



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

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Website: www.nerpc.nic.in

No. NERPC/SE (O)/OCC/2017/ **1023-60**

Dated: December 29, 2017

To,

1. Managing Director, AEGCL, Bijuli Bhawan, Guwahati – 781 001
2. Managing Director, APDCL, Bijuli Bhawan, Guwahati – 781 001
3. Managing Director, APGCL, Bijuli Bhawan, Guwahati – 781 001
4. Director (Generation), Me. PGCL, Lumjingshai, Short Round Road, Shillong – 793 001
5. Director (Distribution), Me. ECL, Lumjingshai, Short Round Road, Shillong – 793 001
6. Director(Transmission), Me. PTCL, Lumjingshai, Short Round Road, Shillong – 793 001
7. Managing Director, MSPDCL, Secure Office Bldg. Complex, South Block, Imphal – 795 001
8. Managing Director, MSPCL, Electricity Complex, Keishampat, Imphal – 795 001
9. Director (Tech.), TSECL, Banamalipur, Agartala -799 001.
10. Director (Generation), TPGCL, Banamalipur, Agartala -799 001.
11. Chief Engineer (WE Zone), Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
12. Chief Engineer (EE Zone), Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
13. Chief Engineer (TP&MZ), Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791111
14. Engineer-in-Chief (P&E), Department of Power, Govt. of Mizoram, Aizawl – 796 001
15. Chief Engineer (P), Department of Power, Govt. of Nagaland, Kohima – 797 001
16. CGM, (LDC), SLDC Complex, AEGCL, Kahilipara, Guwahati-781 019
17. Group General Manager, NTPC, Bongaigoan Thermal Power Project, P.O. Salakati, Kokrajhar- 783369
18. ED, NERTS, PGCIL, Dongtiah-Lower Nongrah, Lapalang, Shillong -793 006
19. ED (O&M), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
20. ED (Commercial), NEEPCO Ltd., Brookland Compound, Lower New Colony, Shillong-793003
21. ED (O&M), NHPC, NHPC Office Complex, Sector-33, Faridabad, Haryana-121003
22. Vice President (Plant), OTPC, Badarghat Complex, Agartala, Tripura - 799014
23. GM, NERLDC, Dongtiah, Lower Nongrah, Lapalang, Shillong -793 006
24. Member Secretary, ERPC, 14 Golf Club Road, Tollygunge, Kolkata-700033
25. Chief Engineer, GM Division, Central Electricity Authority, New Delhi – 110066
26. Chief Engineer (NPC), NRPC Complex, Katwaria Sarai, SJSS Marg., New Delhi - 110016

Sub: Minutes of 139th OCC Meeting.

Sir/Madam,

Please find enclosed herewith the minutes of 139th OCC Meeting held at Guwahati on the **19th December, 2017** for your kind information and necessary action. The minute is also available on the website of NERPC, www.nerpc.nic.in.

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

Encl: As above

भवदीय / Yours faithfully,

बि. लिंगखोइ / B. Lyngkhoi
निदेशक / Director/ SE

Copy to:

1. CGM, AEGCL, Bijuli Bhavan, Guwahati - 781001
2. CGM, APGCL, Bijuli Bhavan, Guwahati - 781001
3. CGM, DISCOM, Bijuli Bhavan, Guwahati - 781001
4. Head of SLDC, Me.ECL, Lumjingshai, Short Round Road, Umjarain, Shillong – 793 022
5. Head of SLDC, Department of Power, Govt. of Arunachal Pradesh, Itanagar- 791 111
6. Head of SLDC, Department of Power, Dimapur, Nagaland
7. Head of SLDC, Electricity Department, Govt. of Manipur, Keishampat, Imphal – 795 001
8. Head of SLDC, Department of Power, Govt. of Mizoram, Aizawl – 796 001
9. Head of SLDC, TSECL, Agartala – 799 001
10. Chief Engineer(Elect), Loktak HEP, Vidyut Vihar, Kom Keirap, Manipur- 795124
11. Addl. GM (EED), NTPC Ltd., Bongaigoan Thermal Power Project, P.O. Salakati, Kokrajhar- 783369
12. DGM (C&M), OTPC, 6th Floor, A-Wing, IFCI Tower -61, Nehru Place, New Delhi – 110019.



निदेशक / Director/ SE

North Eastern Regional Power Committee

MINUTES OF THE 139th OPERATION COORDINATION

SUB-COMMITTEE MEETING OF NERPC

Date : 19/12/2017 (Tuesday)
Time : 10:00 hrs
Venue : "Hotel Nandan", Guwahati.

The List of Participants in the 139th OCC Meeting is attached at **Annexure – I**

Shri P.K. Mishra, Member Secretary, NERPC welcomed all the participants to the 139th OCC meeting. He noted the presence of participants from all the utilities except Mizoram. He expressed satisfaction about the maximum participants from all the utilities and requested to continue the same in future so that matters can be resolved during the meeting. He informed the members that senior officials from CEA&NLDC have kindly agreed to attend the meeting to resolve issues regarding PSDF funded projects. He requested all the constituents to take the opportunity to raise all their relevant queries pertaining to PSDF for the benefit of their organization(s).

Thereafter, Member Secretary requested Shri B. Lyngkhoi, Director/SE(C&O) to take up the agenda for discussion. SE(C&O), NERPC informed that CE, NPC could not attend the meeting due to unavoidable circumstances, however all the works related to PSDF he has already been discussed telephonically and the same would be intimated during the meeting. He also welcomed representative from M/s CDAC and M/s SCOPE and requested them to give the current status about their projects.. Further, he stated that due to the multitude of agenda items discussions should be focused and precise.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 138th MEETING OF OPERATION SUB-COMMITTEE OF NERPC.

The minutes of 138th meeting of Operation Sub-committee held on 24th November, 2017 at Guwahati were circulated vide letter No. NERPC/SE (O)/OCC/2016/4556-4591 dated 4th December, 2017.

NERLDC vide mail dtd. 11.12.2017 sought the following modifications-

1. Deviation outstanding payable by Assam:

Recorded:

NERLDC made a presentation (attached at **Annexure-X**) on sustained overdrawal by Assam and huge outstanding deviation charges payable by Assam (enclosed). It was explained that such sustained overdrawal is not permissible and any entity has to maintain its actual close to schedule.

To be Recorded:

Regarding outstanding deviation charges, it was advised that Assam should clear the outstanding payable of Rs. 25 Crores by one-time payment and then current dues should be paid on regular basis.

APDCL representative agreed to do the needful.

Item D.14. Transformer Tap optimization:

Recorded:

The line " DGM(MO),NERLDC opined that changing tap position at present based on scenario for February, 2018." may be replaced by following:

To be Recorded:

NERLDC proposal regarding tap changing as per February 2018 scenario load flow case was discussed and it was felt that tap changing study should be based on seasonal pattern considering high-normal-low hydro, summer, winter seasons etc., and preferably study may be on quarterly basis. NERLDC was advised to look into it."

The Sub-committee confirmed the minutes of 138th OCCM of NERPC with no modifications as no comments/observations were received from the constituents.

ITEMS FOR DISCUSSION

B.1. ACTION TAKEN:

1. IMPLEMENTATION OF PROJECTS FUNDED FROM PSDF:

The status as informed in 139th OCC:

State	Protection System	ADMS	Capacitor Installation	SAMAST**
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Arunachal Pradesh	No requisition of funds.	DPR preparation stage.	-	SLDC to apprise SERC of the project.
Nagaland	Work under execution. Completion by 31.12.17.	Under scrutiny of Techno-Economic Sub-group.	To re-submit proposal.	Documents and relevant papers have been furnished to Nagaland SERC as desired by Chairperson, SERC. SERC has requested for a presentation at Kohima/Nagaland by the SAMAST group
Mizoram	Main Equipment and Diagnostic Tools LOA issued. Civil Works LOA by 14.12.17	To be further examined by Techno-Economic Sub-group after interaction with consultant.	Proposal on hold. To be considered upon funds being available.	To furnish action plan.
Manipur	By Dec'17 all LOAs' to be issued.	Pilot project under scrutiny of Techno-Economic Sub-group. To submit clarification.	-	NERPC/NERLDC members to meet SERC /MSPCL higher officials to enable take-off of the project.
Tripura	To submit UC by 31.01.18.	Submitted to NPC/NLDC.	Under Study stage**	NERPC/NERLDC members to meet TSERC /TSECL higher officials to enable take-off of the project.
Assam	Remaining tenders by Jan'18 and all LOAs' by Aug'18.	Under scrutiny of Techno-Economic Sub-group.	-	DPR to be submitted by Dec'17.
Meghalaya	MePTCL& MePGCL -LOA completed.	DPR submitted to CEA & NLDC	-	Draft DPR Estimates and BoQ of MePTCL submitted.

Deliberation of the sub-Committee:

Representative of M/s SCOPE presented the ADMS(Automated Demand Management System) scheme developed by them:-

- Required load relief in contingencies automatically or manually by tripping loads at lower voltage levels(11kV) corresponding to signals generated from dedicated server at SLDC
- Trip signals to 33/11kV feeders on round robin basis or customized algorithm.
- Communication using Fibre Optic, MDLS or PLCC.
- RTUs need to be installed at each 33/11kV S/S and signals like CB, Isolator status & Analog Data like MW, MVAR etc.

GM, NLDC at the outset thanked the forum for allowing him to interact with the distinguished members of various utilities. He appreciated the presentation by M/s SCOPE on ADMS. However, he also noted the basic objective of ADMS is to disconnect load so that control areas can adhere to the voltage and frequency limits stipulated by IEGC. The elaborate scheme of M/s SCOPE is more of a SCADA for Distribution Management. Though it serves the purpose of ADMS, it also increases the cost sufficiently. An ADMS with round robin disconnection of load may be implemented without actual data at SLDC. He requested the forum and M/s SCOPE to relook into the cost of project so that it may fulfil the guidelines of CERC as well as be cost efficient.

The forum noted the view of NLDC but at the same time informed that the costs of projects in NER should not be compared with other regions; moreover, this is the pilot project only. Further, the forum opined that load centres in NER are only in the State capitals, except Assam and hence the order of Hon'ble CERC will be complied with this pilot projects only and may not require further. The forum requested NPC/NLDC to look into the matter on priority so that the scheme can be implemented as directed by CERC.

Further NLDC highlighted the following w.r.t. various PSDF projects:-

- The proposal for Capacitor Bank installation by DoP Nagaland has been studied in detail. For 33kV nodes 32/32.5 kV has been classified as low voltage. Similarly for 11kV feeder 10.33kV has been classified as low voltage. These do not account for Capacitor Bank Installation and proper studies have to be carried out by expert or NERPC/NERLDC. *(DoP Nagaland informed that revised proposal consistent with ground realities would be submitted).*

Member Secretary stated that all PSDF related projects from now on should be routed out through NERPC so that they can scrutinize properly and NERPC will send the proposal to NPC & NLDC on behalf of the States so that the schemes can be sanctioned at the earliest.

All members agreed to the proposal of the Chair.

