSAT fault means that remote VSAT not meeting the Performance of VSAT mentioned in the tender.
- The maximum time to repair (MTTR) of VSAT will not exceed the following –
 - 72 Hrs. for SLDCs.
 - 120 Hrs. for remote stations (considering the difficulty areas of NE region).
- In case the maximum time to repair the VSAT exceeds the above-mentioned duration or unable to meet the desired uptime, Contractor would pay penalty of an amount of ₹ 500 per remote VSAT per week and maximum upto 10% of AMC value of that problematic site (NE).
- The downtime starts from the time complaint is logged. Any delay in logging the complaint by user shall be excluded from the downtime calculations.
- Penalties whichever shall be at the higher side shall be imposed.

For the purpose of the above clause, non-availability/degradation in the throughput of service on account of the following shall not be construed as defect or interruption in 'Remote VSAT availability' –

- Failure or fluctuation of electric power.
- Accident, neglect of the equipment.
- Any fault in any attachments or associated equipment, which is not supplied by the Contractor.
- Downtime caused due to optimization and preventive maintenance of VSAT Hub.
- Event of Force Majeure conditions like natural calamities, civil disturbance, strike, war, curfew, flood, serious accident during traveling for attending fault etc.
- Non-Availability / degradation of satellite / Transponder.

g) Documentation during Maintenance Period

Events shall be recorded by using of event form. The forms shall be filled in duly dated, timed and signed by representatives of both the parties. Absence of one or the other

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

party's representative shall not render the record invalid but assumes only that such representative signs the record at his earliest convenience.

The initial condition of the system shall be recorded on the start status form to constitute or reference for later events. All the events recorded in the start status form shall have to be rectified. If a unit is replaced or repaired both the new and the replaced or repaired unit is to be recorded in the event report form. Contractor shall submit the detailed report for fault occurrence after the cards/equipment is rectified at the works of supplier.

The Contractor shall submit the Maintenance Service Report for each VSAT site duly signed by the official of the site for the confirmation of satisfactory maintenance services and functionality of the link during the period of warranty as well as AMC (yearly report). Employer/Owner and Contractor shall mutually decide the format of Maintenance Service Report.

h) Intimation on Team & Support System

The vendor shall give details of support system (in NER, how maintenance will be done, details of office address, manpower strength, availability of authorized representative in NER for all sites) during bidding.

i) Scope of Work during Maintenance Period

Sl. No.	Description	Detailed Scope
1.0	Overall Infrastructure	Infrastructure includes the building, air conditioners, AC/DC system, UPS, cable trenches, Earthing, etc. provided by Employer/Owner. They will be maintained by Employer/Owner.
1.1	Equipment site	
1.1.1	General conditions	General checking during quarterly / troubleshooting site visits and advise.
1.1.2	Cleanliness of the room	General checking during quarterly / troubleshooting site visits and advise.
1.1.3	Earthing interconnections	Earth resistance measurement shall be done by Employer/Owner station team during Preventive Maintenance. The Contractor shall get the earthing resistance value noted in visit report.
1.1.4	Cable route	General checking during quarterly / troubleshooting site visits and advise.
1.1.5	EMI issues	This shall be under Employer/Owner scope. The Contractor intimated this is general practice that whenever there is fault or outage, fault analysis report is shared by Contractor with customer.
1.2	UPS	Checking of output values, earthing interconnection during quarterly site visits and advice. It shall also be checked during troubleshooting site visits if it is considered the probable cause of fault.
1.3	Indoor cabling	Checking terminations, re-kroning, if necessary, during semi-annual/troubleshooting site visits. It shall also be checked during troubleshooting site visits if it is the probable cause of faults.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Sl. No.	Description	Detailed Scope
1.4	Out-door cabling	Checking terminations, re-kroning, if necessary, during semi-annual/troubleshooting site visits. It shall also be checked during troubleshooting site visits if it is the probable cause of faults.
2	Main Equipment	
2.1	VSAT System	Faulty equipment to be replaced at site as per conditions of Maintenance Plan.
2.2	Monitoring and general operation of VSAT System	Regular monitoring of the VSAT link. Investigations for abnormal behaviour and take corrective actions.
2.3	Provisioning/ Re-provisioning of channels	As per requirement.

Other associated works:

- Prior intimation shall be given to the respective sites via email/letter before going for AMC at sites.
- Physical checking of antenna footing for corrosion, breakage, loosening/breakage of cemented footing shall be done during the AMC visit.
- Measurement of Earth Resistance of Antenna Footage and VSAT equipment shall be done during the AMC.
- Input Power Supply voltage shall be checked and measured.
- Cable dressing if any and cleaning of VSAT equipment shall be done during AMC.
- For voice communication, voice quality of IP phone shall be checked. If any faulty/defective/issue found in phone, the contractor shall send for repairing/replacement free of cost.
- Software and firmware maintenance shall be done (if any).
- Employer shall be informed of all alterations or improvements to the hardware supplied under this Specification. Employer shall be placed on the Contractor's mailing list to receive announcements of the discovery, documentation, and solution of hardware problems as well as other improvements that could be made to hardware which is provided with the communication equipment. The service shall begin at the time of contract award and shall continue for seven years. The Contractor shall also include a subscription to the hardware subcontractors' change notification service from the time of contract award through the warranty period, with an Employer renewable option for extended periods.

j) Coordination Requirements

• **Meeting Practice**

Regular meeting between Employer/Owner and the Contractor is vital for communication and information flow between these two organizations. The purpose of the meeting is to tackle the essential issues concerning the services and network performance. The suggested schedule for meeting is once in every month. The meeting agenda shall be decided between Employer/Owner and Contractor and could for example consist of the following issues:

- Services and network performance according to the report during last month
- Review of emergency situation
- Status of spare

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

- Action plan
- Next Meeting
- Alarms/events unattended till the date of meeting

The following participants shall be present in the meeting –

- Co-ordinator (Contractor)
- Members of the Contractor team as needed
- Co-ordinator Employer/Owner representative
- Operation and maintenance staff as designated to attend (Employer/Owner)

Virtual platform shall be used for meeting unless both parties feel site/office visit is required under some technical urgency or so as exception.

- **Emergency Meeting**
 - Whenever a major outage occurs in any part of the network, an emergency meeting may be called if desired by Employer/Owner. In the meeting, the outage will be discussed in the context of cause, correction and prevention.
- **SCADA, Telecommunication and Telemetry Meeting (NETeST)**
 - NETeST meeting is being conducted by NERPC on quarterly-basis in which all the communication elated issues are taken up in the forum. Contractor shall participate in such meetings as and when requested by Owner or NERPC.
- **Interface between Employer/Owner and Contractor**

Contractor Interfaces

Contractor shall submit detail of personnel deployed in the enclosed format through which all problems identified by Employer/Owner are to be reported to Contractor via duty phone.

Description		
Name		
Telephone		
Fax		
Email		

Note: The total value of penalties which can be imposed during one year due to non-compliance of AMC Agreement shall not exceed the total value of Work Awarded to the Contractor for the services (like AMC, Hub operation, etc.) for that one year period plus Bank Guarantees available with Employer/Owner under this tender/rate contract.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

EVENT REPORT FORM

Event Report No _____ Date: _____

Station: _____ Constituent: _____

Affected circuit: _____

Fault Description: _____

A) Event start time _____ date _____ time _____

B) Reporting time by NMT _____ date _____ time _____

REPORT

i) Failure within contractor system
Yes _____ No _____ (If No then date _____ time _____)

ii) Entrance to site and room for rectification date _____ time _____

iii) Rectification start time by Contractor date _____ time _____

iv) Fault fixed date _____ time _____

Total Outage time _____

Comments: _____

Faulty unit Sl. No: _____

New Unit Sl. No.: _____

Date: _____
Employer/Owner _____ Contractor _____

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

START STATUS FORM

Page: (1)

Report no:

Time : 10.00 Hrs:

Start: Date : _____

	Station	Description
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____

Special test conditions or action:

Attachments:

Initials:

Employer/Owner _____

Contractor _____

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Annexure-2**List of stations for VSAT Installation in NER**

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
A. Meghalaya							
1	Mendipathar	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
2	Khliehriat	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
3	Lumshnong	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
4	Killing	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
5	Umtru	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
6	Umiam Stage IV	132	MePTCL, Meghalaya	--	--	--	Real-time operational data to be telemetered for grid monitoring.
B. Manipur							
7	Rengpang	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
8	Tipaimukh	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							d for grid monitoring.
9	Thanlon	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
10	Hundung	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
11	Karong	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
12	Chandel	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
13	Tamenglong	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
14	Moreh	132	MSPCL, Manipur	--	--	--	Real-time operational data to be telemetered for grid monitoring.
C.	Mizoram						
15	Champhai	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
16	Khawzawl	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
17	Saitual	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
18	Bukpui	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
19	Khawiva	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
20	E.Lungdar	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
21	Lawngtlai	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
22	Bairabi	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
23	Mamit	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
24	W.Phaileng	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
25	Marpara	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							d for grid monitoring.
26	Lungsen	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
27	Sihhmui	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
28	Melriat	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
29	Zuangtui	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
30	Luangmual	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
31	Bawktlang	132	P&ED-Mizoram	--	--	--	Real-time operational data to be telemetered for grid monitoring.
D.	Arunachal Pradesh						
32	Lekhi Industry	33	DoP, Arunachal Pradesh	--	--	--	Located in Papum Pare District. Drawing power from Grid Lekhi S/s.
33	Bandardawa Industry	33	DoP, Arunachal Pradesh	--	--	--	Located in Papum Pare District. Drawing

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							power from Grid Nirjuli S/s.
34	Holongi Industry	33	DoP, Arunachal Pradesh	--	--	--	Located in Papum Pare District. Drawing power from Grid Chimpu S/s.
35	Tippi Industry	33	DoP, Arunachal Pradesh	--	--	--	Located in West Kaming District. Drawing power from Grid Tippi S/s.
36	Liker MHP, Kamba, Aalo	33	DoP, Arunachal Pradesh	--	--	--	Located in West Siang District. Power being injected in grid.
37	Tago MHP, Ziro	33	DoP, Arunachal Pradesh	--	--	--	Located in Lower Subansiri District. Power to be injected in grid.
38	Nuranang MHS, Jung	33	DoP, Arunachal Pradesh	--	--	--	Located in Tawang District. Power to be injected in grid.
39	Mukto MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in Tawang District. Power to be injected in grid.
40	Sippi MHS, Daporijo	33	DoP, Arunachal Pradesh	--	--	--	Located in Upper Subansiri District. Power to

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							be injected in grid.
41	Liromoba MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in West Siang District. Power to be injected in grid.
42	Kitpi Ph-II MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in Tawang District. Power to be injected in grid.
43	Subung MHS, Boleng	33	DoP, Arunachal Pradesh	--	--	--	Located in Siang District. Power to be injected into Grid.
44	Jengging MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in Upper Siang District. Power to be injected into Grid.
45	Paciha MHS	33	DoP, Arunachal Pradesh	--	--	--	Located in East Kameng District. Power to be injected into Grid.
46	Gerukamukh (Kamle District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no provision of redundant communication links.
47	Ziro (New)/Yachuli (Lower Subansiri District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							sive Scheme with no fix provisioning of redundant communication links.
48	Basar (Lepa Rada District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
49	Seppa (East Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
50	Rilo (Pakke Kessang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
51	Bameng (East Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							sive Scheme with no fix provisioning of redundant communication links.
52	Seijosa (Pakke Kessang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
53	Naharlagun (Papum Pare District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
54	Banderdewa (Papum Pare District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
55	Sagali (Papum Pare District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							sive Scheme with no fix provisioning of redundant communication links.
56	Holongi (Papum Pare District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
57	Kambang (West Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
58	Likabali (Lower Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
59	Koloriang (Kurung Kumey District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							sive Scheme with no fix provisioning of redundant communication links.
60	Palin (Kra Daadi District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
61	Niglok (East Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
62	Pasighat (East Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
63	Miao (Changlang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							sive Scheme with no fix provisioning of redundant communication links.
64	Jairampur (Changlang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
65	Changlang (Changlang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
66	Khonsa (Tirap District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
67	Dambuk (Lower Dibang Valley District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							sive Scheme with no fix provisioning of redundant communication links.
68	Halaipani (Anjaw District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
69	Yingkiong (Upper Siang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
70	Bomdila (West Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
71	Tawang (Tawang District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							sive Scheme with no fix provisioning of redundant communication links.
72	Kalaktang (West Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
73	Tenga (West Kameng District)	132/33	DoP, Arunachal Pradesh	--	--	--	Station getting constructed under Comprehensive Scheme with no fix provisioning of redundant communication links.
E. Nagaland							
74	Sanis	132/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
75	Kiphire	132/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
76	Zadima	220/132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
77	Philimi, Zunheboto	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
78	Chiephobozou, Kohima	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
79	Nagaland University, Kohima	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
80	Pfutsero, Phek	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
81	Wokha	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
82	Meluri	132/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
83	Power House	66/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
84	Ganeshnagar	66/33	DoP-Nagaland	No	No	Existing	Tail-End station with no path diversity
85	Tuli	66/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
86	Tuensang	66/33	DoP-Nagaland	No	No	Existing	Tail-End station with no path diversity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
87	Mon	66/33	DoP-Nagaland	Yes	No	Existing	Tail-End station with no path diversity
88	Zunheboto	66/33	DoP-Nagaland	No	No	Existing	Tail-End station with no path diversity
89	Chumukedima	66/33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
90	Sovima	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
91	Dairy Farm	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
92	Nito Farm	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
93	Tizit	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
94	Naginimora	66/33	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
95	Mon Power House	66/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
96	Likimro HEP	Nov-66	DoP-Nagaland	No	No	Existing	Tail-End station with no path diversity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
97	Forest	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
98	Supermarket	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
99	Padampukhuri	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
100	Medziphema	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
101	Peren	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
102	Jalukie	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
103	Referral	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
104	Rangapahar	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
105	Dhansiripahar	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
106	Niuland	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
107	Lerie	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
108	Keyake	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
109	Jakhama	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
110	New Secretariat Complex	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
111	IG Stadium	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
112	ITI	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
113	Naga Bazar	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
114	Pungro	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
115	Kiphire Town	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
116	Zubza	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
117	Sataka	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
118	Tuensang Town PH	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
119	3rd NAP Camp	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
120	Noklak	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
121	Mokokchung	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
122	Amphuto	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
123	Longnak	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
124	Hospital Power House Mokokchung	33/11	DoP-Nagaland	No	No	Proposed	Tail-End station with no path diversity
F.	Assam						
125	CTPS	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
126	Hailakandi	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							d for grid monitoring.
127	Hatsingimari	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
128	Narengi	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
129	Pavoi	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
130	Rangia	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
131	Khaloigaon	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
132	Umrangshu	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
133	Haflong	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
134	Dullavcherra	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
135	Ghoramari	132	AEGCL, Assam	--	--	--	Real-time operational