- **Poor utilisation of funds** - He informed that MoP and Monitoring Committee had noted the poor utilisation of funds by most of NER states. For R&U works, agreement had been signed more than two years back. However due to LOAs not being awarded for complete package 30% funds have still not been released. Poor utilisation is resulting in reduction of future outlays. He also informed that for release of the third tranche of 60% funds Auditors' Certificate is mandatory and for the final 10% IR is to be submitted. *(All the concerned utilities agreed to finish LOA process ASAP).*

The forum thanked NERPC Secretariat for taking up the issue with NPC & NLDC not to link with inspection report but only their own Audit Certificates. All NER States agreed to complete the works soon.

NLDC also viewed seriously about poor utilization in respect of Arunachal Pradesh and stated that till date no initiative has been taken by them inspite of rigorous persuasion by NERPC.

EE, SLDC, Ar. Pradesh requested NERPC to visit and persuade with the competent authorities in Ar. Pradesh as he has been trying all along but no concrete direction was given by competent authorities. NERPC agreed.

- **For Communication Projects:** funding pattern agreed by MoP is 50:50 since only 6 fibres out of the 24 would be utilised for Power System purposes, the rest the state may exploit for commercial purposes. *(SE(C&O), NERPC on behalf of the forum requested GM, NLDC to take up the matter with MoP for 90:10 funding for NER. The matter would also be taken up the Hon'ble Power Ministers of NER with MoP separately).*

Sr. Manager, TSECL requested that Grounding Transformer and Transfer Bus be included in R&U scheme for Tripura as part of cost modification. GM, NLDC agreed but informed that the differential cost must be within the allowable 10%.

Regarding SAMAST implementation in NER States: DGM(MO)-NERLDC stated that the SAMAST Group formed by MS-NERPC has been actively working for

SAMAST implementation in NER States and there has been substantial progress in case of Assam and Meghalaya. The status report of Assam was presented as prepared by Assam SLDC. It was stated that as per budgetary offers received from various parties, estimated cost is quite on the higher side due to high cost of software(s) which would have to be scaled down accordingly. NLDC was requested to fund the cost of meters also from PSDF as 5-minute Metering would have to be done in case of SAMAST. Sh. Bansal, NLDC stated that funding of meters also from PSDF is under active consideration. He further stated that realistic cost estimate would have to be prepared while finalising DPR looking at the approved figures and LOA of other States of the Country. It was stated that in case of Assam, the cost estimate excluding meters would be in the range of Rs. 15 Crores and with meters it would be around Rs. 20 Crores. Shri Bansal while generally agreeing to it stated that for other small NER States, the cost estimate should be much lower.

It was agreed that DPR of all NER States would be routed through NERPC. In the first phase, DPR of Assam and Meghalaya would be prepared followed by other states.

GM, NLDC also requested all concerned utilities to kindly submit Item wise supply details to NERPC periodically.

The Sub-Committee noted as above.

Action: All state utilities/NERPC.

2. Outage of Important Grid Elements:

Name of the Element	Name of Utility	Status as informed in 137th OCC
63MVAR Reactor at Byrnihat to replace with 80MVAR Reactor	MePTCL	DPR completed & already submitted to NLDC.
400KV 80MVAR Bus Reactor at Palatana	OTPC	Electrical Inspection done. By 31.01.2018 CoD.
132 kV Jiribam – Rengpang S/C	MSPCL	Charged at 33kV and operational. Item to be dropped.
132 kV Mariani (AEGCL) – Mokokchung (DoP, Nagaland) S/C	DoP Nagaland & AEGCL	Line cannot be charged due to low insulation. RCE of ₹ 43 lakhs to be sanctioned by Dec'17.
132 kV P K Bari – Silchar I & II	NERTS	Ckt#I on ERS w.e.f.16.11.2017. Both circuits on permanent structure by Dec'17.

132 kV Dimapur - Dimapur I	Nagaland	By Jan'17 Bus Upgradation at Dimapur(NAG).
132 kV Hailakandi – Dullavcherra	AEGCL	By 15.02.2017.

The Sub-Committee noted as above.

Action: AEGCL, MePTCL, OTPC, NERTS.

3. Furnishing of various data for reliable grid operation:

Data regarding	Status as of 139 th OCC	
DAS output for FRC calculation	Data received from Ranganadi, Khandong, Kopili Stg II and OTPC. NHPC informed Loktak does not have DAS facility. BgTPP, Kopili, Doyang and Monarchak yet to submit the data	
Furnishing Geographic co-ordinates of nodes	Coordinates of Private owned stations in Assam yet to be submitted. Agenda may be dropped	
Report on VDI/FDI	Submitted by SLDC of Assam (Daily Basis), Meghalaya (Monthly Basis), P & ED Mizoram and DoP, Nagaland	
DG healthiness report	Khandong, Kopili Stg-II, AGBPP, Kopili, DoP Nagaland, P&E, Mizoram, Loktak and OTPC submitted the data	
Auxiliary Supply details	To be reviewed after Third Party Protection Audit	
Technical & Commercial data for PoC (Q4 2017-18)	NTPC, NEEPCO, OTPC, NHPC, DoP Arunachal Pradesh, MSPCL, AEGCL, MePTCL, P & ED Mizoram, DoP, Nagaland submitted the data. TSECL submitted all except YTC data.	
Operating Procedures.	Items	Data submitted by
	OP of States	Submitted only by AEGCL and MePTCL
	OP of HVDC	Not Submitted
	OP of Transmission System	Not submitted by any constituents
	OP of Generating Stations	Not submitted by any generators
	OP of GIS	Not submitted by any constituents
Data related to Power Map.	Items	Data submitted by
	Communication (PLCC/OPGW/GPRS/SAT/Satellite)	Not submitted by any constituents

Data related to Single Line Diagram.	State SEM Location	Not submitted by any constituents
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NERLDC has also requested that Water level, inflow details, discharge quantity & Number of Gate opening (in case of spillage) of Hydro Plants be recorded on a 12 hour basis (2 entries in a day) and to be submitted to NERPC & NERLDC on a monthly basis for proper operational planning.

Status on submission of Data during 139th OCC*				
Station	Water level (12 hours basis)	Inflow	Discharge	Gate Opening
Kopili	Daily Basis	Not giving	Daily Basis	Daily Basis
Khandong	Daily Basis	Not giving	Daily Basis	Daily Basis
Ranganadi	Monthly basis upto Nov'17	Daily Basis	Daily Basis	Not giving
Doyang	Daily Basis	Not giving	Monthly Basis upto Nov'17	Monthly Basis upto Nov'17
Loktak	Monthly Basis upto Nov'17	Monthly Basis upto Nov'17	Monthly Basis upto Nov'17	Monthly Basis upto Nov'17
Nagaland	Monthly Basis upto Nov'17	Monthly Basis upto Nov'17	Monthly Basis upto Nov'17	Not giving
Meghalaya	Monthly Basis upto Nov'17	Not giving	Not giving	Monthly Basis upto Nov'17
Assam	Monthly Basis upto Nov'17	Monthly Basis upto Nov'17	Monthly Basis upto Nov'17	Monthly Basis upto Nov'17
Tripura	Not giving	Not giving	Not giving	Not giving

***Agenda Item may be dropped.**

Members requested NERLDC to give a presentation in the next OCC meeting on the application of the data being collected, its utility for the grid operation particularly and the source from where the requirement has come from.

Deliberation of the sub-Committee:

NERLDC gave presentation on the necessity of the data being collected along with the various requirements. The presentation is attached in **Annexure B.1.3.**

The Sub-committee noted as above.

Action: All utilities as above.

B.2. OPERATIONAL PERFORMANCE AND GRID DISCIPLINE DURING NOVEMBER, 2017

As per the data made available by NERLDC, the grid performance parameters for November, 2017 are given below:

NER PERFORMANCE DURING SEPTEMBER, 2017

States	Energy Met (MU)		w.r.t. Oct,17 % inc (+) /dec (-)	Energy Reqr. (MU)		w.r.t. Oct,17 % inc (+) /dec (-)	% inc (+) /dec (-) of energy reqr vs met. In Nov,17
	November -17	October-17		November-17	October -17		
Ar. Pradesh	69.09	72.27	-4.40	70.14	73.59	-4.69	-1.50
Assam	696.69	843.29	-17.38	712.58	872.23	-18.30	-2.23
Manipur	68.84	66.96	2.81	69.89	68.39	2.19	-1.50
Meghalaya	135.42	127.88	5.90	135.42	127.88	5.90	0.00
Mizoram	39.53	39.98	-1.13	40.43	41.10	-1.63	-2.23
Nagaland	58.70	68.60	-14.43	59.73	69.78	-14.40	-1.72
Tripura	104.60	126.46	-17.29	105.56	128.18	-17.65	-0.91
Region	1172.86	1345.44	-12.83	1193.75	1381.15	-13.57	-1.75

States	Demand Met (MW)		w.r.t. Oct,17 % inc (+) /dec (-)	Demand in (MW)		w.r.t. Oct,17 % inc (+) /dec (-)	% inc (+) /dec (-) of Demand vs met. In Nov,17
	Nov-17	Oct-17		Nov-17	Oct-17		
Ar. Pradesh	136	139	-2.16	144	145	-0.69	-5.56
Assam	1478	1745	-15.30	1515	1822	-16.85	-2.44
Manipur	178	170	4.71	180	174	3.45	-1.11
Meghalaya	339	300	13.00	339	300	13.00	0.00
Mizoram	90	86	4.65	95	88	7.95	-5.26
Nagaland	132	135	-2.22	132	137	-3.65	0.00
Tripura	240	291	-17.53	240	303	-20.79	0.00
Region	2380	2499	-4.76	2443	2596	-5.89	-2.58

REGIONAL GENERATION & INTER-REGIONAL EXCHANGE IN MU

AVERAGE FREQUENCY (Hz)

Month---->	Nov-17	Oct-17	Month---->	Nov-17	Oct-17
Total Generation in NER (Gross)	1362.689	1627.573		% of Time	% of Time
Total Central Sector Generation (Gross)	1043.830	1213.062	Below 49.9 Hz	16.91	13.60
Total State Sector Generation (Gross)	318.859	414.511	Between 49.9 to 50.05 Hz	73.53	77.21
<i>Inter-Regional Energy Exchange</i>			Above 50.05 Hz	9.56	9.19
(a) NER-ER	0.00	4.12	Average	49.97	49.97
(b) ER-NER	335.56	380.18	Maximum	50.27	50.20
(c)NER-NR	441.40	483.06	Minimum	49.62	49.65
(d)NR-NER	0.00	0.00			
© Net Import	-105.84	-107.00			

Deliberation of the sub-Committee:

NERLDC gave a presentation on the grid performance for the month of November 2017. NERLDC also highlighted that Daily, Weekly and Monthly Voltage Deviation Report, Frequency Deviation Report and System Reliability Report for November'17 are already mailed to all the constituents for necessary actions. Further it was informed that members may access these reports from NERLDC website under the tab CERC KPI Reports.

The Sub-Committee noted as above.