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							data to be telemetered for grid monitoring.
136	Matia	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
137	Dispur (Capital)	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
138	APM	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
139	Jorhat West	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
140	Bokakhat	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
141	Sibsagar (Betbari)	132	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
142	Sonapur	220	AEGCL, Assam	--	--	--	Real-time operational data to be telemetered for grid monitoring.
G. Tripura							
143	Dharmanagar	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							d for grid monitoring.
144	Ambassa	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
145	Dhalabil	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
146	Baramura (GTP)	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
147	Rokhia	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
148	Monarchak GS	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
149	Kanchanpur	132	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
150	Gandacherra	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
151	Ompi	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
152	Gokulnagar	66	TSECL, Tripura	--	--	--	Real-time operational

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

S. No.	Stations Proposed for VSAT Project	Voltage Level (in kV)	Ownership	Telemetry Available (Yes/ No)	Fiber-Optic Available Yes/ No)	RTU Proposed/ Existing	Remarks
							data to be telemetered for grid monitoring.
153	Sabroom	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
154	Satchand	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
155	Bogafa	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
156	Belonia	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.
157	Gumi HEP	66	TSECL, Tripura	--	--	--	Real-time operational data to be telemetered for grid monitoring.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Annexure-3

Bill of Quantity: Cost Break-up of various components

- **Opex Type of financial model for establishment VSAT communication set-up in NER on hiring (hub services) basis**

In the Opex type of model, the hub services can be taken on hiring basis from the service provider of VSAT communication. Some tentative figures corresponding to the associated financial implications are mentioned in *table* below.

Tentative financial implications of VSAT communication in case of hiring of hub (for 129 sites)				
VSAT CAPEX for Real Time SCADA data for 129 Sites – With 1 year Warranty and 2 year AMC				
Sl. No.	Details	Quantity, A	Unit Price (in INR), B	Total Cost (in INR), C = A x B
1	VSAT Equipment including: HT Modem with 4 LAN Port (or additional switch with 5 ports along with Modem), 1.2 M Ex-C Band Tx/Rx Antenna, 2W BUC with LNB, Integration Material, Freight Charges with 1 Year Warranty	157		
2	VSAT Equipment including: HT Modem with 4 LAN Port (or additional switch with 5 ports along with Modem), 1.8M Ex-C Band Tx/Rx Antenna, 5W BUC with LNB Integration Material, Freight Charges with 1 Year Warranty	7		
3	Installation and Commissioning for 1.2 Mtr Antenna+ License liasioning charges for WPC/SACFA Clearance	157		
4	Installation and Commissioning for 1.8 Mtr Antenna+ License liasioning charges for WPC/SACFA Clearance	7		
5	DC Power Supply - 48V DC	164		
6	VSAT Platform Charges – 1.2 Mtr Antenna	157		
7	VSAT Platform Charges – 1.8 Mtr Antenna	07		
	Capital Expenditure			

VSAT OPEX for Real Time SCADA data for 129 Sites - Per Annum				
Sl. No.	Details	Quantity, A	Unit Price (in INR), B	Total Cost (in INR), C = A x B
1	Extended-C band, 128 Kbps site-wise bandwidth for each remote site per annum	157		

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

2	Extended-C band, 512 Kbps site-wise bandwidth for SLDCs per annum	7		
3	AMC support at 1.2m remote per annum (from 2nd year onwards)	157		
4	AMC support at 1.8m SLDC per annum (from 2nd year onwards)	7		
5	NMS Charges	1		
Operational Expenditure for 6 Years (6 year Bandwidth & 5 Year AMC)				

Miscellaneous CAPEX				
Sl. No	Description	Quantity, A	Unit Price (in INR), B	Total Cost (in INR), C = A x B
1	IEC 101 to 104 Protocol Converter	157		
2	Session Initiated Protocol Phones	164		
Miscellaneous Capital Expenditure				

Date: _____

Signature: _____

Name: _____

(Authorized Representative)



**Detailed Project Report (DPR)
for
Procurement and Installation of Remote
Terminal Units in selected stations of
North Eastern Region (NER)**

2022

North Eastern Regional Power Committee
NERPC Complex, Dong Parmaw
Lapalang, Shillong - 793006 (Meghalaya)
Website: www.nerpc.nic.in
email: nerpc@ymail.com

Summary of Proposal

For Official Use - To be filled by the Nodal Agency of PSDF	
Project Proposal Number:	Date of Receipt:

To be filled by the Applicant Organization / Utility		
1	Name of the requesting Organization/ Utility	<ul style="list-style-type: none"> • Department of Power, Arunachal Pradesh • Assam Electricity Grid Corporation Limited • Manipur State Power Company Limited • Meghalaya Power Transmission Corporation Limited • Power & Energy Department of Mizoram • Department of Power of Nagaland
2	Short Summary of Project/ Scheme/ Activity	
a	Name of the Project/ Scheme/ Activity	Procurement and Installation of Remote Terminal Units in selected stations of North Eastern Region (NER) for Real-Time Data Telemetry purposes.
b	Objective of the Project/ Scheme/ Activity	Supply, Installation, Testing and Commissioning of Remote Terminal Units (around 155 in nos.) in selected stations of North Eastern Region (NER) for facilitating Real-Time Data Telemetry in respective State Load Despatch Centres.
c	Authorised Person for this Project/ Scheme/ Activity	<ul style="list-style-type: none"> • Arunachal Pradesh: Executive Engineer, SLDC Itanagar, DoP, 132kV Chimpu Substation, Itanagar, Arunachal Pradesh – 791111 • Assam: Chief General Manager, State Load Despatch Centre, Assam Electricity Grid Corporation Ltd., ASEB Colony, Power House, Kahilipara, Guwahati-781019 • Manipur: General Manager, State Load Despatch Centre, Yurembam Power House, Imphal West-795004, Manipur • Meghalaya: Superintending Engineer, State Load Despatch Centre, Meghalaya Power Transmission Corp. Ltd., Umjarain Mawkynroh, NEHU Campus, Shillong-793022, Meghalaya • Mizoram: Sr. Executive Engineer, State Load Despatch Centre Division, P&E Office Complex, North Block (III Floor), Electric Veng, Aizawl- 796001, Mizoram

		<ul style="list-style-type: none"> • Nagaland: Executive Engineer, State Load Despatch Centre, Full Nagarjan, Dimapur, Nagaland – 797112
d	Nature of the Project/ Scheme/ Activity: Inter-state/ Intra-state (Please specify)	Intra-state incident to state-level grid operation
e	Identified Beneficiaries	The state constituents of North Eastern Region of India
f	Merits of the Scheme	With implementation of the scheme, overall real-time data telemetry from the grid-connected stations will improve which will help is secure and reliable grid operation and load despatch functions in NER. The improvement in the Load Despatch functions through data-visibility of all the grid connected stations is of utmost importance to perform mission critical operation of national importance related to management of expanding power system network in North-Eastern region.
g	Limitations, if any	No limitation envisaged. Only replacement of few old RTUs will lead to temporary data interruption which can be managed for that minor interim period.
h	Time frame for Implementation	The scheme is scheduled to be implemented within 12 months from the date of receipt of sanction of the fund/grant.
i	Estimated Cost of Project/ Scheme/ Activity	43,21,30,700 incl. GST
j	Category under which the project is classified (Please refer to para 5.1 of the Guidelines/ Procedure)	<p>As per PSDF Guidelines issued vide MoP Office Memorandum ref. 10/1/2014-OM dated 18th September 2014 (https://psdfindia.in/fund-disbursement/guidelines-for-disbursement/#) Clause 5.3 -</p> <p>Quote <i>Other Schemes benefitting large no. of utilities collectively and having a significant impact towards the power system development and grid operation shall also be considered for funding from PSDF, on case-to-case basis.</i> Unquote</p>

Detailed Proposal (DP)**1. Details of the Requesting Organization/ Entity****1.1 Details of Organization/ Entity**

A1) Name of Organization / Entity	Department of Power, Arunachal Pradesh
A2) Acronym or Abbreviation (if applicable)	DoP-AP
B1) Name of Organization / Entity	Assam Electricity Grid Corporation Limited
B2) Acronym or Abbreviation (if applicable)	AEGCL
C1) Name of Organization / Entity	Manipur State Power Company Limited
C2) Acronym or Abbreviation (if applicable)	MSPCL
D1) Name of Organization / Entity	Meghalaya Power Transmission Corporation Limited
D2) Acronym or Abbreviation (if applicable)	MePTCL
E1) Name of Organization / Entity	Power & Energy Department of Mizoram
E2) Acronym or Abbreviation (if applicable)	P&ED-Mizoram
F1) Name of Organization / Entity	Department of Power of Nagaland
F2) Acronym or Abbreviation (if applicable)	DoP-Nagaland

1.2 Details of Head of the Organization**• DoP-AP**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief Engineer (Power), Western Electrical Zone
E-mail address	
Landline Number	
FAX No.	
Address	Department of Power, Govt. of Arunachal Pradesh, Vidyut Bhawan, O-Point Tinali, Itanagar, Arunachal Pradesh
City	Itanagar
Postal Code	791111

- **AEGCL**

Name (Mr./ Ms./ Mrs.)	Dhrubajyoti Hazarika
Designation	Managing Director (I/C)
E-mail address	
Landline Number	0361-2739520
FAX No.	
Address	Bijulee Bhawan, 1 st Floor, Paltan Bazar, Guwahati, Assam
City	Guwahati
Postal Code	781001

- **MSPCL**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief Secretary, Government of Manipur
E-mail address	
Landline Number	0385-2450050
FAX No.	
Address	Electricity Complex, Keishampat Junction, Imphal, Manipur
City	Imphal
Postal Code	795001

- **MePTCL**

Name (Mr./ Ms./ Mrs.)	Arunkumar Kembhavi
Designation	Chairman Cum Managing Director
E-mail address	
Landline Number	
FAX No.	
Address	Meghalaya Energy Corporation Limited, Lumjingshai, Short Round Road, Shillong, Meghalaya
City	Shillong
Postal Code	793001

- **P&ED-Mizoram**

Name (Mr./ Ms./ Mrs.)	
Designation	Engineer-In-chief
E-mail address	
Landline Number	
FAX No.	
Address	Power & Electricity Department, Kawlphetha Building, New Secretariat Complex, Khatla, Aizawl, Mizoram
City	Aizawl
Postal Code	796001

- **DoP-Nagaland**

Name (Mr./ Ms./ Mrs.)	
-----------------------	--

Designation	Chief Engineer (Power)
E-mail address	cepower1helpdesk@gmail.com
Landline Number	0370-2243149
FAX No.	0370-2240178
Address	Electricity House, A.G. Colony, Kohima, Nagaland
City	Kohima
Postal Code	797001

1.3 Details of Project In-Charge/ Project Manager (Authorized Person) for this project/ scheme/ activity (Not below the rank of Dy. Gen. Manager/ Superintending Engg.)

• **DoP-AP**

Name (Mr./ Ms./ Mrs.)	
Designation	Executive Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	SLDC Itanagar, DoP, 132kV Chimpu Substation, Itanagar, Arunachal Pradesh
City	Itanagar
Postal Code	791111

• **AEGCL**

Name (Mr./ Ms./ Mrs.)	
Designation	Chief General Manager
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Assam Electricity Grid Corporation Ltd., ASEB Colony, Power House, Kahilipara, Guwahati
City	Guwahati
Postal Code	781019

• **MSPCL**

Name (Mr./ Ms./ Mrs.)	
Designation	General Manager
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Yurembam Power House, Imphal West, Manipur

City	Imphal
Postal Code	795004

• **MePTCL**

Name (Mr./ Ms./ Mrs.)	
Designation	Superintending Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Meghalaya Power Transmission Corp. Ltd., Umjarain Mawkynroh, NEHU Campus, Shillong, Meghalaya
City	Shillong
Postal Code	793022

• **P&ED-Mizoram**

Name (Mr./ Ms./ Mrs.)	
Designation	Sr. Executive Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre Division, P&E Office Complex, North Block (III Floor), Electric Veng, Aizawl, Mizoram
City	Aizawl
Postal Code	796001

• **DoP-Nagaland**

Name (Mr./ Ms./ Mrs.)	
Designation	Executive Engineer
E-mail address	
Landline Number	
Mobile Number	
FAX Number	
Address	State Load Despatch Centre, Full Nagarjan, Dimapur, Nagaland
City	Dimapur
Postal Code	797112

Any change in above mentioned details will be notified to the Nodal Agency of PSDF immediately.

2. Justification of the Proposal

2.1 Analysis of the Objective

Electricity plays an important role in the overall economic development of the country. In the last six (06) decades, since independence, Indian Power Sector has achieved phenomenal growth from a few scattered small generators supplying load to local process of elite customers, to strong regional grids spanning throughout the length and breadth of the country, and supplying to even remote corners of most of the states, With the growth of transmission and generation systems in North-Eastern region, it is imperative to upgrade the existing monitoring and supervision facility at SLDCs which is functioning at state-level to coordinate the real-time operation of respective state-grids.

Considering the complexity & growth of Power System, need of effective management of Power System was felt essential. Accordingly, Unified Load Despatch & Communication (ULDC) Projects were established on regional-basis for providing advance SCADA/EMS and Communication system for management of regional power grids. These ULDC projects were commissioned progressively from July 2002 to February 2006 in southern, Northern, North-Eastern, Eastern and Western regions.

Under North Eastern Region, to facilitate smooth and efficient operation of regional grid, POWERGRID undertook implementation of State-of-the-Art ULDC projects, under ULDC schemes, and which was put in commercial operation in 2003.

At present, many stations in the North-Eastern region have obsolete or non-repairable RTUs; RTUs with spares cost high; no RTUs, etc. The present DPR covers replacement of some old RTUs as well as installation of many new RTUs at state-level in grid-connected stations which includes the planning, design, engineering and implementation of aforesaid RTUs.

2.2 Identified Beneficiaries of the Project

The states of Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura in particular and the Nation in general.

With implementation of the scheme, all the stakeholders in the power sector of North Eastern Region will be able to run more efficiently and effectively. So, reliability of the NER grid can be achieved at desired level. Further, it will also mitigate the risks of using obsolete systems and frequent failure at RTU level.

2.3 Identified Source of Funding

100% of the total project cost is to be funded through grant from PSDF.

2.4 Details of Activities for Project/ Scheme/ Activity

After getting approval of the project towards funding, the following activities will be undertaken to achieve desired results:

- Tendering Activities with award of work to qualified L1 Bidder.
- Site Survey
- Factory Acceptance Tests (FAT)
- Supply, Installation and Commissioning of RTUs along with associated Hardware suitable for integration with respective LDCs.
- Integration with existing SCADA/EMS system for transfer of real-time data from the substations to the associated State Load Dispatch Centre (SLDC) on IEC-101 or IEC-104 protocol as found suitable.

List of stations to be covered under this project are mentioned in **Annexure-1**.

2.5 Executing Agencies

Projects will be executed in fork of different independent work-orders on state-wise basis and the state-utilities/ SLDCs will be the executing agencies for respective works. Necessary guidance, if required, can be taken from NERPC, NERLDC and POWERGRID-NERTS in various forums such as Operation Coordination Committee (OCC), North Eastern Telecommunication, SCADA and Telemetry (NETeST), etc.

All the technical specifications required for the execution works and material procurement works will be prepared as per the guidelines in applicable IS standards and CEA recommendations by calling open tenders on e-procurement platforms.

2.6 Timeline for implementation of Project/ Scheme/ Activity

Timeline for implementing this project/ scheme/ activity is given hereunder considering date of receipt of PSDF grant approval as zero-date:

- a) Issuance of Work-Order: 9 months
- b) Procurement of Equipment (Delivery of Material at site after FAT): 9 months
- c) Erection and Commissioning: 6 months

Timeline of the Project/ Scheme/ Activity	
Likely duration of Project (in months)	18 months
Start Date	Date of receipt of sanction of PSDF Grants
Likely Completion Date	18 months from date of sanction of PSDF Grants

Timeline of Activities

Project Implementation Schedule – 18 Months (Months after Letter of Award – LoA)																			
S. No.	Task Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	<i>(Subject Package)</i>	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
1	Engineering	■	■																
2	Tendering Activities			■	■	■	■												
3	Letter of Award							■											
4	Site Survey								■	■									
5	Factory Acceptance Tests										■	■							
6	Supply of Equipment											■	■						
7	Installation and Commissioning												■	■	■	■	■	■	■
8	Integration with SLDCs																		■

Summary of Detailed Project Report (DPR)***Cost Break-up of various components***

Sl. No.	Item Description	Unit	Quantity	Total Price (in ₹)
I	Supply of Equipment (with warranty of 3 years)			
1	Remote Terminal Units (including cable, Panel, CMR, Interposing relays)	Nos.	155	32,90,65,000
II	Services			
2	Transportation, Freight and Insurance	Nos.	155	5,48,70,000
3	Installation, Testing and Commissioning (with preparation of RTU Database; Associated Cabling, Wiring, etc.)	Nos.	155	98,02,200
III	Spares			
4	Spare parts of the supply equipment @10% (i.e. 10% of Supply + Transportation, Freight and Insurance cost)	--	--	3,83,93,500
	Total			43,21,30,700

- Note:** a) Budgetary Quotation from GE was taken with per-unit supply price of ₹ 16.59 lacs plus 28% GST i.e. ₹ 21.23 lacs; per-unit Installation and Commissioning Charges ₹ 3 lacs plus 18% GST i.e. ₹ 3.54 lacs; per-unit Transportation, Freight and Insurance Charges of ₹ 53.6 thousands plus 18% GST i.e. ₹ 63.24 thousands.
- b) The above-mentioned charges have been considered on the basis of per-unit charges by GE multiplied by quantity of RTUs required by state-utilities.
- b) The spare parts of price around 10% will also be considered while estimating the life of equipment as 15 years.

Targets for financial Milestones

Description	Total Amount (in INR)	1 st Installment (11 th Month after sanction of Grant)	2 nd Installment (18 th Month after sanction of Grant)
PSDF Grant	43,21,30,700	30,71,48,000	12,46,71,760
Internal Resource	NIL	NIL	NIL
Total	43,21,30,700	30,71,48,000	12,46,71,760

Financial Implication of the Scheme

1. Summary

S. No.	Item	Amount (in INR) incl. GST
1	Total Cost Estimate	43,21,30,700
2	Funding Proposed from PSDF	43,21,30,700
3	Contribution from Internal Sources	Nil
4	External Borrowings	Nil

2. Details

2.1 Cost Estimate

The Unit rates for all equipment have been obtained from budgetary quotation from M/s GE (refer **Annexure-3**). The detailed cost-estimate for implementing the project/ scheme/ activity has been under approval by higher management of SLDCs. However, it has been agreed in principle in NETeST forum of RPC.

3. Funding

3.1 Funding proposed from PSDF

100% of the estimated cost is proposed to be funded from PSDF. The funding is to be divided among state-utilities on the basis of quantum of RTUs required for installation.

MePTCL (Meghalaya): 20 RTUs i.e. ₹ 5,57,58,800 (incl. GST)

MSPCL (Manipur): 3 RTUs i.e. ₹ 83,63,820 (incl. GST)

P&ED (Mizoram): 14 RTUs i.e. ₹ 3,90,31,160 (incl. GST)

DoP (Arunachal Pradesh): 43 RTUs i.e. ₹ 11,98,81,420 (incl. GST)

DoP (Nagaland): 42 RTUs i.e. ₹ 11,70,93,480 (incl. GST)

AEGCL (Assam): 33 RTUs i.e. ₹ 9,20,02,020 (incl. GST)

3.2 Contribution from Internal Resources

Nil.

3.3 External Borrowings

No external borrowings will be necessary.

Brief Details of the Project Appraisal by CTU/ STU/ RPC

Item	Details to be filled by Applicant Utility		
Appraisal By	CTU _____	STU _____ ✓	RPC _____
Date of Submission to CTU/ STU/ RPC for approval	xx.xx.2022		
Name of the Scheme	Procurement and Installation of Remote Terminal Units in selected stations of North Eastern Region (NER) for Real-Time Data Telemetry purposes.		
Copy of the Appraisal Report by CTU/ STU/ RPC (attached at <i>Annexure</i>)	Yes _____	No _____ ✓	
Summary of observations from CTU/ STU/ RPC Appraisal Report	Summary of Proposal Appraised	Supply, Installation, Testing and Commissioning of Remote Terminal Units in selected stations of North Eastern Region (NER) for facilitating Real-Time Data Telemetry in respective State Load Despatch Centres.	
	Technical Observations	The proposed scheme fulfils the technical requirement as per relevant standards and fund to be in order. With implementation of the scheme, overall efficiency, reliability and secure operations of the systems will be improved and any contingency can be tackled.	
	Financial Observations	The estimated cost arrived on the basis of earlier Letter-of-Awards appears to be right.	
	Compliance of Grid Standards/ Codes by Applicant	Yes	
	Limitations/ Shortcomings pointed out by CTU/ STU/ RPC, if any	No limitation envisaged. Only some intermittency may be observed due to configuration/integration of	

Item	Details to be filled by Applicant Utility	
		RTUs in new system which can be managed judiciously.
	Recommendations of CTU/ STU/ RPC	Recommended for immediate implementation and posing for 100% PSDF funding.

Undertaking

(On a Non-judicial Stamp paper of Rs.50 only duly notarized and attested)

I, Dr./ Mr./ Ms. son/daughter/wife of
..... resident of

.....
..... (full address) and presently working as
..... in the

..... hereby undertake to comply with the following terms and
conditions with regard to funding of the
..... (name of scheme) with
disbursement from PSDF:

- **No tariff shall be claimed for the portion of the scheme funded from PSDF.**
- **Amount of grant shall be refunded in case of transfer/disposal of the facility being created under this proposal to any other scheme for funding.**
- **Shall specifically mention if for the scheme under the proposal, the grant from any other agency is being taken / proposed to be taken.**
- **The grant shall be refunded back to PSDF in case of non-utilisation of the grant within one (01) year of release of installment.**

Annexure-1

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
1	Mawphlang	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
2	New Shillong	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
3	New Umtru	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
4	Umiam Stage-IV	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
5	Umiam Stage-I	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
6	Umiam Stage-II	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
7	Umiam Stage-III	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
8	Umiam	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
9	NEHU	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
10	Neigrihms	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
11	EPIP-1	132	MePTCL, Meghalaya	Real-time operational data to be telemetered

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
				for grid monitoring.
12	EPIP-2	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
13	Leska	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
14	Mawlai	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
15	Mawlyndep	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
16	Mawngap	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
17	Mustem	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
18	Ampati	132	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
19	<i>Plus 2 more (as spare)</i>	132 or above	MePTCL, Meghalaya	Real-time operational data to be telemetered for grid monitoring.
20	Thoubal	132	MSPCL, Manipur	Real-time operational data to be telemetered for grid monitoring.
21	Tamenglong	132	MSPCL, Manipur	Real-time operational data to be telemetered for grid monitoring.
22	Gamphazol	132	MSPCL, Manipur	Real-time operational data to be telemetered

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
				for grid monitoring.
23	Champhai	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
24	Khawzawl	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
25	Saitual	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
26	Bukpui	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
27	Khawiva	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
28	E.Lungdar	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
29	Lawngtlai	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
30	Bairabi	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
31	Mamit	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
32	W.Phaileng	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
33	Marpara	132	P&ED-Mizoram	Real-time operational data to be telemetered

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
				for grid monitoring.
34	Lungsen	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
35	Sihhmui	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
36	Melriat	132	P&ED-Mizoram	Real-time operational data to be telemetered for grid monitoring.
37	Daporijo 132/33KV Station	132	DoP, Arunachal Pradesh	Located in Upper Subansiri District. Old RTU got burnt & discussed in OCC Meeting also.
38	Lekhi Industry	33	DoP, Arunachal Pradesh	Located in Papum Pare District. Drawing power from Grid Lekhi S/s.
39	Bandardawa Industry	33	DoP, Arunachal Pradesh	Located in Papum Pare District. Drawing power from Grid Nirjuli S/s.
40	Holongi Industry	33	DoP, Arunachal Pradesh	Located in Papum Pare District. Drawing power from Grid Chimpu S/s.
41	Tippi Industry	33	DoP, Arunachal Pradesh	Located in West Kaming District. Drawing power from Grid Tippi S/s.
42	Liker MHP, Kamba, Aalo	33	DoP, Arunachal Pradesh	Located in West Siang District. Power being injected in grid.
43	Tago MHP, Ziro	33	DoP, Arunachal Pradesh	Located in Lower Subansiri District. Power to be injected in grid.
44	Nuranang MHS, Jung	33	DoP, Arunachal Pradesh	Located in Tawang District.

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
				Power to be injected in grid.
45	Mukto MHS	33	DoP, Arunachal Pradesh	Located in Tawang District. Power to be injected in grid.
46	Sippi MHS, Daporijo	33	DoP, Arunachal Pradesh	Located in Upper Subansiri District. Power to be injected in grid.
47	Liromoba MHS	33	DoP, Arunachal Pradesh	Located in West Siang District. Power to be injected in grid.
48	Kitpi Ph-II MHS	33	DoP, Arunachal Pradesh	Located in Tawang District. Power to be injected in grid.
49	Subung MHS, Boleng	33	DoP, Arunachal Pradesh	Located in Siang District. Power to be injected into Grid.
50	Jengging MHS	33	DoP, Arunachal Pradesh	Located in Upper Siang District. Power to be injected into Grid.
51	Paciha MHS	33	DoP, Arunachal Pradesh	Located in East Kameng District. Power to be injected into Grid.
52	Gerukamukh (Kamle District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
53	Ziro (New)/Yachuli (Lower Subansiri District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
54	Basar (Lepa Rada District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
55	Seppa (East Kameng District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
56	Rilo (Pakke Kessang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
57	Bameng (East Kameng District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
58	Seijosa (Pakke Kessang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
59	Naharlagun (Papum Pare District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
60	Banderdewa (Papum Pare District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
61	Sagali (Papum Pare District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
62	Holongi (Papum Pare District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
63	Kambang (West Siang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
64	Likabali (Lower Siang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
65	Koloriang (Kurung Kumey District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
66	Palin (Kra Daadi District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
67	Niglok (East Siang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
68	Pasighat (East Siang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
69	Miao (Changlang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
70	Jairampur (Changlang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
71	Changlang (Changlang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
72	Khonsa (Tirap District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
73	Dambuk (Lower Dibang Valley District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
74	Halaipani (Anjaw District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
75	Yingkiong (Upper Siang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
76	Bomdila (West Kameng District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
77	Tawang (Tawang District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
78	Kalaktang (West Kameng District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
79	Tenga (West Kameng District)	132/33	DoP, Arunachal Pradesh	Station under construction in Comprehensive Scheme; RTU not planned under it.
80	Zadima	220/132/33	DoP-Nagaland	Upcoming
81	Philimi, Zunheboto	132/33	DoP-Nagaland	Upcoming
82	Chiephobozou, Kohima	132/33	DoP-Nagaland	Upcoming
83	Nagaland University, Kohima	132/33	DoP-Nagaland	Upcoming
84	Pfutsero, Phek	132/33	DoP-Nagaland	Upcoming
85	Wokha	132/33	DoP-Nagaland	Upcoming
86	Meluri	132/33	DoP-Nagaland	No RTU installed at present.
87	Chumukedima	66/33/11	DoP-Nagaland	No RTU installed at present.
88	Sovima	66/33	DoP-Nagaland	No RTU installed at present.
89	Dairy Farm	66/33	DoP-Nagaland	No RTU installed at present.
90	Nito Farm	66/33	DoP-Nagaland	No RTU installed at present.
91	Tizit	66/33	DoP-Nagaland	No RTU installed at present.
92	Naginimora	66/33	DoP-Nagaland	No RTU installed at present.
93	Mon Power House	66/11	DoP-Nagaland	Upcoming
94	Forest	33/11	DoP-Nagaland	No RTU installed at present.
95	Supermarket	33/11	DoP-Nagaland	No RTU installed at present.
96	Medziphema	33/11	DoP-Nagaland	No RTU installed at present.
97	Peren	33/11	DoP-Nagaland	No RTU installed at present.
98	Jalukie	33/11	DoP-Nagaland	No RTU installed at present.
99	Referral	33/11	DoP-Nagaland	No RTU installed at present.
100	Rangapahar	33/11	DoP-Nagaland	No RTU installed at present.
101	Dhansiripahar	33/11	DoP-Nagaland	No RTU installed at present.
102	Niuland	33/11	DoP-Nagaland	No RTU installed at present.
103	Lerie	33/11	DoP-Nagaland	No RTU installed at present.
104	Keyake	33/11	DoP-Nagaland	No RTU installed at present.