ITEMS FOR DISCUSSION

C. OLD ITEMS

1. Status of Generating Units, Transmission Lines in NER:

During 139th OCC meeting, the status as informed by different beneficiaries is as follows:

SN	Items	Status as given in 138 th OCC Meeting	Status as given in 139 th OCC Meeting
a. New Projects			
1	400/220kV, 315 MVA ICT-1 of NTPC at Bongaigaon	ICT-1 – Mar'18	ICT-1 - Mar'18

2	Kameng HEP of NEEPCO two units (2 x 150 MW) Next two units (2x150 MW)	Delay in dam construction. First unit by early 2018.	Delay in dam construction. First unit by early 2018.
3	Pare HEP of NEEPCO (2 x 55 MW)	Delay in dam construction. First unit by early 2018.	Delay in dam construction. First unit by early 2018.
4	400 kV D/C Silchar - Melriat line of PGCIL	March, 2018.	March, 2018.
5	220kV Rangia - Salakati of AEGCL	March, 2018	March, 2018.
6	132kV Monarchak – Surjamaninagar D/C of TSECL	Extension required. Letter to be sent to NERPC.	TSECL informed that letter for extension would be sent to NERPC soon.
7	400kV D/C Balipara – Kameng	To be matched with Kameng HEP.	To be matched with Kameng HEP. To be reviewed in next OCCM
8	RHEP 80 MVAR Bus Reactor	Studies to be conducted in detail.	Ar. Pradesh, Nagaland- Mar'18 Manipur, Mizoram - CoD
9	SLDCs (Ar. Pradesh, Manipur, Mizoram, Nagaland)	Ar. Pradesh, Nagaland- Mar'18 Manipur, Mizoram - CoD	Ar. Pradesh - Mar'18 Manipur, Mizoram, Nagaland - CoD
10	400/220 kV 315 MVA ICT-II at Bongaigaon	March, 2018.	March, 2018.
11	220/132 kV, 2x160 MVA ICTs at Balipara	March, 2018.	ICT#II - delayed
12	220/132 kV, 1x160 MVA ICT with GIS Bay at Kopili	March, 2018.	March, 2018.
13	400/132 kV, 1x315 MVA ICT-III at Silchar	March, 2018.	March, 2018.
14	Replacement of 2x315 MVA ICTs with 2x500 MVA ICTs at Misa (PG)	March, 2018.	March, 2018.
15	400 kV Silchar – Misa D/C	2019	2019
16	1x125 MVAR Bus Reactor at 400 kV at Balipara	March, 2018(LOA date).	March, 2018(LOA date).
17	1x125 MVAR Bus Reactor at 400 kV Bongaigoan	March, 2018(LOA date).	March, 2018(LOA date).

18	Bays at Hailakandi & 132V Silchar-Hailakandi	DoCO 16.11.2017. To be dropped.	DoCO 16.11.2017. To be dropped.
19	Tuirial HEP of NEEPCO	Unit #I -Trial run completed Unit #II - Dec'2017	Unit #I -CoD by Dec'17 Unit #II - Jan'18
20	400 kV, 63 MVAR Bus Reactor #II at Biswanath Chariali	Nov'17	Charged on 09.12.17
21	33kV bay at 220kV Mariani(AS) S/Sn	Metering issues to be taken up with APDCL by NERTS	Metering issues to be taken up with APDCL by NERTS
22	33kV Tezu-Tezu(AP)	Dec'17	-
23	33kV bay for 132kV Badarpur(PG) S/Sn	APDCL to revert back with status.	APDCL to revert back with status.
24	Completion of MW vacation OPGW project 1. Srikona – Pailapul – Jiribam 2. BTPS – Agia – (Boko – Mirza) – Sarasujai Aizwal – kolasib – badarpur	-	Target completion : Feb 2018
25	Dedicated 33kV feeder at Khliehriat Substation from Lumshnong.	-	Estimate Requested to Director Distribution, shillong and CEO, Jowai. Request submitted on: 07 th Feb 2017 Reminder Submitted on: 25 th Nov 2017
26	Dedicated 33kV feeder for Badarpur Substation from Panchgram upper SS	-	Old copy of estimate handed over to APDCL, Badarpur for submission of revised and corrected GST estimate.

b. Elements under breakdown/ upgradation

27	Up-gradation of 132 kV Lumshnong-Panchgram line	DPR already submitted to NERPC/NLDC.	DPR already submitted to NERPC/NLDC.
28	Switchable line Reactors at 400kV Balipara & Bongaigaon	CSD to be procured. Bongaigaon- Dec'17	Jan'18
29	PLCC Panels at Loktak end of Loktak – Ningthoukhong 132 kV feeder and Loktak - Rengpang 132 kV feeder	May'2018	May'2018

30	LILO of 132kV Ranganadi – Nirjuli at Pare of NEEPCO by PGCIL	LILO completed. Two towers to be diverted. Complete by Dec'17.	LILO completed. Two towers to be diverted. Complete by Dec'17.
31	LILO of 132kV Ranganadi – Itanagar (Chimpu) at Pare of Ar. Pradesh	-	Bay 1 at RHEP for Pare: Jan'18 Bay 2 at RHEP for Itanagar: Mar'18
32	LILO portion of 132kV Ranganadi – Nirjuli(diversion work) at Lekhi by DoP Ar. Pradesh	-	Dec'17
33	Replacement of Main-I relay for 400kV Silchar-Byrnihat at Byrnihat S/Sn	By second week of Dec'17.	By 21.12.2017.
34	Re-conductoring of 132kV Umiam Stg#III - Umtru	DPR prepared. Submitted for approval.	DPR prepared. Submitted for approval.
35	Upgradation of ULDC FO node	-	Target completion : June 2018
36	HTLS re-conductoring of 132kV Agartala – RC Nagar – I & II	-	Ckt – I : Dec' 2017 Ckt – II : Jan ' 2017
37	HTLS re-conductoring of 132kV Imphal – Imphal – I		The forum requested NERTS to withhold the upgradation works until second state 132kV Imphal-Imphal is commissioned.

Deliberation of the sub-Committee:

POWERGRID representative updated the forum on progress of NERPSIP works (detailed presentation attached at **Annexure-C.1**).

Arunachal Pradesh	Scheduled Completion - Dec'18 Anticipated Completion - Dec'19
Assam	Aug. of 220/132kV Samaguri & 132/33kV Dhaligaon - Mar'18 Rest Start of Erection works - Oct'18
Manipur	Scheduled Completion - Dec'18
Meghalaya	Scheduled Completion - Dec'18
Mizoram	Scheduled Completion - Dec'18
Nagaland	Scheduled Completion - Dec'18
Tripura	Scheduled Completion - Dec'18

GM, MSPCL expressed anxiety over the tardy progress of Tamenglong S/S. He wanted to know the status of the S/S and requested POWERGRID to keep this S/S

in priority list. Further, he stated that any assistance is necessary, Manipur will give their full support but he re-instated that the S/S should be completed at the earliest.

SE(C&O), NERPC thanked ED,NERPSIP for deputing concerned official in OCC meeting. Since most of the projects are scheduled for completion only in Dec'18, it was decided that forthcoming projects under PSIP may be monitored quarterly henceforth. NERTS representative requested AEGCL to provide time schedule for takeover of dismantled 220/132kV 50MVA ICT at Balipara. Further he also informed that upgraded 160 MVA ICT –II HV /LV bays shall be maintained by powergrid w.e.f. DOCO 27/09/2017.

The Sub-Committee noted as above.

Action: All state utilities/central utilities/NERPC.

D. NEW ITEMS

D.1 Generation Planning (ongoing and planned outages)

NEEPCO/NHPC may kindly intimate the availability for hydro stations:

Generating Station	Units running	MW	MU	Reservoir
Khandong	2		14.49	714.15
Kopili-II	1			
Kopili	4		134.26	606.3
Ranganadi	3		Subject to inflow	
Doyang	3		21.5	319.6
Loktak	3		250.00	768.73
AGBPP	-	-	-	-
AGTPP	-	-	-	-

Hydro planning

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

Deliberation of the sub-Committee:

The Committee discussed and approved the proposed shutdown by Generating Stations and the same has already been uploaded in the website of NERPC.

D.2 Outage Planning Transmission elements

It was agreed in the 99th OCC meeting that shutdown will be availed only after approval is given by the OCC forum. It was also agreed that deferment/revision of outages elements other than already approved in OCC will be henceforth put/displayed in the website of NERPC (under Operational Activities/OCC Approved shutdown) as per CERC regulations/ CEA guidelines etc for ensuring smooth & secure grid operation.

Furnishing request of shut down of the element, which was approved by NERPC, by Indenting Agency (ISTS licensees/STUs/Generating Companies) to NERLDC: Planned shutdown approved by NERPC shall be considered for implementation by NERLDC on D-3 basis. If an outage is to be availed on say 10th of the month, the shutdown availing agency would reconfirm to NERLDC on 7th of the month by 10:00 Hr. This practice is necessary to ensure optimal capacity utilization and the time required for associated system study/coordination by/amongst RLDC/NLDC.

In 124th OCCM, SE(C&O) strongly opined that constituents should inform to NERPC/NERLDC in case shutdown is not avail as approved in the OCC meeting and should mention clearly the reason for not availing the shutdown. The full list of shutdown would be placed in the next OCC by NERLDC so that proper record can be made in future for generating units as well as transmission lines. All constituents endorsed the view of SE(C&O).

In 130th OCCM, Member Secretary opined strongly about non commitments of earlier decision by the constituents and stated that all proposed plan shutdowns and agenda for the next OCC meeting should be sent to NERPC Secretariat latest by 5th day of next month. He directed SE(C&O) that the decision should be strictly adhere to and no shutdowns or agenda will be entertained after that stipulated date.

In 134th OCCM, it was decided that all communication related shutdown be approved in OCC forum only.

Deliberation in the Meeting:

SE(C&O), NERPC clarified that all shutdown proposals must be sent at least 6 working days before date of OCC meeting. Any proposal received after D-6 working days would not be entertained. After detailed deliberation, it was decided that in case OCC approved shutdown is not granted by RLDC due to grid constraints NERLDC would reschedule the shutdown on a date mutually agreeable with the utility.

The sub-Committee discussed and approved the proposals received from the constituents regarding transmission elements and generating units for December, 2017 - January, 2017 and the same has already been uploaded in website of NERPC.

D.3 Estimated Transmission Availability Certificate (TAC) for the month of June, 2017 & July, 2017:

NETC and POWERGRID have submitted the outage data for the month of June & July, 2017. So the attributability of outage of the said elements may please be finalized.

Deliberation in the Meeting:

The forum once again advised NETC & POWERGRID to submit data in a time bound manner as decided previously.

The Sub-Committee noted as above.

Action: NERPC

D.4 Assessment of Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) by SLDC on respective Inter-State Transmission Corridor

Updated PSS/E Base Cases had been mailed to all the SLDCs on 02.11.17. All SLDCs are requested to assess the Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) for the month of Nov'17 using these cases, and submit the study cases and results to NERLDC by 31.10.17.

NERLDC has assessed the state control area wise, state subsystem wise and group of control-area wise TTCs for NER Grid, on behalf of SLDCs of NER. The study results will be presented in the meeting. SLDCs are requested to check the TTC of their control areas as computed by NERLDC and give comments, if any, by 30.11.17.

If no comments received from any SLDCs of NER, TTC, ATC & TRM figures of State control area and group of control areas as assessed by NERLDC will be considered as final and may be uploaded on website.

As per discussions in 122nd OCC meeting of NERPC, all SLDCs of NER may host the assessed TTC / ATC / TRM figures on their website for information dissemination.

Deliberation in the meeting

SLDC Manipur gave a presentation (attached at **Annexure D.4**) on the TTC/ATC calculations done by them for Jan'17 scenario. The forum appreciated the efforts and requested SLDC Arunachal Pradesh to give presentation in next OCC meeting.