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
105	Jakhama	33/11	DoP- Nagaland	No RTU installed at present.
106	New Secretariat Complex	33/11	DoP- Nagaland	No RTU installed at present.
107	IG Stadium	33/11	DoP- Nagaland	No RTU installed at present.
108	ITI	33/11	DoP- Nagaland	No RTU installed at present.
109	Naga Bazar	33/11	DoP- Nagaland	No RTU installed at present.
110	Pungro	33/11	DoP- Nagaland	No RTU installed at present.
111	Kiphire Town	33/11	DoP- Nagaland	No RTU installed at present.
112	Sataka	33/11	DoP- Nagaland	No RTU installed at present.
113	Tuensang Town PH	33/11	DoP- Nagaland	No RTU installed at present.
114	3rd NAP Camp	33/11	DoP- Nagaland	No RTU installed at present.
115	Noklak	33/11	DoP- Nagaland	No RTU installed at present.
116	Mokokchung	33/11	DoP- Nagaland	No RTU installed at present.
117	Padampukhuri	33/11	DoP- Nagaland	Upcoming
118	Zubza	33/11	DoP- Nagaland	Upcoming
119	Amphuto	33/11	DoP- Nagaland	Upcoming
120	Longnak	33/11	DoP- Nagaland	Upcoming
121	Hospital Power House	33/11	DoP- Nagaland	Upcoming
122	Matia	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
123	Azara	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
124	Kamakhya	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
125	Rangia	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
126	Sipajhar	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
127	Nalbari	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
128	Shishugram	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
129	Hatsingimari	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
130	Barpeta	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
131	Umrangshu	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
132	Khaloigaon	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
133	Dhekiajuli	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
134	Ghoramari	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
135	Hailakandi	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
136	Karimganj	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
137	Bokajan	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
138	Bokakhat	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
139	Diphu	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
140	Golaghat	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
141	Garmur (Jorhat)	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
142	Nazira	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
143	Betbari (Sibsagar)	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
144	Behiating	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
145	Bordubi	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
146	Sonari	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.
147	Rupai	132	AEGCL	Real-time operational data to be telemetered for grid monitoring.

S. No.	Stations Proposed for RTU Project	Voltage Level (in kV)	Ownership	Remarks, if any
148	Agia	220	AEGCL	Real-time operational data to be telemetered for grid monitoring.
149	Boko	220	AEGCL	Real-time operational data to be telemetered for grid monitoring.
150	Jawaharnagar	220	AEGCL	Real-time operational data to be telemetered for grid monitoring.
151	Rangia	220	AEGCL	Real-time operational data to be telemetered for grid monitoring.
152	Sonapur	220	AEGCL	Real-time operational data to be telemetered for grid monitoring.
153	Sonabil	220	AEGCL	Real-time operational data to be telemetered for grid monitoring.
154	Mariani	220	AEGCL	Real-time operational data to be telemetered for grid monitoring.

TECHNICAL SPECIFICATION OF RTU

Contents

Section 1: TECHNICAL SPECIFICATION OF RTU	31
1.0 General	31
1.1 Design Standards	32
1.2 RTU Functions	32
1.3 Communication ports	33
1.4 Modems	34
1.5 Splitters	35
1.6 Local Configuration & Maintenance Interface	35
1.7 Local Data Monitoring System (LDMS) Interface	35
1.8 Communication interface between RTU & MFMs	36
1.9 Communication Protocol between RTU & IEDs	36
1.10 Master Station Communication Protocol	36
1.10.1 Scan groups	37
1.10.2 Reporting of status points	37
1.10.3 Reporting of Analog points	37
1.10.4 Digital control commands	37
1.11 Data Concentrator Communication Protocol	37
1.12 Analog Inputs	38
1.13 Status Inputs	39
1.13.1 Contact Multiplying Relay	39
1.13.2 Momentary Change Detection	40
1.14 Digital Telemetry	40
1.15 Sequence of Events (SOE) feature	40
1.16 Control Outputs	40
1.16.1 Two State Momentary Control	41
1.16.2 Raise/Lower Pulse Output	41
1.16.3 Control Output Interposing Relays (Double Contact Digital Output)	41
1.16.4 Latching (Dummy Breaker) Relay	41
1.16.5 Control Security and Safety Requirements	42
1.16.6 Local/Remote selector switch	42
1.17 Time facility	42
1.18 Diagnostic features	42
1.19 Input DC Power Supply	43
1.20 Environmental Requirements	43
1.21 Noise level	43
1.22 RTU Size and Expandability	43
1.23 RTU and SIC panels	44
1.24 Interconnections	45

1.25 Wiring/Cabling requirements	45
1.26 Terminal Blocks	46
1.27 RTU Architecture	46
1.28 RTU Security Process	46
Transducer & Weather Sensor Requirements	46
1.29.1 Transducer Protection	46
1.29.2 Multi-Function Transducers (MFMs)	47
1.29.3 Transformer Tap Position Transducer	48
1.29.4 Weather Sensors	48
1.30 Portable Configuration and Maintenance Terminal (PCMT)	51
1.31 Training, Documentations and TESTING	52
1.31.1 TRAINING	52
1.31.2 DOCUMENTATION	53
1.31.3RTU/SIC Testing	53

Section 1: TECHNICAL SPECIFICATION OF RTU

1.0 General

The Remote Terminal Unit (RTU) shall be installed at Substations & Power stations to acquire analog data, device status signals and Event Signals. RTU shall also be used for control of station devices from Master station. The supplied RTUs shall be interfaced with the Control & Relay (C&R) panels, Transducers, IEDs, Metering Equipment, Communication Equipment, Power Supply Distribution Boards; for which all the interface cables shall be supplied by the Contractor.

This document describes the specifications for the Remote Terminal Unit (RTU). Contractor shall supply RTU, associated equipment such as transducers, relays, weather sensors, modems, cabling etc. and required number of panels for housing of all the hardware envisaged for the RTU and System Interface Cubicle (SIC).

The contractor shall be responsible for supplying all hardware, software, installation, cabling and field implementation for RTU as defined in this Specification. The contractor shall also provide complete documentation, training and testing to fully support the hardware and software provided. The RTU shall be used for real-time supervision and control of substation/ power plant through SCADA system. RTU configuration/ point count, MFT/MFM transducer count and requirement of weather sensors quantity is given in **Appendix – A**.

The contractor shall also be responsible for integration of supplied RTUs with the existing SCADA/EMS System of the owner as per the specified protocols (IEC 101 and IEC 104) and interoperability profile. Necessary additions/modifications in SCADA System databases and displays for integration of RTU with SCADA/EMS System shall be in the Owner's scope.

The manufacturer's whose RTU is being offered shall have manufactured and supplied at least 50% of the tendered value at any EHV environment of 132 kV or above Substation/Power Plant and the same shall be in successful operation for more than 2 years as on the date of bid opening.

Shall the Contractor elect to subcontract manufacturing, installation, testing & commissioning or any other work defined herein, it shall remain the Contractor's responsibility to complete the assigned work.

It is Employer's/Owner's intent that the Contractor uses as much standard hardware and software as possible; however, all of the functional requirements of this Specification must be satisfied. The use of the Contractor's standard hardware and software may cause the Contractor to conclude that there is a need for additional items not specifically mentioned in this Specification. The Contractor shall supply all such necessary items and provide a complete RTU design that meets all of the Employer's/Owner's functional requirements defined in this Specification.

Cabling should be minimized; system design should be as much modular as possible and CMRs should be used only when absolutely essential. However, the system supplied by the Contractor should fulfil all the requirements of this specifications.

In event of the configuration of RTU given in specification undergo changes during detailed engineering, the prices of particular RTU shall also be adjusted based on the unit prices of Transducers, Meters, Status Input Cards, Analog Input Cards, Control Output Cards, Control Output Relays, CMRs, Modems, etc. only.

Employer/Owner may not initially procure all capabilities specified in this document. Regardless of the RTU configuration purchased, the RTUs shall be capable of all functions specified herein with the addition of the necessary hardware and software modules in the field when required by Employer/Owner. Each function is presented in sufficient detail to provide the Contractor with as much insight as possible into both the initial and future requirements of the RTUs.

The Weather Sensors to be supplied under the project shall be field proven and shall have been in successful operation for meteorological application for at least one year as on date of Bid opening. The Bidder shall furnish the documentary evidence in support of the above and submit the same along with the bid.

1.1 Design Standards

The RTUs shall be designed in accordance with applicable International Electro-technical Commission (IEC), Institute of Electrical and Electronics Engineer (IEEE), American National Standards Institute (ANSI), and National Equipment Manufacturers association (NEMA) standards and British Standards, unless otherwise specified in this Technical Specification. In all cases, the provisions of the latest edition or revision of the applicable standards in effect shall apply.

1.2 RTU Functions

All functional capability described herein shall be provided by the Contractor even if a function is not initially implemented. The term master station is used to denote the SCADA systems. As a minimum, the RTUs shall be capable of performing the following functions:

- (a) Collecting and processing the digital status inputs, analog inputs, event records, accumulated values and transmitting to master station(s).
- (b) Receiving and processing digital & analog control commands from the master station(s).
- (c) Accepting polling messages from at least three (03) master stations simultaneously using separate logical databases for each master station.
- (d) Communication simultaneously on all Communication ports (as per cl. 1.3) and using multiple concurrent protocols, including the IEC 60870-5-101, 60870-5-104, IEC 61850 & MODBUS/103 protocol.
- (e) Data transmission rates from 300 to 9600 baud for serial ports (for both IEC 60870-5-101 & MODBUS/103) and 10/100 Mbps for TCP/IP Ethernet ports.
- (f) RTU shall be compatible with protocol 61850 for communication with IEDs.
- (g) RTU shall have the capability of automatic start-up and initialisation following restoration of power after an outage without need of manual intervention. All restarts shall be reported to the connected master station(s).
- (h) RTU shall have dual redundant CPU and Power Supply Unit.
- (i) RTU shall support time synchronization through messages received from master station using IEC 60870-5-101 protocol.
- (j) RTU shall support downloading of RTU database from the master station using Intranet.
- (k) RTU shall support SOE (Sequence of events) feature.

- (l) Acting as a data concentrator for acquiring data from Slave RTUs, MFMs/MFTs and exercising supervisory control on slave RTUs using IEC 60870-5-101 and IEC 60870-5-104 and Modbus protocol.
 - (l) RTU shall support archiving facility for reporting and analysis. The archived data shall be saved to user defined file duration at user defined interval-eg. Every 5 minutes for a period of 1 week. The computation of the archived data shall also be supported – eg. Maximum, Minimum and Average.
 - (m) Harsh Environmental Coating.

1.3 Communication ports

The RTUs shall support simultaneous communications with multiple independent master stations (SCADA system), maintenance and configuration terminal (Laptop PC), a local logger (printer), Multi-function transducers and Local Data Monitoring System (LDMS)/Logger.

The RTUs shall have the following minimum number of communication ports as follows:

- a) Two Ethernet ports for connectivity to Master Station on IEC 60870-5-104 and to relays on IEC 61850.
- b) 2 nos. RS232 ports – for communication with IEDs on IEC 61850, master stations on IEC 60870-5-101, energy Meters on Modbus/TCP/IP, etc.
- c) 2 nos. serial ports for communication on IEC 60870-5-101 in dual standby mode (with single master) of Active/Active mode (with dual master) as per Owner's requirements.
- d) One port for the RTU maintenance and configuration terminal.
- e) Two ports for Local Data Monitoring System (LDMS).
- f) Required number (minimum two) of RS 485 ports for polling Multi-function transducers using MODBUS/103 protocol in multi-drop (party line) mode. Maximum 8 nos. MFMs shall be connected to each port

It shall be possible to increase the number of communication ports in the RTU by addition of cards, if required in future. The RTU shall respond to independent scans and commands from Master Station, LDMS and Configuration & Maintenance Terminal simultaneously. The RTU shall support the use of a different communication data exchange rate (bits per second) and scanning cycle on each port.

The RTU shall provide feature of being configured into point-to-point and party-line communication mode.