NERLDC has assessed TTC of each state control area of NER, each state subsystem on behalf of SLDCs of NER and group of control-area wise TTCs for NER Grid:

States	Off-peak		Peak	
	N-0	N-1	N-0	N-1
Arunachal	215	185	209	179
Assam	1775	1639	1751	1614
Manipur	338	259	338	260
Meghalaya	358	200	305	158
Mizoram	129	118	129	118
Nagaland	175	90	171	74
Tripura (including Bangladesh)	316	112	324	78

The Sub-Committee noted as above.

Action: All SLDCs.

D.5. Implementation of SPS for transfer of 160 MW power to Bangladesh through Tripura-Bangladesh link and modifications suggested for other SPSs in NER:

In Special Meeting on SPS, UFR etc. held on 23.06.17, Chief Manager, NERTS, POWERGRID presented the draft scheme to implement the suggested SPS for transfer of 160 MW power to Bangladesh through Tripura-Bangladesh link. The Sub-Committee discussed the suggested schemes in detail and agreed in principle to implement the schemes.

The forum requested NERPC to take up the matter with CEA/CTU/NLDC for implementation at the earliest after vetting in OCC forum.

In 138th OCCM, S.E. (C&O), NERPC informed that a meeting in Bangladesh would be convened very soon and exact date would be intimated in Dec'17.

Deliberation in the meeting

S.E. (C&O), NERPC informed that due to prior engagements of Member Secretary, NERPC the visit to Bangladesh could not be scheduled. After preliminary discussions with NLDC, Bangladesh POWERGRID the visit is slated to be held on Jan'18 or early Feb'18.

The Sub-Committee noted as above.

Action: NERPC.

D.6. Modus-Operandi for SPS mock testing:

The 138th OCC forum requested NERTS to prepare a draft sequence of operation for each SPS and present in next OCC for ratification. The date for SPS 2 and SPS 3 mock testing will also be finalized in next OCC Meeting.

Deliberation in the meeting

Sr. Engineer, NERTS presented the modus-operandi (attached at **Annexure-D.6**) for Mock testing of SPS-2&3. The forum requested OTPC to append the sequences at Palatana GBPP to the modus-operandi and submit at the earliest. The date for mock testing would be decided after that and with prior notice of at least 3 days to all concerned utilities.

The Sub-Committee noted as above.

Action: OTPC/NERTS/AEGCL/MeECL/NERPC.

D.7. Submission of the Annual Load Generation Balance Report (LGBR) for Peak as well as Off-peak scenarios and the Annual outage plan for 2018-19 by 31.10.17 as per IEGC

- a) As per IEGC, each SLDC shall submit LGBR for its control area, for peak as well as off-peak scenario, **by 31st October for the next financial year**, to respective RPC Secretariat. The annual plans for managing deficits/surpluses in respective control areas shall clearly be indicated in the LGBR submitted by SLDCs.
- b) As per IEGC, all SEBs/STUs, Transmission Licensees, CTU, ISGS, IPPs, MPPs and other generating stations shall provide to the respective RPC Secretariat their proposed outage plan in writing for **the next financial year by 31st October of each year**. These shall contain identification of each generating unit/transmission line/ICT etc., the preferred date for each outage and its duration and where there is flexibility, the earliest start date and latest finishing date.

In 138th OCCM, SE(C&O), NERPC requested all the utilities to submit data by 30.11.2017 so that LGBR may be prepared and finalized by Dec'17. The forum requested NERPC to consider only generation capacity that will be able to generate in FY17-18 rather than the entire Installed Capacity for accurate projections.

AEGCL informed the forum that Adamtilla and Baskhandi generating station have been decommissioned. TSECL informed that some units of Rokhia and Baramura have also been decommissioned. SE(C&O), NERPC directed AEGCL and TSECL to write letter to CEA regarding the same.

Deliberation in the meeting

SE(C&O), NERPC informed that almost all utilities had submitted the relevant data and the draft LGBR would be presented in the next OCC meeting.

The Sub-Committee noted as above.

Action: All utilities

D.8. Voltage Deviation Index of PALATANA and BgTPP:

As per VDI reports issued by NERLDC and uploaded in website, the voltage at 400 kV BgTPP and 400 kV Palatana buses are found to be going out of IEGC band (above 420 kV) for considerable time on regular basis as shown below.

Date	Time in Hrs	
	BGTPP	PALATANA
11-11-2017	3.58	3.43
12-11-2017	3.8	4.05
13-11-2017	6.4	5.1
14-11-2017	2.9	1.39
15-11-2017	6.13	5.1

Being generator buses, the voltages are supposed to be controlled by varying the MVAR injection / drawal and maintaining the same inside IEGC band at all times.

The 138th OCC forum requested BgTPP and Palatana GBPP to conduct Internal study and revert back to the forum.

Deliberation in the meeting

OTPC representative stated that voltage at Palatana bus remains high on a sustained basis as it is a global issue. NERLDC stated while system frequency is a global phenomenon, voltage is a local one and OTPC should make effort by absorbing

reactive Power accordingly. It was agreed that in the next meeting, OTPC would make a presentation with evidence regarding reactive power absorption during high voltage period.

Manager, OTPC informed that AVR is functioning at Palatana GBPP and MVAR generation is as per capability curve and requirement of grid. DGM(MO),NERLDC stated that in the 138th OCC meeting RLDC had presented cases of high voltage and MVAR generation by Palatana & BgTPP. It was agreed that in the next meeting, OTPC and BgTPP would make a presentation with evidence regarding reactive power absorption during high voltage period.

The Sub-Committee noted as above.

Action: OTPC/NTPC.

D.9. Transformer Tap optimization:

System study was conducted by NERLDC considering load, generation and network pattern of November, 2017 during Peak & Off Peak periods. Suggested taps position of important transformers in NER for maintaining bus voltages within permissible limit as well as to minimize system losses.

In 138th OCCM, NERLDC informed that they are conducting tap optimisation studies on half yearly basis considering lean and high hydro scenario. NERLDC showed the study results of Tap optimization for transformers in NER Grid for February 2018 scenario which represents lean hydro period and suggested that voltage profile is improved most in Byrnihat after changing tap from their present setting. NERLDC also highlighted that due to the inter-connected system, tap has to be changed in other transformers as well to attain the voltage profile within IEGC band as highlighted in study result.

SE(C&O), NERPC once again re-iterated that NERLDC has to write to Director(Tech.), MePTCL. DGM(MO),NERLDC opined that changing tap position at present based on scenario for February, 2018 would be inappropriate. The forum requested NERLDC to present details of tap-position required for particular periods and also frequency of change.

Deliberation in the meeting

NERLDC informed the forum that tap changing studies are done considering high & lean hydro scenarios on half yearly basis. NERLDC also informed the forum about the letter issued by ED, NERLDC vide letter no. NERLDC/ED/SO-II/10693-95 dated

12.12.17 addressed to Director (Transmission), MeECL with a copy to MS, NERPC and SE, SLDC Meghalaya.

The Sub-Committee noted as above.

D.10. HYDRO Generation planning during lean season:

Water levels of all reservoir based hydro generating stations of NER have started depleting and for next 4-5 months we have to manage our demand with the energy available corresponding to water content. So proper planning is very much essential for management of NER load during lean season. Current water level and corresponding MUs of hydro stations are as shown below.

Reservoir Parameters						
Reservoir	Parameters		Present Parameters (11.12.17)		Last Year	
	FRL (m)	MDDL (m)	Level (m)	Energy (mu)	Level (m)	Energy (mu)
Khandong	719.30	704.26	713.65	14.49	715.40	17.08
Kopili	609.60	597.24	607.26	83.70	606.75	78.50
Loktak	769.00	767.95	768.60	250.00	768.62	250.00
Uiam	978.88	958.45	976.70	33.38	965.67	7.71
Gumti	93.55	83.60	92.80	27.00	92.00	23.83
Doyang	333.00	306.00	319.65	24.30	319.90	24.30
Ranganadi	567.00	560.00	565.29	N/A	565.08	N/A

Deliberation in the meeting

SE(C&O) opined that in view of precarious water levels at various reservoirs and impending shutdown of AGBPP the generations at hydel plants need to be planned at the earliest. DGM(MO),NERLDC suggested that for five months henceforth generation reduction may be opted for. The total energy content is to be divided by 150 days to get the DC(MU) per day. Then this DC (MU) may be distributed accordingly based on requirement of beneficiaries. All the SLDCs unanimously agreed that the generation may be only during evening peak period (17:00 hrs to 21:00 hrs). The forum requested NERLDC to accordingly draw up schedules for all hydro plants and apprise SLDCs.

Regarding coal shortage at BgTPP; SE(C&O) apprehended reduced generation which would affect all concerned. After detailed deliberation the following were decided unanimously by the forum:-

1. At least 3 days coal reserve would be maintained at BgTPP.
2. Peak hours full generation and off peak technical minimum generation and if required stopping of machine during off peak as per IEGC 5th amendment and to be run during peak hours.

The Sub-Committee noted as above.

Action: All generating utilities/NTPC/NERLDC.

D.11. Revision of Restoration Procedures of NER 2017:

System Restoration procedure of NER Grid was last updated in December'2016. Since then changes have been taken place in the NER network and the procedure needs to be revised. Further as per IEGC clause 5.8(a) this document needs to be revised annually. 2016 version of Restoration Procedure of NER is available in NERLDC website (www.nerldc.org/documentindex.aspx) and it is password protected. Password was informed during the meeting. So all entities of NER Grid are requested to please go through the 2016 revision of Restoration procedure & annexures and forward to NERLDC the changes in Network, Power maps etc., by 5th December' 2017 so that draft Restoration Procedure can be prepared and published before 139th OCC. In this connection NERLDC vide no. NERLDC/SO-I/10477-90 dt.09/11/2017 was communicated to all for reference. It was decided that the Procedure is to be finalized by end of Dec, 2017 positively.

Deliberation in the meeting

NERLDC requested all utilities to send their feedback on draft 2017 version at the earliest.

The Sub-Committee noted as above.

Action: All utilities.

D.12. Revision of draft NER REACTIVE POWER MANAGEMENT MANUAL 2017.

NERLDC is preparing NER REACTIVE POWER MANAGEMENT MANUAL every year. Like earlier years this year also we have prepared draft NER REACTIVE MANUAL and sent it to all concerned over mail.

All concerned are requested to please go through the draft reactive manual 2017 and give comments if any within 25th December'17 so that we can publish it by 31st December'17.

The Sub-Committee noted as above.

D.13. Recording of operational instructions over VOIP in RLDC:

As per last OCC discussion establishment of recording system for all real time instructions and conversations thro' VOIP network was supposed to be established within 1 month. Till today no visible action is noticed. It is very important to establish the recording system at the earliest as all verbal communication/ conversations among RLDCs, SLDCs and stations are getting lost.

Deliberation in the meeting

NERTS informed that revised price from party has been received and dongle will be installed in RLDC in 1st week of Feb'18. SE(C&O), NERPC requested NERTS to make VOIP at SLDCs fully functional at the earliest. The Sub-Committee decided to drop the agenda item and review later on.

The Sub-Committee noted as above.

Action: NERTS.

D.14. Real-time Scheduling issues:

Like growing complexities of real time operation real time scheduling of energy is also getting complex day by day. Energy scheduling process is a very important function in real time system operation and flawless scheduling is very much essential. Post-facto revision is not acceptable in scheduling process. So correctness of scheduling is our topmost target. Despite of utmost care during scheduling some inadvertent errors take place. Hence to make the scheduling error free, following actions are suggested to all concerned.