1.4 CPU and Power Supply

The RTU shall have redundant CPU and Power Supply unit so that the RTU can communicate with the Master Stations even when one of the redundant units fails. A failover process shall cause the assignment of all the functions of the failed unit to the healthy unit. The failover between the two redundant units shall not require any manual intervention and shall not cause any interruption in the functioning of RTU. The failover process of the CPU shall not take more than 30 seconds after the failure of primary CPU. All the functions of RTU shall be operational within 30 seconds of the failover operation i.e, within one minute from the time of failure of primary CPU.

1.5 Modems

The modems can be used for RTU communicating to master station. The Contractor shall supply two (2) number modems one at Control Centre/Stand alone and other at RTU end. For Critical RTUs, 4 nos. modems are required, 2 nos. at Control Center and 2 nos. at RTU End.

The modem for remote end, complete in all respects including power supply unit & rack shall be supplied. These modems can be located either in the FEP at Control Center end or at other Communication nodes (Stand Alone Modem).

The modems shall meet the following requirements:

- a) Use CCITT Standards including V.24, V.28.
- b) Use frequency shift keying (FSK) modulation.
- c) Communicate at data rates of 300, 600 and 1200 bps.
- d) Use CCITT R.38a, and R.38b standard tones for the selected RTU data rate.
- e) Use PLCC bandwidth upto 4khz and shall accommodate multiple data channels over and above voice channels.
- f) Use both 2-wire and 4-wire communication lines.
- g) Receive level adjustable from -8 to -40 dBm @ 600 ohms.
- h) Transmit level adjustable from 0 to -24 dBm @ 600 ohms.
- i) Have a minimum sensitivity of -48 dBm.
- j) Shall operate on 48 VDC power supply
- k) Compatible with IEC 60870-5-101 protocol

1.6 Cellular (GPRS/3G/4G) Modem and Gateway

The RTU shall be equipped with Cellular Modem for data communication with Master Station over IEC 60870-5-101/104. In case PLCC or Optical Fibre network is available at RTU Station, the Cellular Communication Modem will provide a manually switchable redundant communication link to Master Station, which may be enabled by the owner's personnel in the event of failure of PLCC/Optical Fibre network. In such case Cellular Communication will use the same protocol as is used for PLCC or Optical Fibre network. However, in case no PLCC/Optical Fibre network is available at RTU Station, the Cellular Communication will act as main communication link with Master Station. The provision of SIM and payment of data charges for GRPS shall be in the scope of vendor up to operational acceptance; thereafter the monthly data charges for GRPS shall be borne by the owner. The RTU port used for Cellular communication shall be adequately protected and firewalled to avoid any cyber security attacks.

The provision of PLCC or Optical Fibre Network between RTU and Master Station is in the scope of owner, however the supply, installation and commissioning of necessary cabling and Integration of RTU with Master Station(s) using the owner's communication system will be in the scope of contractor.

The contractor shall also provide and integrate the GRPS Gateway at Master Stations (Main & backup). The Gateway shall be equipped with requisite number of RS 232 Ports (minimum 10) for IEC-101 and Ethernet Ports (minimum six) for IEC-104 communication. The Gateway shall have at-least 50% spare ports of each type for future expansion. Provision of Internet connectivity with Static IP address at Master Station end shall be in the Owner's scope. The communication between RTU and Master Station using Cellular Communication shall be point to point and no intermediate hub shall be used by the contractor to route the Cellular traffic between RTU and Master Station(s). The Gateway shall be equipped with a firewall to avoid any cyber security threat emanating from public Interface used for Cellular traffic.

1.7 Splitters

Splitters shall be provided for splitting of 60870-5-101 protocol communication ports to communicate with two terminal servers. The splitters shall be mounted in the panel for Terminal Servers and shall operate on 24 or 48 VDC.

1.8 Local Configuration & Maintenance Interface

The RTUs shall include the interface to support the portable configuration and maintenance terminal (PCMT). The interface shall provide easy access to allow Employer/Owner to use the maintenance terminal at the RTUs installed in the field using Ethernet.

1.9 Local Data Monitoring System (LDMS) Interface

The RTUs shall include the interface for communication with the LDMS system. The LDMS shall be used for local data acquisition, monitoring and control of substation parameters through RTU. The scope of LDMS shall include installation and integration of LDMS software on a Personal computer.

The LDMS shall be a mini SCADA system providing MMI capability for use in the sub-station control room building. The LDMS software shall include following functions:

- I. data acquisition for analog, digital, events and pulse accumulator type data
- II. data processing – Conversion to engineering units, limit monitoring, data validity test, calculated data
- III. calculated data (such as maximum, minimum, average values with associated time-stamping etc.) of all the station parameters.
- IV. Time Synchronization
- V. Sequence of Events Processing
- VI. Supervisory control
- VII. Alarm, tagging, trending, quality codes etc.
- VIII. Single Line Diagrams, Trends, daily, weekly, monthly reports etc. shall be prepared by the bidder and integrated on LDMS system. The LDMS shall also have capability to generate additional displays, single line diagrams, reports, and trends.

The LDMS shall store all real-time telemetered & calculated data every 5 minutes (adjustable to 15min, 30min, 45min, 60 minutes as required by Owner). The software and hardware shall be sized for storage of all above data at every 5 minutes for at least six (06) months duration. All alarms, events, SOE etc. shall also be stored on regular basis. It shall be possible to define daily, weekly, monthly Substation reports on LDMS. It shall be possible to generate reports highlighting the maximum, minimum, average with associated time-stamping etc. of all the station parameters. The historical data stored on the storage medium shall be in standard format and necessary tools for its export to standard spreadsheet programs (MS-Excel and Comma-Separated-Value format) shall be provided.

The LDMS shall update analog data from RTU every 5-10 seconds (programmable) and status data by exception. The SOE status data shall be recorded with resolution of 10 ms timestamp.

The contractor shall provide 1 no. 2 kVA inverter of reputed make without battery. (Input from 48 VDC with -10% to 20 % variation, Output 230 V AC +/- 2% suitable for single computer load) with each LDMS system. The contractor shall use the 48V DC power supply available in RTU. The contractor shall also provide 1 no. 1 KVA UPS of reputed make (Input: single phase 230 V with variation from 190 to 270 V, Output: single phase 230 V with +/- 1% variation with 8 hrs. recharge time and suitable for single computer load) with each LDMS system.

1.10 Communication interface between RTU & MFMs

The RTU shall acquire data from the MFMs. The MFMs will act as slave to the RTU. The RTU shall have the ability of issuing retry scan to acquire data from the MFMs in case of communication failure between RTU and MFMs. All data from the devices connected on a single port shall be acquired within 5 seconds.

1.11 Communication Protocol between RTU & IEDs

The RTU shall use the IEC 61850 protocol for communication with IEDs over Sub-station LAN. The RTU shall act as a Client and collect data from the IEDs). The contractor shall be provided an Ethernet Port on the existing IEC 61850 Sub-Station Switch by the owner to connect RTU to the existing Sub-Station data from the IEDs). The necessary IED Configuration (.icd and .scd) files required to configure the RTU for communication with IEDs shall be provided by the owner.

The RTU shall store the data acquired from the MFMs & IEDs in its database and do processing like change detection/deadband processing on the data for optimizing its transmission to the Master Station (SCADA Control Centre). The processing shall include requirements of mapping of information from the protocol of MFM/IEDs to the protocol requirement for communication with Control Center.

1.12 Master Station Communication Protocol

The Contractor shall provide a communication protocol for communicating with SCADA master stations using the IEC 60870-5-101 and IEC 60870-5-104 communication protocol standard. The communication protocol shall support all the requirements of this standard. The communication protocol shall be non-proprietary and the Contractor shall provide complete description and documentation of the protocol to Owner.

The RTU shall perform as a slave to SCADA master station when using the IEC 60870-5-101 protocol. All communication shall be initiated by the SCADA master stations. RTU must notify the master stations of unusual conditions at the RTU (such as a power fail/restoration or RTU malfunction), the transfer of changed data etc. All the notifications shall be accomplished within the framework of the periodic data acquisition exchanges.

The RTU shall store the data acquired from the MFT/MFMs & IEDs in its database and do processing like change detection/deadband processing on the data for optimizing its transmission to the Master Station (SCADA Control Centre). The processing shall include requirements of mapping of information from the protocol of MFT/MFM/IEDs to the protocol requirement for communication with Control Center.

The RTU shall process the various messages/commands for communication to the Master station using the following priority.

- a) Control command

- b) Status data by exception
- c) Analog data by exception
- d) Analog data periodic
- e) Status data integrity scan

The communication interface to the master station(s) shall allow scanning and control of defined points within the RTU independently for each master station using a separate logical database in the RTU. It shall be possible to pick points from the RTU database randomly and assign it for reporting to a Master station. Further, the RTU shall support the use of a different communication data exchange rate (bits per second), scanning cycle, and/or communication protocol to each master station.

1.12.1 Scan groups

Analog and digital input points (including points reported by exception) shall be assignable to scan groups using the IEC 60870-5-101 and IEC 60870-5-104 protocol profile communication protocol standard. A scan group shall be a specified set of data points within the RTU central database which will be communicated to a master station when requested by a specific (addressed) scan request. A scan group size shall only be limited by the communication protocol message length. Any RTU input point shall be assignable to any scan group. The RTUs shall support at least sixteen scan groups and all scan groups per communication port (i.e. master station/ LDMS interface). The Contractor shall provide a convenient and flexible scheme for assigning points in the RTU to scan groups.

1.12.2 Reporting of status points

The RTU communication protocol shall be configured to report digital status changes by exception to master station using the IEC 60870-5-101 and IEC 60870-5-104 protocol profile communication protocol standard. Digital status data shall have higher priority than the Analog data. All the digital status data shall also be assigned to scan groups for integrity check by Master stations at every 10 minutes.

1.12.3 Reporting of Analog points

The analog data shall be reported periodically to update all the values at the master station within 10 to 15 seconds (configurable from 5 to 20 seconds as per requirements of Owner) using IEC 101 /104 protocol profile. Analog data shall also be reported by exception if the analog value exceeds its previous value by more than 20% (configurable from 1% to 20% in the RTU itself as per Owner's requirements).

1.12.4 Digital control commands

The RTU shall follow the select-and-execute sequence for operation of digital control commands from the master station using the IEC 60870-5-101 and IEC 60870-5-104 protocol profile communication protocol standard. The RTU shall reset its control logic upon any error in the sequence.

1.13 Data Concentrator Communication Protocol

The RTU shall have the in-built functionality to act as an IEC 60870-5-101 and IEC 60870-5-104 protocol master and collect data and also perform supervisory control from/on the slave RTUs and communicate it to the Control Center. The Master protocol implementation shall be such that the data polling requirements mentioned at section 1.11 is at least accomplished.

In case the RTU is proposed to be used as a Data concentrator (as per relevant Appendix), it shall be provided with at least ten (10) IEC 101 input ports/ cards and shall have capability to report to two master stations on IEC 104 interface. Data concentrator shall support at least 1,500 (fifteen hundred) data points. The RTU as a Data Concentrator shall be supplied with GPS receiver system with antenna, cable etc. for time stamping of Data concentrator which in turn shall synchronize the IEC 101 protocol connected RTU/device. The RTU as a Data Concentrator shall be complete with built-in monitoring mechanism to avoid loss of any data, especially the one reported by exception. The data concentrator shall have dual CPU and dual Power supply unit. The overall data update requirement from any Sub-RTU to Control Centre shall not affect the functionality defined elsewhere in the specification.

The Data concentrator shall have the provision for remote login from Control Centre. The SLDC computer system shall be able to configure and poll health of Data concentrator from remote on 104 connected interface after due authentication of the users.

It shall support diagnostic & maintenance activities remotely. Individual RTU configuration shall be possible from Data Concentrator including accommodating devices from heterogeneous suppliers. The RTU as a Data Concentrator shall have following communication ports & support for protocols:

- i. IEC 60870-5-104 for SCADA control centers.
- ii. IEC 60870-5-101 for Sub-RTUs.
- iii. IEC 101/104 for local SCADA

The other requirements given for RTU elsewhere in the specification shall be applicable to RTU as a Data concentrator also. Necessary ports shall not only be demonstrated to Employer/Owner but shall also be kept configured for future use or emergency use.

1.14 Analog Inputs

The RTU shall accommodate analog inputs which are unipolar or bipolar, 2-wire ungrounded differential signals. All analog signals are generally of the order of +4 to +20 mA but RTU shall be capable of accepting other standard analog input ranges (0 to 5V, 0 to 10mA, +/- 10 mA, 4-20 mA) also as per Owner's requirements.

The RTU shall make all appropriate signal level conversion and conditioning to allow full utilization of analog inputs and meaningful reasonability checking. The analog-to-digital converter shall have a minimum resolution of 2048 counts (sign plus 11 data bits). Each type of analog input shall be converted with full resolution. The RTU shall monitor the drift in characteristics of its ADC and mark the analog points with a drift quality code if a drift is detected. This drift quality code shall be sent to the master station also.

The RTU accuracy, for analog input measurement, shall be 99.8% or better at 25 degree C ambient temperature. Mean accuracy shall drift no more than 0.002% per degree C within the temperature range of -5 to +55 degree Celsius. Determination of accuracy shall be made while the analog multiplexer is operating at rated speed.

Each input shall have suitable protection and filtering to provide protection against voltage spikes and residual current at 50 Hz, 0.1 ma (peak-to-peak) and overload. Loading upto 150% of the input value shall not sustain any failures to the RTU input. The total input impedance offered by the RTU shall not be greater than 250Ω (for +4 to +20 mA range).

All analog inputs shall be scanned by the RTU from the field at least at 1 second periodicity.

1.15 Status Inputs

RTU shall be capable of accepting isolated dry (potential free) contact, internally wetted @ 48V DC of Dry (Potential Free) contact @220V DC or 110V DC (+/-30%) for status inputs. All status inputs shall be wired by the Contractor to MFT/MFM or RTU through 220V DC or 110V DC or 48V DC (+/- 30%) wet contact wired directly from semaphores in the C&R panels as available at site. The RTU shall provide necessary sensing voltage, current, optical isolation and de-bounce filtering independently for each status input. The sensing voltage shall not exceed 48V DC. The sensing voltage source shall be isolated from that of the RTUs logic power so that any noise or a short circuit across the sensing supply of a digital status input terminals would not disrupt the RTU operation other than the shorted digital status input.

The RTU shall be set to capture contact operations of 20 ms or more duration. Operations of less than 20 ms duration shall be considered no change (contact bounce condition). The RTU shall accept two types of status inputs i.e. Single point Status inputs and Double point status inputs.

Single point status input will be from a normally-open (NO) or normally-closed (NC) contact which is represented by 1-bit in the protocol message.

Double point status input will be from two complementary contacts (one NO and one NC) which is represented by 2-bits in the protocol message. A switching device status is valid only when one contact is closed and the other contact is open. Invalid states shall be reported when both contacts are open or both contacts are closed.

All status inputs shall be scanned by the RTU from the field at 1 millisecond periodicity. The RTU shall also store all status changes detected for retrieval by the Master Stations. For communication delays or short-term failure of communications with a master station, the RTU shall store a minimum of 300 status change events. The RTU shall report any overflow of this status change buffer to the Master Stations.

It is the Employer's/Owner's intent to minimize the use of Contact Multiplying Relays (CMRs) in order to subsequently minimize the nos. of components and its associated failures. The Contractor shall use CMRs to convert wet contact to isolated dry contact only when it is necessary for satisfactory performance of the system.

1.15.1 Contact Multiplying Relay

Contact multiplying relays (CMRs) are required to multiply the auxiliary contacts of breaker/isolators etc. as per site conditions. The contacts of these relays shall be used to provide status input to the RTUs. The relays shall be of self-reset type. The relay shall have a minimum of two changeover contacts each with minimum current carrying capacity of 5 A at 110V/220 V DC.

The relays shall conform to the following requirements:

- a) Power frequency withstand voltage: 2 kV for 1 minute as per IEC standards.
- b) Insulation resistance of 100 Mega-Ohms at 500V DC.
- c) 5 KV Impulse test as per IEC standards

The CMRs shall be generally mounted in existing control & Relay panel but in case of non-availability of space, it shall be accommodated in the System Interface Cabinets (being supplied by the Contractor).

The CMRs shall have a LED indication which shall light up when the CMR is in energized (picked-up) condition. The CMR coil shall be rated for the voltage existing at the site.

1.15.2 Momentary Change Detection

Two-state status input points with momentary change detection shall be used by Employer/Owner for points where multiple operations (changes of state) can occur between scans from the master station (such as breakers with auto-reclosing devices that operate faster than the master station scan rate). The RTU shall capture and maintain all of the momentary changes, up to 4 per MCD digital status point. The MCD status input points shall be set to capture operations of greater than 20 ms duration.

Alternatively, the RTU can store and report the multiple state changes of a digital input as discrete events. It shall be ensured that all the changes are reported to the Master station in the sequence in which they occur in the RTU.

1.16 Digital Telemetry

Digital telemetry input points shall be provided for sixteen bit inputs from employer telemetry contacts. The digital telemetry may use BCD, (4 bit decimal character without sign) and/or binary (16 bit) codes.

1.17 Sequence of Events (SOE) feature

SOE is the time-stamped digital status data. SOEs will enable Employer's/Owner's personnel to determine the sequential operation of digital status input devices for their state changes. The RTU shall time-stamp the digital status data with a time resolution of one millisecond.

Initially, all breakers & protection contacts digital status input points in the RTU & events captured from IEDs shall be configured as SOE points. However, it shall be possible to assign any digital status input data point in the RTU as SOE point.

Each time a SOE status input point changes state, the RTU shall time-tag the change and send it to the Master station. The RTU shall maintain a SOE buffer within the RTU for communication delays and communication failure. SOE buffer shall be sized to store, as a minimum of 5,000 events. The RTU shall transmit the SOE data stored in its buffer to master station. An acknowledgement of receipt by the master station shall be made prior to the loss of any data in the RTU SOE buffer. Data not received at the master station shall be retransmitted. The RTU shall send a message to the master station to indicate the RTU SOE data buffer overflow condition.

1.18 Control Outputs

The RTU shall provide the capability for a master station to select and change the state of digital output points either directly or through MFT/MFM. In case the Control Output is provided through MFT/MFM, the communication between RTU & MFT/MFM shall also support select before operate functionality. Device control will be used by employer to control power system devices including:

- (a) Two-state Devices: Circuit breakers, motor-operated switches, auto/manual switches, relay disable/enable, and other two-state devices

- (b) Variable Output Devices: Raise/lower control of generators, transformer load-tap-changers (LTC), and other variable output devices.

The RTUs shall have the capability for control outputs as described in the following sub-sections below.

1.18.1 Two State Momentary Control

A pair of outputs shall be supplied for each two-state (open/close) control output point that drive control relays. One output shall be supplied for open, the other for close. Upon command from a master station using the check-before-execute sequence, the appropriate control output shall be operated for a preset (momentary) time period. The operation period shall be adjustable for each point from 0.1 to 2 seconds.

1.18.2 Raise/Lower Pulse Output

A pair of outputs shall be supplied for each (raise/lower) control output point that drive control relays. One output shall be supplied for raise, the other for lower. When commanded from the master station, the appropriate raise or lower output shall be operated for the selected time interval. The closure time interval for raise/lower pulse output points shall be specified in the operate command from the master station. The raise/lower output for each point shall operate over a range of 0.1 to 4 seconds in a minimum of eight equal increments.

1.18.3 Timed Supervisory Control

The RTU shall store Timed Supervisory control command received from the SCADA system. This supervisory control command from the SCADA system shall contain the 'time' up to a resolution of milliseconds and the type of control Operation.

The RTU shall then perform the supervisory control command at the specified time. The SCADA system shall be able to cancel this command prior to the occurrence of the specified Time of Operation.

1.18.4 Control Output Interposing Relays (Double Contact Digital Output)

Control output interposing relays shall be supplied by the Contractor for each control output specified in appendix. Each control relay shall consist of two isolated single-pole double-throw contacts. The output contacts shall be rated to carry minimum current of 10 amps at 220 V DC, and shall provide arc suppression to permit interruptions of an inductive load. Relay coils shall be shunted with diodes to suppress inductive transients associated with energizing and de-energizing of the relay coils. The relays shall conform to the IEC standards.

1.18.5 Latching (Dummy Breaker) Relay

The Contractor shall provide a latching relay to be used to simulate and test supervisory control from the RTU. The simulation relay shall accept the control signals to open and close from the RTU, and shall provide the correct indication response through a single contact indication input point. This point is not included in the RTU point count in **Appendix A**.

1.18.6 Control Security and Safety Requirements

The RTU shall include the following security and safety features as a minimum for control outputs:

- (a) Select-and-execute sequence for control output.
- (b) No more than one control point shall be selected at any given time.
- (c) The control selection shall be automatically cancelled if after receiving the "control selection" message, the "control execute" command is not received within the set time period.
- (d) The control selection shall be automatically cancelled if after receiving the "control selection" message, the "operate" command is not the next received message and is not received within the set time period.
- (e) No control command shall be generated during power up or power down of RTU.

1.18.7 Local/Remote selector switch

A manual Local/Remote selector switch shall be provided for each RTU to disable all control outputs by breaking the power supply connection to the control outputs. When in the "Local" position, the Local/Remote switch shall allow testing of all the control outputs of RTU without activating the control outputs to field devices. A status input indication shall be provided for the Local/Remote switch to allow the SCADA system to monitor the position of the switch. This point is not included in the RTU point count defined in Appendix A.

1.19 Time facility

The RTU shall have an internal clock with the stability as defined in **Table-1**. The RTU shall be synchronised through synchronisation message from master station at every 10 minutes using IEC 60870-5-101 protocol. The RTU shall support the calculation of the propagation delay dynamically by the Master station. However, all the RTUs shall have a suitable interface for receiving synchronization signals from a local GPS receiver.

The RTUs communicating over IEC-60870-5-104 shall be supplied with a GPS receiver for synchronization of RTU clock.

The RTU shall synchronize its internal clock with the master station system clock when time synchronization messages are available and shall mark all the time stamped information/data as invalid when the RTU clock is not synchronised with the Master station.

To achieve the RTU internal clock stability of atleast 1 ppm, the contractor shall supply RTUs with GPS. The internal GPS should also provide positional information for asset management.

1.20 Diagnostic features

The RTU design shall facilitate isolation and correction of all failures. The following features which promote rapid problem isolation and replacement of failed components shall be provided:

- a) Self-diagnostic capabilities within each RTU which can be initiated at the RTU site. The diagnostic software shall check for memory, processor, and input/output ports errors and failures of other functional areas defined in the specification of the RTU.
- b) On-line error detection capabilities within the RTU and detailed reporting to the connected master station of detected errors. It shall be possible to choose the errors to be sent to the Master station within the framework of the communication protocol.
- c) Local indication of major RTU failures
- d) A non-volatile event buffer that shall record all fatal errors/restarts/ faults. The RTU should archive the events on an External Storage device.
- e) RTU should support SNMPv3 and Syslog.
- f) RTU should have a inbuilt Web Browser application which can be accessed over Intranet from the Control Centre.

1.21 Input DC Power Supply

The RTU will be powered from a 48 V DC (+ve earthed) system. The RTU shall not place additional ground on the input power source. The characteristics of the input DC power supply shall be

- (a) Nominal voltage of 48V DC with operation between 36V DC and 72V DC.
- (b) Maximum AC component of frequency equal to or greater than 100 Hz and 0.012 times the rated voltage peak-to-peak.

The RTU shall have adequate protection against reversed polarity, over current and under voltage conditions, to prevent the RTU internal logic from being damaged and becoming unstable causing mal-operation.

1.22 Environmental Requirements

The RTU will be installed in control room buildings with no temperature or humidity control. The RTUs shall be capable of operating in ambient temperature from -5 to +55 degree C with rate of temperature change of 20 degree C/hour and relative humidity less than 95%, non-condensing. At some locations, environmental temperature may go below -5 degree C for which the contractor shall take suitable measures for successful operation of RTU.

1.23 Noise level

RTU shall be solid state and acoustically quiet. The audible noise generated by the RTU equipment shall not exceed 50 dbA one meter from the enclosure.

1.24 RTU Size and Expandability

The software and the database shall be sized to accommodate growth within the ultimate sizing parameters as defined in this specification for the RTU without requiring software or database structure regeneration.

The point counts for the RTUs have been defined in the **Appendix A**. The RTU shall have additional wired available reserve capacity of twenty percent (20%) for each type of points defined in the BOQ. This reserve capacity shall be used without any additional hardware such as I/O cards and terminal blocks.

The RTUs delivered shall have the capability to accommodate additional I/O modules to expand the overall point count of the RTU by a minimum of fifty percent (50%) i.e. 80% more than the actual RTU count defined in the BOQ. The I/O modules here means Status Input module, Analog input module and the Control output module. Other modules, such as processor module, racks etc. as required to meet the overall expandability requirement defined above shall also be supplied by the contractor.

1.25 RTU and SIC panels

The Contractor shall provide RTU & System Interface Cabinet (SIC) panels. The SIC shall primarily house all MFMs, interposing control relays and interface terminal blocks. Generally, CMRs and MFMs shall be installed in the Customer Control/Relay panels and all other equipment like Heavy Duty Relays, etc. shall be housed in the RTU panel. However where it would not be possible to mount the MFMs in the existing customer panel SIC panel shall be provided.

The SIC shall be mounted adjacent to the RTU panel. However, in a few cases, the SIC may be mounted separately at a different locations. All RTU signals shall be connected to the MFMs, interposing relays, and field signals in the interface cabinet. The panels shall meet the following requirements:

- (a) Shall be free-standing, floor mounted and height shall not exceed 2100 mm.
- (b) Shall have maintenance access to the hardware and wiring through lock-able full height doors.
- (c) Shall have the provisions for bottom cable entry
- (d) The safety ground shall be isolated from the signal ground and shall be connected to the ground network. Safety ground shall be a copper bus bar. The contractor shall connect the panel's safety ground of to the Employer's grounding network. Signal ground shall be connected to the communication equipment signal ground.
- (e) All panels shall be supplied with 230 Vac, 50 Hz, single-phase switch and 15/5A duplex socket arrangement for maintenance.
- (f) All panels shall be provided with an internal maintenance lamp, space heaters and gaskets.
- (g) All panels shall be indoor, dust-proof with rodent protection, and meet IP41 class of protection.
- (h) There shall be no sharp corners or edges. All edges shall be rounded to prevent injury.
- (i) Document Holder shall be provided inside the cabinet to keep test report, drawing, maintenance register etc.
- (j) All materials used in the enclosures including cable insulation or sheathing, wire troughs, terminal blocks, and enclosure trim shall be made of flame retardant material and shall not produce toxic gasses under fire conditions.
- (k) The structural frame of the panels shall be of cold rolled sheet steel of thickness not less than 3 mm for the weight bearing members of the panels such as base frame, front sheet & door frames and 2mm for sides, door, top and bottom portions.

- (l) All sheet steel work shall be degreased, pickled, phosphated in accordance with IS6005. The phosphate coating shall be sealed with application of two coats of ready mixed, stoving type zinc chromate primer. Two coats of synthetic enamel paint RAL7032 shade) shall be applied both in the exterior and the interior of the panel.

Note: since the project may involve replacement of existing RTUs, hence the dismantled RTUs and associated hardware shall be handed over to Employer/Owner itself.

1.26 Interconnections

All cabling between component units of the RTU, RTU to interface cabinet, RTU to MFTs/MFMs and to the Employer/Owner control and relay panels (located in the substation control room) shall be supplied and installed by the Contractor and shall be shown on Contractor supplied drawings. Plug-type connectors with captive fasteners or compression type connectors shall be used for all internal interconnections. The connectors shall be polarized to prevent improper assembly. Each end of interconnection cables shall be identified by a marker which includes the cable number and the identifying number and location of each of the cable's terminations. This information shall match with the Contractor's drawings.