- a) All utilities must check revision no '0' (Zero) which is uploaded at 18:00Hrs of D-1 and in case of any discrepancy; the same must be intimated to NERLDC control room before issues of R-1 at 23:00Hrs.
- b) All constituents must continuously check their schedule in real time and in case of any discrepancy; the same must be intimated to NERLDC control room in real time basis.
- c) All constituents should apply for partial requisition in standard format which will be circulated by NERLDC.
- d) In case of partial requisition from ER_ISGS, all the constituents should intimate NERLDC Control room through mail along with phone call apart from punching the partial requisition in ERLDC WBES.

- e) In case of URS requisition from ER_ISGS, all the constituents should apply for the same to NERLDC Control room through mail along with phone call. NERLDC would forward the same to ERLDC for implementation.
- f) In both the cases of (d) and (e), the constituents must check the ERLDC WBES for verification of implementation partial or URS requisitions. In addition to these if any other changes are observed scheduling in ERLDC WBES, the same must be intimated to NERLDC Control room.

Deliberation in the meeting

NERLDC representative explained in detail the various steps mentioned in agenda. It was stated that checking of respective schedule by SLDCs after issuance of Revision-0 by NERLDC at 1800 Hrs of previous day is very important and SLDCs should ensure checking before commencement of the day of operation at 00:00 Hrs.

A uniform format has been developed by NERLDC in excel which should be used by all SLDCs while submitting requisition and revising requisition. Instructions have been written in the excel sheet regarding procedure to fill-up and submit. It was agreed that NERLDC would mail the format to all the SLDCs so that it can be made effective at the earliest.

The Sub-Committee noted as above

Action: All SLDCs.

D.15. Telemetry and Voice Communication problem:

- 1. **Telemetry problem: In tabular format.**
- 2. **Voice Communication problem:**

Dedicated voice communication links and its availability is one of the key requirements for efficient grid management. But it is observed that non availability of adequate communication links with many stations affecting grid operation seriously.

VOIP system not installed.

- 1. NTPC, BgTPP (Even no BSNL or Mobile)
- 2. OTPC, PALATANA
- 3. 400 kV BYRNIHAT/KILLING.
- 4. 400 kV AZARA.
- 5. 400 kV SILCHAR.
- 6. SURJYAMANINAGAR (International Link) / KUMILLA.
- 7. Zero, Roing, Tezu and Pasighat

VOIP phones are not working

1. Mariani(POWERGRID)
2. Mokokchung
3. Kumarghat.
4. Khandong.
5. Doyang
6. Nirjuli
7. Kohima
8. Kathalguri
9. Jiribam
10. Kolasib

Following SLDCs do not have ULDC phones:

1. SLDC Imphal
2. SLDC Aziwal
3. SLDC Itanagar

b. Most of the POWERGRID stations are connected through only one dedicated voice link.

Minimum two nos., of dedicated links needs to be established at the earliest. In earlier (PUNWARE system) there were 2 nos of dedicated voice communication channel with every stations but in VOIP system only one no of link is established.

Deliberation in the meeting

After detailed deliberation the Sub-Committee referred the matter to the next NETeST meeting of NERPC.

The Sub-Committee noted as above

Action: NERPC.

D.16. Update on Real Time Energy Assessment for Effective Grid Management:

As decided in 137th. OCC meeting, the matter regarding visit of CDAC to NERLDC was pursued and CDAC representative visited NERLDC on 16.11.2017. Complete details of Meters pertaining to all NER States as sought by CDAC was handed over to them. There are total existing 76 SEMs which would cover computation of drawal by seven States. A list of projected future meters is also given in the statement for integration as and when commissioned.

CDAC would install the AMR system to compute net drawal by each State on every 15 minute time block basis and schedule vs actual as well as computed Deviation charges would be displayed in a server in each SLDC, NERLDC and NERPC secretariat.

As all required data has been handed over, CDAC was advised to start work on the project at the earliest. CDAC need to chalk out an action plan and intimate time bound plan to NERPC so that progress can be monitored in each OCC meeting. It was suggested that work on a particular State at a time may be commenced and completed in time bound target.

The 138th OCC forum was informed about the correspondence with CDAC in the subject matter. It was explained that all SEMs at ISTS in NER are with propriety protocol which would be shared by meter manufacturer with AMR provider.

TSECL representative stated that in a meeting with CDAC, they had intimated that CDAC should prepare a scheme which would be compatible with meters installed in NER ISTS. As meter manufacturer would share the protocol, CDAC should be able to execute the project.

SE (C&O), NERPC stated that some way out should be found out to enable execution of the project by CDAC with existing ISTS meters as it involves GOI grant.

After detailed deliberation, it was decided that CDAC should provide the mechanism (e.g. Converter, driver etc.) to make the existing meter compatible with their protocol so that the project can be implemented at the earliest. The forum requested NERPC to take up the matter with CDAC and find out the cost of converter, drivers etc.

Further details related to the project to be furnished to CDAC is as below:

1. Total no. of SEMs for computation of drawal of States: **77 existing + 36 future**
One SEM in case of Meghalaya was inadvertently missed in earlier list, hence total meters including future would be 113 nos.
2. Total no. of metering locations : **37 existing + 5 future**
List of locations are enclosed at **Annexure D.16**.
3. Meters are L&T and Elster make at present.
4. Meters provide 15 minute time block data, not real time data.
5. The proposed project would be an integrated one for all seven States where schedule vs actual drawal, computed deviation charges would be displayed in servers provided in SLDCs, NERLDC and NERPC secretariat.

6. The above takes care of complete meter details of all seven states of NER.

Deliberation in the meeting

CDAC representative stated that they would require the proprietary protocol from the meter manufacturer(s) to proceed further with the Project. DGM(MO), NERLDC explained that as per practice followed in other Regions like NR, ER etc., AMR provider, Meter manufacturer and Powergrid sign a tripartite agreement to enable passing of the protocol to AMR provider. A sample of draft agreement in ER (TCS is AMR provider) was provided to CDAC and it was advised that CDAC should initiate process and circulate a draft agreement for the present case. CDAC agreed to do the needful and stated that they would develop protocol converter accordingly.

CDAC was asked not to delay any further and complete the project in quickest possible time.

The Sub-Committee noted as above

D.17. Procurement of additional 70 Laptops:

Target as intimated by NERTS in 138th. OCC:

- i. e-RA : 01.12.2017
- ii. LOA : 15.12.2017
- iii. Material Dispatch: 31.01.2018

Deliberation in the meeting

The revised target was intimated as below:

- i. e-RA : 26.12.2017
- ii. LOA : 29.01.2018
- iii. Material Dispatch: 15.03.2018

SE(C&O), NERPC expressed concern regarding the delay and stated that there should not be any further delay and the Laptops should be made available as per target date.

The Sub-Committee noted as above

Action: NERTS.

D.18. Installation of new L&T SEMs in NER:

Following installations are to be done urgently:

- 1. Replacement of Elster Meters at Azara and Agia
- 2. Installation of two SEMs at 400/220 KV ICT at Bongaigaon
- 3. Installation of SEMs at Pare HEP

4. Installation of check meters at Loktak and Ranganadi HEP.

Deliberation in the meeting

NERTS stated following:

1. Replacement of Elster Meters at Azara and Agia: **Replaced on 19.12,2017**
2. Installation of two SEMs at 400/220 KV ICT at Bongaigaon: **Completed**
3. Installation of SEMs at Pare HEP: **NERLDC should issue a letter addressed to NERTS advising the installation.**
4. Installation of check meters at Loktak and Ranganadi HEP: **NERLDC should issue a letter addressed to NERTS advising the installation. Kopili-2 check meter installation would also be included in the advice.**

DGM(MO), NERLDC stated that letters against SI nos. 3 and 4 would be issued by 20.12.2017.

NERTS representative stated that there would be some additional cost to the SEMs on account of applicable inter-State GST. OCC agreed that sharing of total cost of SEMs/accessories including additional cost on account of GST would be borne by utilities as per agreed methodology.

The Sub-Committee noted as above

Action: NERTS.

D.19. AMR in NER:

The tender for AMR scheme could not be published as the cost estimate approved was of pre-GST regime. Finance Deptt recommended to frame fresh estimate with GST before tendering process. Accordingly for framing cost estimate offer from parties viz. Valiant Communications, AMI Tech, TCS were fetched. Out of these parties, received offer only from M/s Valiant communications amounting to Rs. 4.95 Crore. POWERGRID proposed to wait for 1 / 2 weeks time for receiving offer from other parties for finalization of cost estimate based on minimum offer of at least three different vendors (subject to availability).

In 138th OCC, NERTS intimated that no further offers have been received. OCC advised NERTS to proceed based on the single offer from M/s Valiant communications.

Deliberation in the meeting

NERTS stated following:

- i. Tendering : Jan'18
- ii. Bid opening : Feb'18
- iii. LOA : Mar'18

As the project has already been delayed substantially, NERTS was advised to ensure that there is no further delay.

The Sub-Committee noted as above

Action: NERTS.

D.20. Testing of SEMs at accredited laboratory:

NERTS stated that fresh offer was received only from a single party viz. M/s Yadav Measurements Pvt. Limited. As per Offer of M/s YMPL, the estimated cost is Rs.12,55,500.00 excluding GST @18% plus boarding/lodging /local transportation extra. POWERGRID proposed to go ahead to frame cost estimate based on single offer. Metering Committee agreed.

In 138th OCC, NERTS intimated that tendering would be tentatively by 31st. Dec'17.

Deliberation in the meeting

NERTS stated that as per policy they do not proceed with cost estimate based on single offer. OCC discussed the matter and considering the fact that Testing has to be done as per CEA Metering Regulations, advised NERTS to proceed with single offer.

The Sub-Committee noted as above

Action: NERTS.

D.21. Other Metering issues:

SN	Location	LOC ID	Meter No	Feeder's Name	Remarks
1	IMPHAL(MN)	ZZ-01	NP-8374-A	Imphal (MN)end of Imphal (PG) II	Imphal (MN) end reading 10% lower than Imphal(PG) end
2	IMPHAL(MN)	MN-01	NP-6950-A	Imphal (MN) end of Imphal(PG) I	Reverse polarity & reading higher by 12% of Imphal (PG) end

5	NINGTHOUKONG	MN-17	NP-4498-A	Ningthoukhong (MN) end of Imphal(PG)	Ningthoukhong end showing reverse polarity & reading only 12% of the other end.
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Deliberation in the meeting

NERTS stated that all the three have been addressed.

The Sub-Committee noted as above.

D.22. Procurement of DCD:

At present there are only 6 DCDs are available in stock. Although Laptops are being procured, DCDs are required to be kept as back-up and also for providing time correction command to SEMs.

Hence it is suggested that POWERGRID-NERTS may initiate action for procurement of 25 DCDs on repeat order.

Deliberation in the meeting

DGM(MO), NERLDC explained that as there are only 6 DCDs in stock and new installations are in progress, additional DCDs would be required urgently. Even after procurement of Laptops, DCDs would be needed for providing time correction command. OCC agreed to the suggestion and advised NERTS to initiate action for procurement of 25 DCDs on repeat order.

Regarding compatibility of new DCDs with old L&T SEMs, NERTS was advised to take-up the matter with L&T and resolves the issue at the earliest. L&T being the sole supplier, they must ensure compatibility of their newly supplied DCD with all their meters.

The Sub-Committee noted as above

Action: NERTS

D.23. Issues with newly supplied L&T meters at KHEP

The installation of new L&T make special energy meter started at KHEP by PGCIL. The following issues are required to resolved before dis-connection of old L&T energy meters.

1. The old L&T meters data are collected through **Vincom** software but for new L&T meters Vincom plus software is required. The Software is not working properly in

Windows 10 – 64 bit OS. Matter already communicated in NER Metering Group in WhatsApp

2. The existing L&T meters data are directly collected through a central PC and thus requested to configure the new meters also so that shift engineers can directly collect the data in the same PC.
3. The Analogics DCD meter may be kept as standby in case of failure of direct connectivity from central PC.
4. We are calculating station Ex-bus through our SEMDBASE software. So, SEMDBASE software modification is required to facilitate the energy calculation for commercial purpose.

Deliberation in the meeting

DGM(MO),NERLDC informed that current week data has not been received because 2 DCDs at Khandong are not working. He requested NERTS that official from Khliehriat(PG) may please be deputed to visit Khandong and collect the data. NERTS concurred and affirmed that the work would be completed by 20.12.2017.

The Sub-Committee noted as above

Action: NERTS.

D.24. Revalidation of approved Shutdowns in Last OCC Meeting:

Kopili U# 4 03/01/2018 to 23/01/2018 (For Annual Planned Maintenance)

Kopili U# 3 25/01/18 to 14/02/18 (For Annual Planned Maintenance)

Khandong U# 1 = 27/12/2017 to 27/02/2018 (For APM and Penstock repairing)

Deliberation in the meeting

OCC reaffirmed the already approved aforementioned shutdowns.

The Sub-Committee noted as above

Action: NEEPCO

ADDITIONAL AGENDA ITEM:

D.25. Restriction of OTPC Palatana DC:

Restriction of OTPC Palatana DC up to installed capacity as per provision of IEGC (5th Amendment) however OTPC unit is able to generate more than Declare Installed Capacity in winter session (As per Gas turbine characteristics) on dated 18/12/2017 and other consequent days.

IEGC 5th Amendment regulations Reg. 5.2(h) en proviso allows for modification in IC in case of gas stations based on ambient temperature & pressure: " *In case of gas/liquid fuel based units, suitable adjustment in Installed Capacity should be made by RLDCs/SLDCs for scheduling in due consideration of prevailing ambient conditions of temperature and pressure vis-à-vis site ambient conditions on which installed capacity of the generating station or unit (s) thereof have been specified*".

Deliberation in the meeting

Manager, OTPC gave a presentation on the gas turbine characteristics and generation limits for Palatana machines.

Accordingly, graph indicating Effect of Compressor Inlet Temperature on Output of OTPC-Palatana was shown (**Annexure-D.25**). It was explained that 100% rated output is designed at 27 degree Celsius (80.6 degree F), the output would increase with lower ambient temperature and vice-versa.

After detailed discussion, following were agreed:

- a. OTPC, while making day-ahead declaration of DC, shall intimate hourly projected ambient temperature of next day based on authentic forecasted data (IMD). Till authentic forecasted weather data is available at Palatana, the IMD weather data of Agartala will be taken as basis. Further, in case IMD data at Agartala is also not available, NERLDC would use some other appropriate weather data.
- b. NERLDC, in line with clause 5.2(h) of IEGC would make suitable adjustment in installed capacity for scheduling purpose based on projected day ahead temperature and characteristics curve of Palatana. The correction would be both on higher and lower side.
- c. Accordingly, ex-bus generation corresponding to 100% of the computed Installed capacity of Palatana less aux consumption would be computed.
- d. Scheduling limit of OTPC would be set accordingly.
- e. OTPC would ensure instantaneously picking up to 105% of their computed Installed capacity when the frequency falls suddenly.
- f. The process has been made effective provisionally from 21.12.2017 and would be reviewed in next OCC.

The Sub-Committee noted as above

Action: NERLDC/OTPC.

D.26.STOA revision by Palatana:

Clause 6.5(19) of IEGC was highlighted as below:

*"Notwithstanding anything contained in Regulation 6.5.18, **in case of forced outage of a unit of a generating station** (having generating **capacity of 100 MW or more**) and selling power under Short Term bilateral transaction (excluding collective transactions through power exchange), the generator or electricity trader or any other agency selling power from the unit of the generating station shall **immediately intimate the outage of the unit along with the requisition for revision of schedule and estimated time of restoration of the unit**, to SLDC/ RLDC, as the case may be. The schedule of beneficiaries, sellers and buyers of power from this generating unit shall be revised accordingly. The revised schedules shall become effective from the 41st time block, counting the time block in which the forced outage is declared to be the first one. The SLDC/ RLDC as the case may be shall inform the revised schedule to the seller and the buyer. The original schedule shall become effective from the estimated time of restoration of the unit. However, the transmission charges as per original schedule shall continue to be paid for two days.*

Provided that the schedule of the buyers and sellers shall be revised after forced outage of a unit, only if the source of power for a particular transaction has clearly been indicated during short-term open access application and the said unit of that generating station goes under forced outage.

Provided also that the provisions of this sub-regulation in respect of revision of schedule by electricity traders and any other agency (except the generating station) shall be operative with effect from 1st July 2012.

*Provided that the generator or trading licensee any other agency selling power from the generating station or unit(s) thereof **may revise its estimated restoration time once in a day and the revision schedule shall become effective from the 4th time block**, counting the time block in which the revision is advised by the generator to be the first one."*

Deliberation in the meeting

Following was discussed:

- a. At 06:37 of 17.12, Station black out happened at OTPC due to grid disturbance, both Units tripped.
- b. OTPC which has 65 MW STOA sale of Merchant quantum revised it to zero with estimated restoration time of 1500 Hrs of 17.12.2017.

- c. OTPC came to know that Unit-1 would not be available approximately for three days.
- d. OTPC should have revised estimated restoration time before 1500 Hrs which can be done once in a day as per 6.5.19(the statement can change as after detailed discussion on IEGC clause 6.5.19 it was concluded that OTPC might revised estimated restoration time before 1500 Hrs which can be done once in a day as per 6.5.19. .
- e. As OTPC did not revise the estimated restoration time and after 1500 Hrs of 17.12, as per current procedure and allowance from NERLDC scheduling of 65 MW STOA sale commenced.
- f. As merchant quantum of one available unit is only 44 MW, OTPC schedule is more than installed capacity on sustained basis. This situation would continue till restoration of second unit.

Conclusion: OCC felt that OTPC should have revised their estimated restoration time. It was felt that once estimated restoration time has elapsed, there is no means to revise the STOA with four time block notice.

The Sub-Committee noted as above

ADDITIONAL AGENDA ITEM:

D.27. Major Disturbance in NER Grid on 17.12.17 at 06:37 Hrs

400 kV Silchar - Byrnihat line tripped at 06:26 Hrs and 400 kV Silchar - Azara line tripped at 06:37 Hrs. SPS 3 failed to operate due to which 132 kV Badarpur - Khliehriat line, 132 kV Haflong - Jiribam line and 132 kV Dimapur - Imphal line tripped on over current. Due to these tripping, Southern part of NER grid was isolated from rest of NER Grid affecting South Assam Power System, Mizoram Power System, Manipur Power System, Tripura Power System and South Comilla (Bangladesh) Power System.

As SPS3 is not reliable, it is proposed to moderate Palatana generation during the period of outage of either circuit of 400 kV Silchar – Byrnihat line and 400 kV Silchar – Azara line to avoid any disturbance in Southern Part of NER Grid for safe, secure and reliable operation of NER grid.

Deliberation in the meeting

NERLDC gave a presentation (attached at **Annexure-D.27**) on the events pre and

post GD on 17.12.17. It was understood that the failure was primarily due to non-operation of SPS-3. Sr. Engineer, NERTS explained the following:

- After tripping of 400kV Silchar-Byrnihat (unsuccessful A/R even after 3 times) Silchar team tried to charge the line from Silchar end, hence 86 A , 86 B and 86 LO was all reset before restoration operation. The CB status in BCU is found to be in spare state (undesirable) which needs to be resolved along with OEM service engineer consultation.
- So upon tripping of 400kV Silchar-Azara CB status of 400kV Silchar-Azara is only reflected in BCU for SPS 3 logic.
- This resulted in non-operation of SPS-3.
- Subsequently combination for DT send logic to Palatana at Silchar S/S for SPS3 has been hardwired.

The forum requested concerned utilities to accelerate efforts for mock testing at the earliest, in order to avoid reduced generation from Palatana. It was also decided that upon successful mock testing there would be no moderation in Palatana generation.

The Sub-Committee noted as above

Action: All utilities.

Member Secretary during his concluding remarks stated that some constituents left the forum as soon as their agenda items are over which is not a good practice. He warned that from next time any member who leaves the forum before conclusion of the meeting, he will report to their competent authorities. He requested that all members should actively participate and help the forum to resolve the issues for the benefit of the region.

Date & Venue of next OCC meeting

It is proposed to hold the 138th OCC meeting of NERPC on second week of November, 2017. However, the exact date and venue will be intimated in due course.

The meeting ended with thanks to the Chair.

List of Participants in the 139th OCC Meetings held on 19.12.2017

SN	Name & Designation	Organization	Contact No.
1.	Sh. N. Perme, EE(E), SLDC	Ar. Pradesh	09436288643
2.	Sh. Bikramaditya Das, DGM	Assam	09859074773
3.	Sh. Dipesh Ch. Das, AGM (LDC)	Assam	09954110254
4.	Sh. R. Choudhury, DGM, APDCL	Assam	09435143426
5.	Smti Toushita Jigdung, DM	Assam	09706934351
6.	Sh. B. C. Borah, AGM (SLDC)	Assam	09435119248
7.	Sh. Paragjyoti Kalita, DM	Assam	09706979183
8.	Sh. K.Goswami, Consultant, APDCL	Assam	08638487200
9.	Sh. I. Borah, JM	Assam	07896482483
10.	Sh. H.Shanti Kumar Singh, GM (SLDC), MSPCL	Manipur	07937009146
11.	Smt. Laishram Ritu, Manager, SLDC	Manipur	09612882984
12.	Smt. Khoisnam Steela, Manager, SLDC	Manipur	08730831103
13.	Sh. H.F. Shangpliang, SE(Gen)	Meghalaya	09863315562
14.	Sh. W. Khyriem, EE, GSPD, MePGCL	Meghalaya	09856007107
15.	Sh. B.Nikhla, EE, MePTCL	Meghalaya	09436314163
16.	Sh. R. Biam, AE	Meghalaya	08794327510
17.	Sh. B. Wankhar, EE (MO)	Meghalaya	09436105914
18.	Sh. T. Gidon, EE, SLDC	Meghalaya	09774479956
	No Representatives	Mizoram	-
19.	Sh. Tekatemjen Walling, JE	Nagaland	07005636717
20.	Sh. Debabrata Pal, Sr. Manager (Comml.)	Tripura	09436500244
21.	Sh. Joypal Roy, Sr. Manager	NEEPCO	09435577726
22.	Sh. Ashim Kr. Sarmah, DM (E/M)	NEEPCO	09435078860
23.	Sh. R. Sutradhar, DGM (MO)	NERLDC	09436302714
24.	Sh. S.C. De, AGM	NERLDC	09436335369
25.	Smt. Momai Dey, Sr. Engineer	NERLDC	09436302716
26.	Smt. Namrata Pathak, AE	NERLDC	09706384809
27.	Sh. Keshab Borah, AE	NERLDC	07399276312