Adequate space and hardware shall be provided for routing of the field wiring within the enclosures. Contractor wiring within enclosures shall be neatly arranged and shall not be directly fastened to the enclosure frame. All internal interconnection wiring and cables shall be routed separately from field wiring to the RTU terminals & power wiring. All wiring shall use copper conductors and have flame retardant insulation. Conductors in multi-conductor cables shall be individually colour coded.

The use of non-flammable, self-extinguishing, plastic wire troughs is permissible. Metal clamps must have insulating inserts between the clamps and the wiring. Wiring between stationary and movable components, such as wiring across door hinges or to components mounted on extension slides, shall allow for full movement of the component without binding or chafing of the wiring.

1.27 Wiring/Cabling requirements

Shielded (screened) cables shall be used for external Cabling from the RTU/ SIC panels. These external cables (except communication cables) shall have the following characteristics:

- a) All cables shall have stranded copper conductor.
- b) Minimum core cross-section of 2.5 mm^2 for PT cables, $4/2,5 \text{ mm}^2$ for CT cables or as per site requirements and 2.5 mm^2 for Power & Control outputs and 1.5 mm^2 for Digital Status inputs, transducer mA current output
- c) Rated voltage U_0/U of 0.6/1.1KV
- d) External sheathing of cable shall have oxygen index not less than 29 & temperature index not less than 250. Cable sheath shall meet fire resistance test as per IS 1554 Part-I.
- e) Shielding, longitudinally laid with overlap.
- f) Dielectric withstand 2.5 kV at 50 Hz for 5 minutes
- g) External marking with manufacture's name, type, core quantity, cross-section, and year of manufacture.
- h) The Communication cable shall be of shielded, twisted pairs and of minimum 0.22sq mm size

1.28 Terminal Blocks

Terminal blocks shall be having provision for disconnection (isolation), with full-depth insulating barriers made from moulded self-extinguishing material. Terminal blocks shall be appropriately sized and rated for the electrical capacity of the circuit and wire used. No more than two wires shall be connected to any terminal. Each analog input signal, digital status input and digital output signals shall require two terminals per point plus a common shield termination for each cable.

All terminal blocks shall be suitably arranged for easy identification of its usages such as CT circuits, PT circuits, analog inputs, status inputs, control outputs, auxiliary power supply circuits, communication signals etc.

Terminal Blocks for CT circuits shall have feature for CT shorting (on CT side) & disconnection (from load side) to facilitate testing by current injection. Similarly, TBs for PT circuit shall have feature for disconnection to facilitate voltage injection for testing.

1.29 RTU Architecture

Bidder has the option to offer RTUs having following architectural design:

- a) Centralized RTU design where all I/O modules are housed in RTU panels and communicating with master station through communication port.
- b) Distributed RTU design where I/O modules are housed in respective bay C&R panels. All these distributed I/O modules shall be connected to a central processor for further communication with master station. The bidder shall assess the requirement of RTU/SIC panels for such design and supply panels accordingly.

1.30 RTU Security Process

- a) Web access shall be secured on https.
- b) Role Based Access Control permissions shall be provided.
- c) Services shall be encrypted using SSL.
- d) Open ports access shall be restricted to specific IP Addresses.
- e) Rate Limiting against DOS (Denial of Service) shall be supported.

1.31 Transducer & Weather Sensor Requirements

All transducers shall use a 48 VDC auxiliary power supply as provided for the RTU. All transducers shall have a maximum power consumption of 10 watts.

1.31.1 Transducer Protection

The input, output and auxiliary circuits shall be isolated from each other and earth ground. The transducer output shall be ungrounded and shall have short circuit and open circuit protection. The transducers shall comply to the following requirements, in addition to the requirement of IEC 60688, without damage to the transducer:

- (a) Electromagnetic Compatibility: IEC 61000-4-3, Level 1
- (b) Electromagnetic Compatibility: IEC 61000-4-4, Level 1
- (c) Shock Resistance: Minimum severity 50 A, IEC 68-2-27 requirements

- (d) Vibration Strength: Minimum severity 55/05, IEC 68-2-6 requirements.
- (e) Input Circuit Consumption: Less than 0.5 VA for voltage and current circuits.

1.31.2 Multi-Function Transducers (MFMs)

The contractor shall provide the multi-function transducers for acquiring the real time analog inputs through 3 phase 4 wire CT/PTs circuits. The multi-function transducer shall be designed for nominal 110 V (Ph-Ph voltage) and 1A/5A (per phase current).

The MFM shall be suitable for 20% continuous over load and shall be able to withstanding 20 times the normal current rating for a period one second. The MFM shall be able to accept the input voltages up to 120% of the nominal voltage. The MFMs shall have low VA burden. These MFMs shall be mounted in the interface cabinet to be supplied by the contractor.

- CT and PT ratio shall be programmable at site.
- CT withstand capacity: 3 times RMS continuous and at least 20 times for 1 second.
- CT Burden: < 0.1 VA
- Voltage withstand capacity: 1kV continuous and 2kV for 1 second.
- PT Burden: < 0.15 VA
- Communication Speed: < 50 milli-seconds.

Multi-function transducers shall provide at least the following parameters as a minimum with the specified accuracies.

Sl. No.	Parameters	Accuracy
(i)	Voltage	±0.5%
(ii)	Current	±0.5%
(iii)	Frequency	± 0.2%
(iv)	Active Power/Reactive power	±0.5% / ±1%
(v)	Import & Export Energy (active/reactive)	±1% / ± 2%
(vi)	Power Factor (measuring range shall be 0.6 to 1.0 lag & lead)	

The parameters to be acquired from multifunction transducers shall be selectable. MFM shall provide the 15 minute values (configurable 15 minute/1 hour) of Active Energy Import, Active Energy Export, Reactive Energy Import and Reactive Energy Export.

Multi-function transducers shall accept nominal 48 V DC (positive earthed) as auxiliary power supply. Multi-function transducer shall be provided with RS485 interface to communicate with RTU over Modbus protocol in multi-drop mode.

The MFMs shall be suitable for mounting on DIN rails. The MFM terminals shall accept upto two 2.5 mm² / 4 mm² for PT/CT circuit terminations as applicable.

The Multi-function transducer shall have a local display to show all the parameters. The parameters being displayed shall be selected through a push button. The display parameters shall include at least the following –

- 3-phase voltage
- 3-phase current
- Frequency

- Total Power Factor (incl. Lead/Lag) – per phase
- Total Active Power (incl. Export/Import) – per phase
- Total Reactive Power (incl. Export/Import) – per phase
- Total Apparent Power (MVA) – per phase
- Energy – Import and Export

The Multi-function transducer shall comply to the EMI/EMC level test requirements as specified for the RTU except for Fast transient burst test requirement which shall be for level 4. The test reports shall be submitted during detailed engineering.

1.31.3 Transformer Tap Position Transducer

The existing transformer tap position indications are of two types.

- (i) Variable resistance type
- (ii) Lamp type

The Contractor shall provide suitable resistance tap position transducers which shall have the following characteristics

- (a) The input measuring ranges shall be from 2 to 1000 ohms per step, which is tuneable at site with at least 25 steps.
- (b) Dual output signal of 4 to 20 mA DC, 0.5% accuracy class as per IEC 688 shall be provided. One output will be used for driving a local digital indicator (to be provided by the contractor) and the other will be used for interfacing with the RTU.
- (c) In case of lamp type, additional resistance/potentiometer unit shall be provided to convert the dry type contacts to a variable resistance as defined in (a) above, suitable for the remote indication.

1.31.4 Weather Sensors

All weather sensors shall be maintenance free and of Industry standard design. The design of sensors shall permit calibration on site. The sensing mechanism shall be rugged enough to avoid frequent recalibration.

The weather sensor shall be a robust ultrasonic sensor with Aluminium alloy construction. The sensor shall be a solid-state device with no moving parts, and shall use ultrasonic measurement technology. The robust Aluminium alloy housing shall be hard-anodised to ensure suitability in harsh environments. The sensors shall be supplied with the complete support/mounting structure as required.

The sensor, support structure shall have built-in protection against lightning stroke/electrical surges, etc.

The output of all the sensors except rainfall sensor shall be 4 to 20 mA at 0-500 ohm impedance.

The output of rainfall sensor shall be in the form of potential free contact and its closure shall be accumulated (over a configurable time period) and reported at master station through RTU. The sensors shall be located in open and in the electrical environment such as 400 KV EHV outdoor stations. The equipment offered should be suitable for satisfactory operation in above environment.

1.31.4.1 Air Temperature Sensor

Sensor	Air Temperature Sensor
Output	As per specification 1.29.4
Temperature Range	-5 ° C to + 60 ° C
Resolution	0.1 ° C
Accuracy	≤ 0.5 ° C or better
Radiation Shield	Radiation Shield made of weather resistant Material and suitable to sensor used.

1.31.4.2 Relative Humidity Sensor

Sensor	Relative Humidity Sensor
Output	As per specification 1.28.4
Range	0 to 99 %
Resolution	1%
Accuracy	3 % or better
Radiation Shield	Radiation Shield made of weather resistant material and suitable to sensor used.
Operating Temperature Range	-5 ° C to + 60 ° C

Note: The Air Temperature and Relative Humidity sensors may be supplied in a single enclosure or separately.

1.31.4.3 Rainfall Sensor

Sensor	Tipping Bucket Rain Gauge
Output	As per specification 1.29.4
Capacity / Range	Unlimited
Resolution	0.2 mm per tip or better
Accuracy	4%
Collecting Area	Minimum 200 sq.mm
Operating Temperature	-5 ° C to + 60 ° C

1.31.4.4 Wind Speed Sensor

Sensor	Anemometer 3 cup assembly, very robust to Withstand strong wind gust.
Output	4 to 20 mA at 0-500 ohm impedance or RS 485 with MODBUS protocol
Starting Threshold	0.5 m/s or better
Range	0.9 - 60 m/s
Resolution	0.1 m/s
Accuracy	2 % or better

Mechanical	3 Cup assembly and housing (complete), should be very robust and capable to withstand strong wind gust and made up of suitable non-rusting material
Mounting Accessories	Made of suitable good quality material like steel or high strength fibre.
Operating Temperature	0°C to + 60°C (-5°C to + 55°C for project area with snowfall history)

Note: The Wind Speed and Wind Direction sensors may be supplied in single enclosure or separately.

1.31.4.5 Wind Direction Sensor

Sensor	Wind Direction sensor
Output	4 to 20 mA at 0-500 ohm impedance or RS 485 with MODBUS protocol
Starting Threshold	0.5 m/s or better
Range	0 – 360° (Degrees)
Resolution	1° (Degree)
Accuracy	3° (Degrees) or better
Construction of Housing and vane	Housing (complete) should be very robust and capable to withstand strong wind gust and made up of suitable-non-rusting material having high mechanical strength. Wind vane and control head may be of Aluminum or other light UV resistant material
Operating Temperature	0°C to + 60°C (-5°C to + 55°C for project area with snowfall history)

1.31.4.6 Air Temperature Sensor

Sensor	Air Temperature Sensor
Output	4 to 20 mA at 0-500 ohm impedance or RS 485 with MODBUS protocol
Temperature Range	0°C to + 60°C (-5°C to + 55°C for project area with snowfall history)
Resolution	0.1°C
Accuracy	< 0.5°C or better
Radiation Shield	Radiation Shield made of weather resistant material and suitable to sensor used.

1.31.4.7 Weather Sensor Installation Requirement

The weather sensor shall be supplied along with necessary accessories (e.g. tripod, stand, clamps etc.) for installation/ fixing of sensors, signal/power cables etc. as part of weather sensors station. All the accessories shall be made of stainless steel or other suitable material having sufficient mechanical strength and corrosion resistance to withstand atmospheric temperature, pressure, wind speed and relative humidity up to the working range (Minimum to Maximum) of sensors for these parameters as defined.

The Employer will prefer to install the sensors on roof top of control centre/substation or other building. The mounting arrangement for all the sensors shall be designed suitably for installation on the roof top.

1.32 Portable Configuration and Maintenance Terminal (PCMT)

Contractor shall supply a Portable Configuration and maintenance Terminal (Laptop PC) which shall provide followings capabilities:

- (a) RTU Data base configuration & Maintenance
- (b) Local Operator Interface & RTU Diagnostics
- (c) Master Station and RTU simulator cum protocol analyzer

a) RTU Data base configuration

The **RTU database Configuration** software being supplied with the PCMT shall have the following features

- i) Full graphics windows User Interface
- ii) Standard editing capabilities e.g. cut, paste, copy, sorting etc.
- iii) Capable of controlling revisions of various RTU database files and storing multiple versions of databases for all the RTUs.
- iv) Capable of uploading database from the RTU and compare that with another version of database stored in the PCMT.
- v) Provide standard template for database modeling required for I/O modules, MFMs & IEDs, communication setting.
- vi) Provide mapping of the individual data points acquired from one Protocol to another protocol for transmission.

The database configuration software shall use the same terminology for configuration of the various protocol parameters as specified in the communication protocol standard i.e. it shall be possible to define these parameters by the user discreetly. Also, it shall be possible to select an ASDU type to be used for transmission of a measurand e.g. measured value to be transmitted as ASDU 9 or ASDU 11.

b) Local Operator interface and RTU diagnostics

The Local **Operator interface** software shall support operator inquiries to demand current status and data values of various RTU points, or an overall substation snap-shot, or of the status change buffer.

The local operator interface software shall provide the following reports:

- i) Status Reports: Display of all substation status indications, of all tele-metered values, and the RTU's status.
- ii) Event Report: Display all the stored events in the event buffer of the RTU.
- iii) Print Request: Provide user interface for requesting print out of the Reports on the Logger

- iv) Maintenance activities: User interface for interacting with the RTU for maintenance activities like diagnostics, database online requests.