28.	Sh. Pinak Nandi, Sr. Engineer	PGCIL	09436335227
29.	Sh. Sominan Das, CM (Engg.) NERPSIP	PGCIL	09436335240
30.	Sh. K.T. Rajah Pandian, Chief Engineer	NHPC	07085057135
31.	Sh. Narendra Kr Gupta, Sr. Manager (O&M)	OTPC	09774253426
32.	Sh. Rajendran R, Manager	NTPC	09445002501
33.	Sh. Kangkan Paul, AM	NTPC	09435029230
34.	Sh. Ratan Singh Basnet, AM	NETC	08811072489
35.	Sh. D.K. Sarma, Sr. Consultant, Ghy	NETC	-
36.	Sh. Debashish Deb, Project Engineer	C-DAC	08486129510
37.	Sh. R.K. Bansal, Consultant	NLDC	09717296936
38.	Sh. Ajay Agarwal, GM	SCOPEs	09717466224
39.	Sh. Bhaskar Arraballu, Manager	SCOPEs	07710099341
40.	Sh. P.K. Mishra, Member secretary	NERPC	09968380242
41.	Sh. B. Lyngkhoi, Director/S.E (C&O)	NERPC	09436163419
42.	Sh. S. Mukherjee, AD-I/AEE	NERPC	08794277306
43.	Sh. S. Imam, AD-I/AEE	NERPC	08986666366
44.	Sh. A. Agrawal, AD-I/AEE	NERPC	07424064484
44.	Sh. S. Ranjan, AD-II/AE	NERPC	08794276168



Presentation on Data Required for Reliable Grid Operation and MIS

**Presented by
Momai Dey,
NERLDC**

1. DAS output for FRC calculation



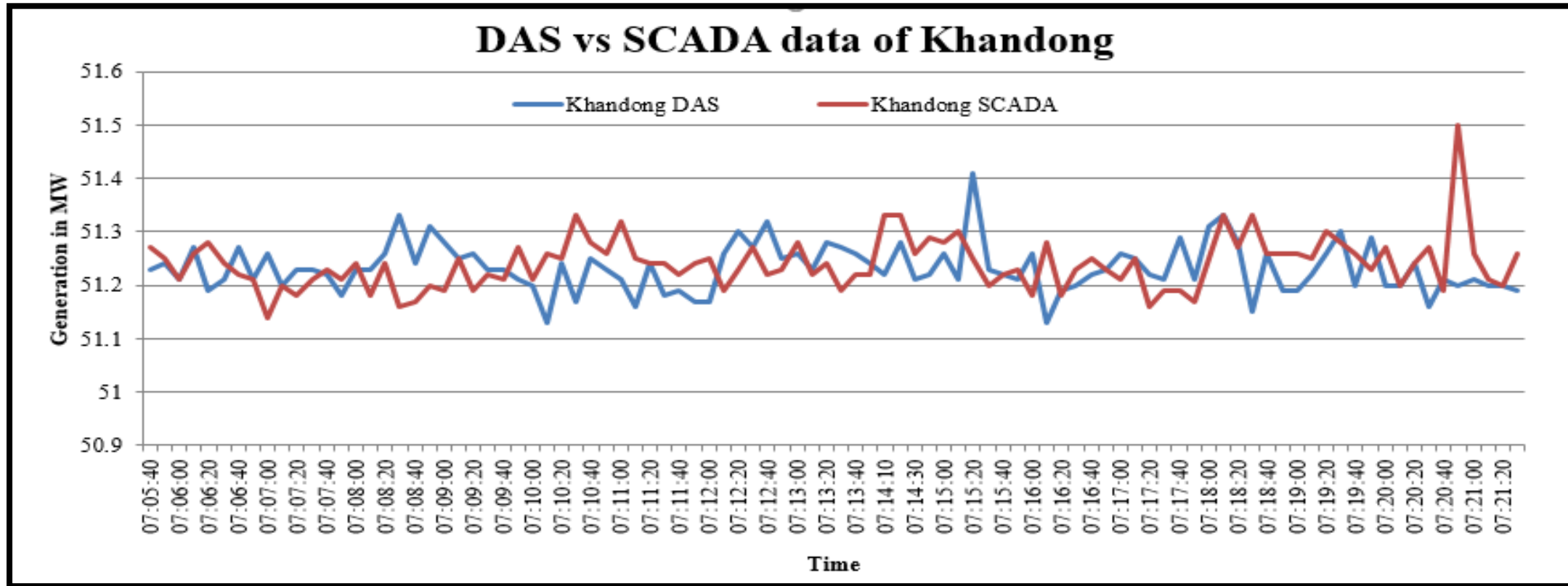
- As per Clause No. 5.1 of Procedure for Assessment of Frequency Response Characteristics (FRC) of Control Areas in Indian Power System, May 2013 issued by CERC, **FRC will be computed for all events involving a sudden 1000 MW or more load/generation loss or a step change in frequency by 0.50 Hz.**
- As per Clause No. 4.6.3 of IEGC, Recording instruments such as **Data Acquisition System/ Disturbance Recorder/ Event Logging Facilities/ Fault Locator** (including time synchronization equipment) shall be provided and shall always be kept in working condition in the ISTS for recording of dynamic performance of the system. **All Users, STUs and CTU shall provide all the requisite recording instruments and shall always keep them in working condition**
- As per Section 11.2.(i) of CEA's Technical Standards for Construction, all generating stations must store important analog data in 1 seconds interval.



Contd.

- **On 12-Nov-17 at 7:14 Hrs, Generation of Talwandi Sabo in Punjab, Northern Region tripped due to loss of evacuation path on tripping of all lines from Talwandi Sabo.**
- **Generation loss of around 1097 MW occurred.**
- **Mail regarding furnishing of DAS data was sent on 23rd Nov'17**
- **Ranganadi HEP, Kopili Stage II HEP and Khandong HEP furnished data for 1 sec interval**

Contd.



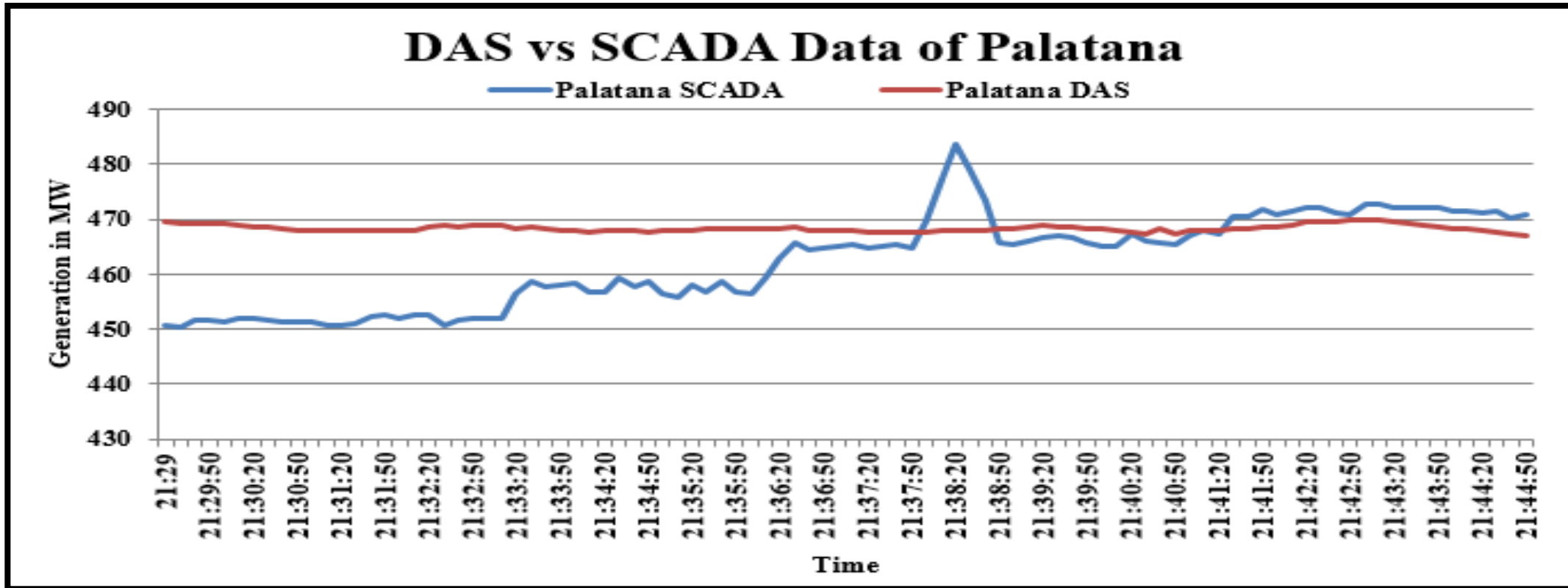
- **Percentage ideal response of Khandong with SCADA: 5 %**
- **Percentage ideal response of Khandong with DAS: 2.79 %**
- **Currently NERLDC is calculating FRC using SCADA Data which is not stable.**



Contd.

- **On 30.10.17, at 21:37 Hrs, 400 kV TPCIL-Nellore PS Line-1 tripped due to failure of Station transformer LA.**
- **400 kV TPCIL-Nellore PS Line-2 was under maintenance. Due to Loss of evacuation path generation loss of 1260 MW occurred at Nellore Power Station in Southern Region.**
- **Mail regarding furnishing of DAS data was sent on 23rd Nov'17**
- **Palatana furnished data for 1 sec interval.**

Contd.



- Percentage ideal response of Palatana with SCADA: 97 %
- Percentage ideal response of Palatana with DAS: 86 %
- Currently NERLDC is calculating FRC using SCADA Data which is not stable.
Hence DAS Data is required for correct FRC Calculations.