The RTU shall have inbuilt features for monitoring the healthiness of the RTU modules and detecting the type of error. The **diagnostics software** shall have diagnostics for the RTU's processor(s), memory, I/O ports, and any other functional areas of the RTU. It shall list the errors recorded by the RTU and provide troubleshooting tools for the RTU.

c) Master station-cum-RTU simulator & protocol analyzer software tool

The Master station and RTU simulator cum Protocol Analyser software shall be used to monitor and test the RTU's operation using the master station communication protocol. It shall have the following features

- i) capable of emulating both the master station and the RTU messages in all the communication protocols used in the RTU subject to minimum of IEC 60870-5-101, 104 & MODBUS/103. When the Master station and RTU simulator cum Protocol Analyser software has received or transmitted a message, it shall be possible to immediately "turn around" and transmit or receive a response message.
- ii) capability of interfacing to digital side of the RTU for the above purpose.
- iii) capable of receiving single and repeated messages using the supplied RTU communication protocol. Each received message shall be checked for validity, including the checksum code. The messages shall be displayed in HEX format or in the 'interpreted form' as desired by the user . It shall maintain and display error counters so that the number of errors during a period of unattended testing can be accurately determined.
- iv) capable of formatting and transmitting, both as one-time and periodic transmissions, any master station-to-RTU command.
- v) capable of preparing illegal messages, such as messages having invalid check codes, for transmission.

The Master station and RTU simulator cum Protocol Analyser software shall also be capable of passively monitoring all communication traffic on a channel without inter-fering with channel operation.

Channel traffic captured in the active or passive modes of operation shall be displayed. All fields of a message shall be displayed. A pass/fail indication for the security check code shall be included with each code displayed.

1.33 Training, Documentations and Testing

1.33.1 Training

The contractor shall provide training to the Employer's personnel. The training program shall be comprehensive and provide for interdisciplinary training on hardware and software. The training program shall be conducted in English. RTU/FRTU training course shall cover the following:

- a) RTU/FRTU operation including data flow.
- b) Troubleshooting, identification and replacement of faulty Modules.
- c) Preventive maintenance of the RTU/FRTU
- d) Use of RTU/FRTU configuration and Maintenance tool

- e) All functional and Diagnostic testing of RTU/FRTU
- f) Database modification and configuration of RTU/FRTU

1.33.2 Documentation

The Contractor shall submit 3 sets of all the standard and customized RTU documents for review and approval which includes the following:

- a) RTU Function Design Document
- b) RTU Hardware description document & all the documents referred therein to meet all the clauses of the specification.
- c) RTU Test equipment user documents
- d) RTU user guide
- e) RTU Operation & Maintenance document
- f) RTU Training documentation
- g) RTU database document
- h) RTU I/O list
- i) RTU Test procedures
- j) Data Requirement Sheet (DRS) of all items
- k) Protocol documentation including implementation profile etc.
- l) RTU installation and Layout, GA, BOQ, schematics and internal wiring drawings for each RTU site
- m) RTU to C&R panels/ field device cabling details for each RTU site
After approval of all the above documents, the Contractor shall submit three sets as final documents. The site-specific drawings as indicated at item (i) and (j) above shall be submitted in three sets for each site before installation of RTU. In case some modifications/corrections are carried out at site, the contractor shall again submit as built site-specific drawings in three sets after incorporating all such corrections as noticed during commissioning of the RTU.

1.31.3 RTU/SIC Testing

(a) Type Testing

A complete integrated unit shall be type tested to assure full compliance with the functional and technical requirements of the Specification. The testing sample shall include at least one of each type of cards/modules and devices. The list of Type tests to be performed on the RTU/SIC is mentioned in **Table-2** & type test requirements are mentioned in **Table-3**.

The contractor may optionally submit type test reports for all the EMI/EMC tests conducted at accredited laboratory for review & approval by Employer/Owner. However, in the event, the type test reports are not meeting the specification requirement, Employer/Owner may ask for the type testing of any or all of the above tests as required at no additional cost to the Employer/Owner.

The type test of RTU w.r.t. functional tests shall be carried out in all cases. Contractor shall commence commercial production of RTUs/SICs after successful completion of all type tests and approval from Employer/Owner.

Further, type test reports for meters, transducers and relays shall be submitted as per relevant standards. All weather sensors shall be calibrated as per Indian Metrological Department standards and certificate shall be submitted in this regard.

(b) Routine Testing

Each complete unit shall undergo routine testing. The list of Routine tests to be performed in the factory is mentioned in **Table-2**.

(c) Field Tests

After RTU/SIC panel installation and interface cabling with C&R panels and communication equipment, the Contractor shall carry out the field-testing. The list of field tests is mentioned in **Table-2**.

(d) Availability Tests

After field testing, RTU/SIC shall exhibit 98% availability during test period of 500 hours. Availability tests shall be performed along with Master station. The RTU/SIC shall be considered available only when all its functionality and hardware is operational. The non-available period due to external factors such as failure of DC power supply, communication link etc., shall be treated as hold-time & availability test duration shall be extended by such hold time.

Table-1: Technical Particulars of RTU

Sr. no.	Item Description	Value	Remarks
1	Data transmission rate	300 to 9600 bps for serial port & 10/100 Mbps for Ethernet port	Configurable
2	Communication ports	Minimum 9 Ports	<ul style="list-style-type: none"> • 2 Ethernet port for Connectivity to Master Station on IEC 60870-5-104 and IEDs/Numerical Relays on IEC 61850 • Two RS232 ports –for communication. With 2 master stations on 60870-5-101. • 1 Port– for RTU configuration & Maintenance tool • 2 port for LDMS • Required Nos (Min 2 Nos) RS 485 ports for polling MFMs/Energy Meters
3	Communication protocol with Master stations	IEC 60870-5-101 & 104	
4	Communication Protocol with LDMS	IEC 60870-5-101/104	
5	Communication Protocol with MFMs	MODBUS/103	
6	Communication Protocol with	IEC 61850	

Sr. no.	Item Description	Value	Remarks
	IEDs		
7	Status data transfer to Master station	by exception	
8	Analog data transfer to Master station	Normally Periodic For major change – by exception	
9	No. of Scan Groups supported	16	
10	Separate Logical Database for each Master Station		
11	RTU shall be able to capture contact operations	of 20 ms or more duration.	
12	SOE buffer size	atleast 1024 events	
13	Time stamping accuracy for SOE	1 ms	
14	Supporting Control of Devices	Two state & OLTC capacitors	
15	Down loading of RTU database from master station	Supported	
16	RTU internal clock stability	Atleast 1 ppm	
17	Nominal Power supply voltage	48V DC	
18	Compliance to cl. 1.29.1 – Transducer Protection		

Table-2: List of Tests on RTU/SIC

Test Nos	DESCRIPTION OF THE TEST	Type test	Routine test	Field test
FUNCTIONAL TESTS FOR RTU/SIC				
1.	Check for BOQ, Technical details, Construction & Wiring as per RTU/FRTU/SIC drawings	√	√	√
2.	Check for RTU database & configuration settings	√	√	√
3.	Check the operation of all Analog inputs, Status input & Control output points of RTU/SIC	√	√	√
4.	Check operation of all communication ports of RTU/FRTU	√	√	√
5.	Check for communication with master stations or master station simulator for RTU/ FRTU	√	√	√
6.	Test for downloading of RTU database from Master station	√		
7.	Test for RTU time synchronization from Master	√		√
8.	Test Power Supply Voltage Margin, Ripple Levels and Short Circuit Protection	√		
9.	Test for RTU operation with DC power supply voltage variation	√		
10.	Check for auto restoration of RTU on DC power recovery after its failure	√	√	√
11.	Test for RTU/ FRTU diagnostic feature	√		
12.	Test for RTU SOE feature	√		
13.	RTU Analog accuracy test for analog input	√		
14.	Transducer accuracy test	√	√	
15.	Test for IEC 60870-5 -104, 61850 & Modbus protocol implemented	√		
16.	Test for RTU internal Clock stability	√		
17.	Test for RTU Noise level measurement	√		
18.	Test for Control Security and Safety for Control outputs	√		
19.	Other functional tests as per technical specification requirements	√		
20.	End to end test (between RTU/ FRTU & Master station) for all I/O points			√
EMI/EMC IMMUNITY TESTS FOR RTU/ FRTU				
21.	Surge Immunity Test as per IEC 60870-2-1	√		
22.	Electrical Fast Transient Burst Test as per IEC-60870-2-1	√		
23.	Damped Oscillatory Wave Test as per IEC 60870-2-1	√		
24.	Electrostatic Discharge test as per	√		
25.	Radiated Electromagnetic Field Test as per IEC 60870-2-1	√		
26.	Damped Oscillatory magnetic Field Test as per IEC-60870-2-1	√		
27.	Power Frequency magnetic Field Test as per IEC-60870-2-1	√		
INSULATION TEST FOR RTU/ FRTU				
28.	Power frequency voltage withstand Test as per IEC 60870-2-1	√		
29.	1.2/50 μs Impulse voltage withstand Test as per IEC 60870-2-1	√		
30.	Insulation resistance test	√		
ENVIRONMENTAL TEST FOR RTU/ FRTU				
31.	Dry heat test as per IEC60068-2-2 / 2-3	√		
32.	Damp heat test as per IEC60068-2-78	√		
33.	Cold Test as per IEC60068-2-1	√		

Note: Test levels for above type tests are elaborated in Table 3

Table-3: RTU Type Test Requirements

Test Nos	Test Name	EUT Status	Test Level	Power Supply Points		I/O Points	Passing Criteria
				CM	DM	CM	
1	Surge Immunity Test	ON	Level 3	2 kV	1 kV	2 kV	A
2	Electrical Fast Transient Burst Test	ON	Level 3	2 KV	-	1 kV	A
3	Damped Oscillatory Wave Test	ON	Level 3	2.5 kV	1 kV	2.5 kV	A
4	Electrostatic Discharge Test	ON	Level 3	+/- 6 kV in Contact discharge mode or +/- 8 kV in Air discharge mode			A
5	Radiated Electromagnetic Field Test	ON	Level 3	10 V/m electric field strength			A
6	Damped Oscillatory Magnetic Field Test	ON	Level 3	30 A/m at 1MHz of magnetic field strength			A
7	Power frequency magnetic field	ON	Level 3	30 A/m of magnetic field strength (Continuous duration sine wave)			A
8	Power frequency voltage withstand	OFF	-	1 KVrms for 1 minute			No break down or flashover shall occur
9	1.2/50µs impulse voltage withstand	OFF	-	2 kVp			No break down or flashover shall occur
11	Insulation Resistance Test	OFF	-	Measure Insulation resistance using 500 V DC Megger before & after Power Freq& Impulse voltage withstand tests			As per manufacturer standard
12	Dry heat test	ON	-	Continuous operation at 55 ⁰ C for 16 hrs			0
13	Damp heat test	ON	-	at 95% RH and 40 ⁰ C for 16 hrs			0
14	Cold test	ON	-	Continuous operation at 0 ⁰ C for 96 hrs			0

Note:-

1. EUT - Equipment Under Test
2. CM - Common Mode; DM - Differential mode
3. I/O pints do not include Communication ports
4. Passing Criteria
0 - no failure: normal performance within the specified limits
A : minor failure : temporary degradation or loss of function or performance which is self-recoverable
5. Functional test as per the sl. nos. 1-18 of Table-2 shall also be done during type testing.

1.34 Annual Maintenance Works

The entire delivered system shall be under Warranty for a period of three (03) years and under Service-AMC for subsequent seven (07) years. The Contractor will be responsible for attending faults, equipment failures, replacement of faulty parts and RTU configuration during the warranty period.

During the Warranty period as well as AMC period, it may be required that due to change in communication media or bay addition/modifications at site, Owner may need to change the RTU configurations. Hence, the modifications in RTU Configurations as well as RTU Database modifications during the entire Warranty and AMC period shall be under scope of Contractor.

Contractor shall maintain sufficient spares to comply with the Warranty and AMC requirements. In case the spares of Owner are used, then same shall be replaced with new spares by Contractor at its own cost.

Date: _____

Signature: _____

Name: _____

(Authorized Representative)

Annexure-3

Re: EXT: Budgetary Quotation for Remote Terminal Units from GE - reg. - Google Chrome
mail.posoco.in/owa/projection.aspx

Reply all | Delete | Junk | ...

Re: EXT: Budgetary Quotation for Remote Terminal Units from GE - reg.

Varshney, Abhishek (GE Digital) <abhishek.varshney@ge.com> Today, 12:08 PM
Akhil Singhal (अखिल सिंघल); BHATTACHARYA, TAMAL (GE Digital) <TAMALBHATTACHARYA1@ge.com>; S P Barnwal (एस पी बर्नवाल); Sakal Deep (सकल दीप); S ४

Inbox

Dear Sir,

Thanks for your mail.

Based on urgency and nos of I/O count, we offer Rs 16.59 lacs per RTU Supply cost including cable, Panel, CMR, Interposing relays and transportation (GST Extra).

I&C charges : Rs 3 lacs per RTU (GST Extra)

Transportation, Freight & Insurance Charges: Rs 53.6 thousand per RTU (GST Extra)

We hope you will find above in order and we remain awaited for your valuable order.

Thanks
Abhishek
+91-8800394840

On 17 Mar 2022 22:41, "Akhil Singhal (अखिल सिंघल)" <akhilsinghal@posoco.in> wrote:

WARNING: This email originated from outside of GE. Please validate the sender's email address before clicking on links or attachments as they may not be safe.

Sir,

Please submit the budgetary quotation for a Remote Terminal Unit along with associated equipment, cabling, ITC, etc. with details as mentioned below.

- **No. of Analog Inputs:** 50
- **No. of Digital Inputs:** 75
- **Control Points:** 20

Please consider as urgent. Thanking you.

Regards,
Akhil Singhal
Ch. Manager, NERLDC

Date: _____

Signature: _____

Name: _____

(Authorized Representative)