2. Furnishing of Geographical Coordinates

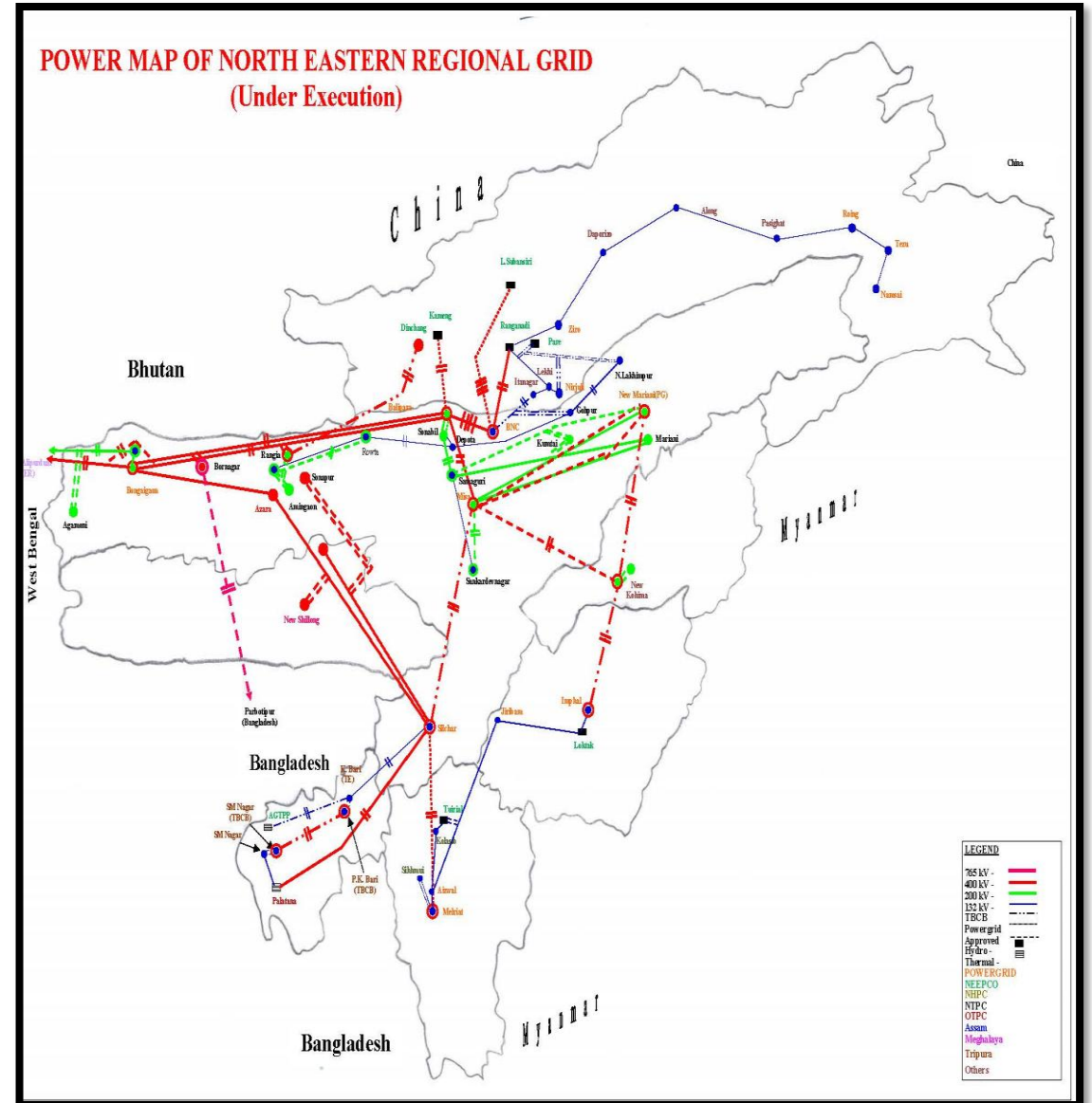
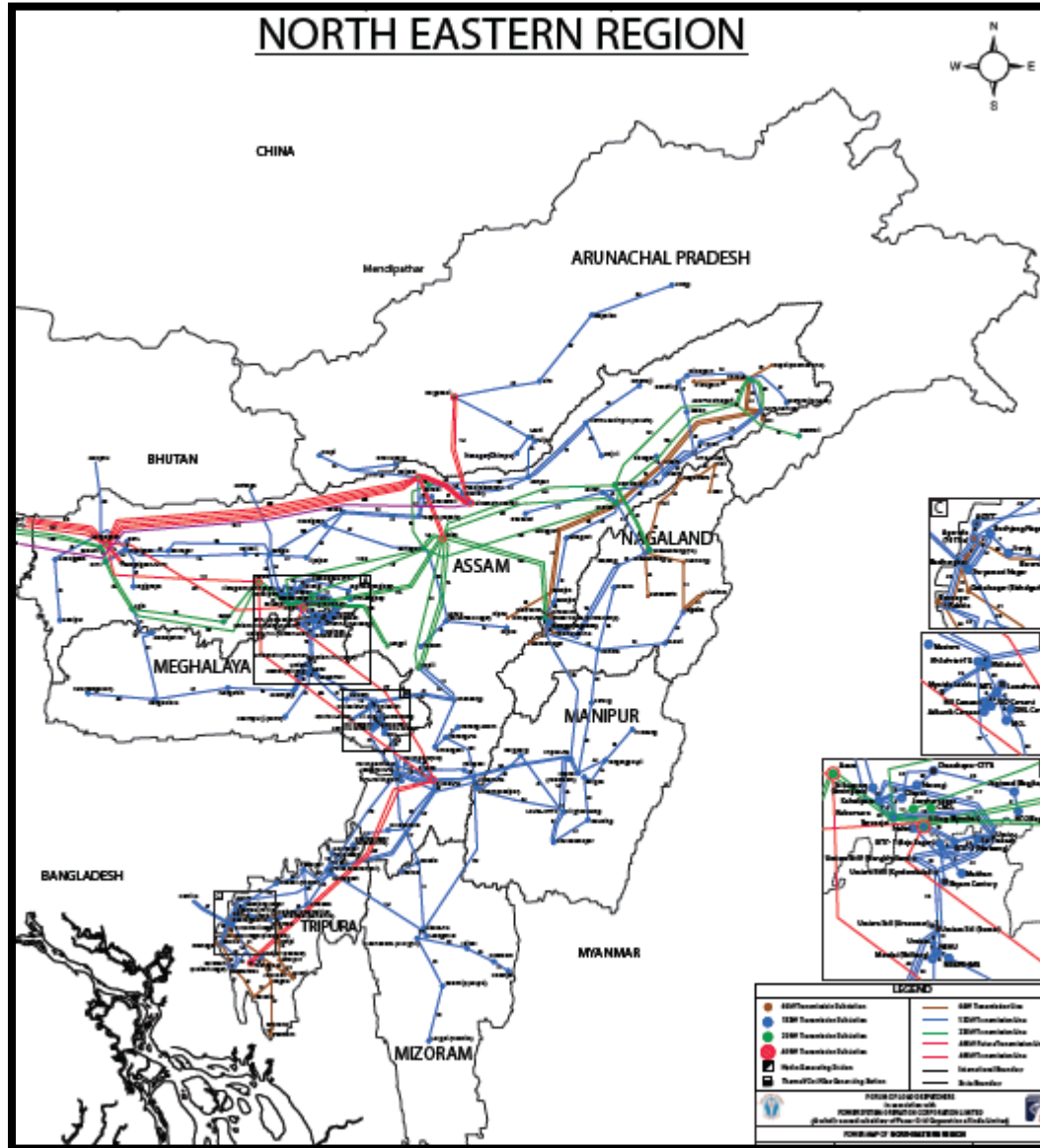


- **CBIP prepares and updates Power Atlas of India from time to time as decided in FOLD Meeting.**
- **NERLDC prepares and updates Power Maps of NER and States of NER on Quarterly Basis. The document contains Power Maps of NER under operation and under execution.**
- **NERLDC is already having Geographical Coordinates of existing substations**
- **Geographical Coordinates of upcoming substations are required for mapping the exact location of stations in Power Maps of NER.**
- **The Map will also be used for better visibility and Planning purposes.**
- **It is also presented to various Dignitaries as when asked for.**

Contd.



Power Map under operation using actual coordinates



Power Map under execution not using coordinates

3. Report of Voltage Deviation Index



- As per directives of CERC, NERLDC is uploading reports on Voltage Deviation Index on daily, weekly and monthly for all 400 kV lines.
- It is helping in identification of nodes where high or low voltage prevails in the system.
- **All SLDCs were requested to provide Voltage Deviation Index Reports of important substations under their jurisdiction.**
- Based on the data provided by the states, feedback for improvement of system are being furnished to CTU by NERLDC on quarterly basis.
- *The Quarterly Operational Feedback is available on NLDC website at <https://posoco.in/documents/operational-feedback-on-transmission-constraints/>.*

4. DG Healthiness Report



- **As per Clause No. 5.8.b, Diesel Generator sets for Black Start would be tested on weekly basis and test report shall be sent to RLDC on quarterly basis.**
- **DG Healthiness is to be maintained for quick restoration after any grid disturbances**
- ***NERLDC is collecting the DG Healthiness Report on monthly basis.***
- **Currently, it is being furnished by OTPC, Kopili, Khandong, Kopili Stg-II DoP, Nagaland and P&E, Mizoram on regular basis.**
- **During recent Third Party Protection Audit of sub-stations of NER, it has been observed that DG sets are not maintained properly in some substations.**

5. Auxiliary Supply Details



- **NERLDC is preparing of database for all substations of NER which contains details of**
 - 1. Auxiliary Supply to the stations (Number of Source, whether alternative source available or not)**
 - 2. Number of DG sets available with Capacity**
 - 3. Number DC Battery Bank available with redundancy in PLCC/Protection**

- **The need of such database is felt when CERC has asked for the details of reliability of auxiliary supply of EHV substations.**

- **It is required to check the reliability and redundancy of the auxiliary power supply to EHV stations.**

- **The same is now being collected during the Third Party Protection Audit and will be reviewed after compilation of the report.**

6. Operating Procedure



- As per Clause No. 5.1.g, a set of detailed **operating procedures for each state grid shall be developed and maintained by the respective SLDC** and it should be consistent with IEGC to facilitate compliance with the requirement of this IEGC.
- As per Clause No. 7.1 of CEA Grid Standards Regulations 2010, every generating company and transmission licensee shall provide written operating instructions for each equipment and **operating procedure for sequence of operations of power system equipment in their control room.**

7. Data Related to Power Map



- As mentioned earlier, NERLDC prepares and updates Power Maps of NER and States of NER on Quarterly Basis.
- Power Map of NER showing Communication System between nodes is not available. Hence, all states were requested to provide details of Communication System.
- The Communication Map is required for easy reference of system operators.
- Only list of nodes having PLCC/ OPGW/ GPRS/ VSAT/ Satellite is to be furnished. The Communication Network will be prepared by NERLDC.

8. Data Related to Single Line Diagram



- NERLDC prepares and updates Single Line Diagram of NER and States of NER on Quarterly Basis.
- Single Line Diagram of NER showing locations of SEMs installed by CTU is available.
- Single Line Diagram of NER showing locations of SEMs installed by STU is not available. **Hence, all states were requested to provide details of SEMs.**
- **This SLD will be helpful for identifying the Open Access Customers of States**
- **Only list of nodes having STU installed SEMs to be provided. The Single Line Diagram will be prepared by NERLDC.**

9. Water Inflow and Gate Opening



- **During 18th FOLD (Forum of Load Despatcher) held on 21st November'16 at New Delhi formation of Working Group on Hydro for studying various aspects of Hydro Stations was discussed.**
- **The committee submitted the report during 19th FOLD Meeting.**
- **For furnishing information to the committee, details of water level, water inflow, number of gate openings etc. was asked for along with the format circulated by FOLD.**
- **Currently the data is used for preparation of various type of reports regarding Hydro Optimization and day to day operation.**
- **The details are furnished by the utilities and is reflected in Monthly Grid Performance Report prepared by NERLDC.**
- **These data will be used in future for hydro optimization to counter the vagaries of renewable energy generation in the country.**

10. ATC-TTC Data and PoC data



- **NERLDC is computing State-wise ATC-TTC on behalf of States and presenting on OCC Meetings.**
- **Data for ATC/TTC calculation of NER-ER corridor and for State-wise TTC calculation on monthly basis.**
- **PoC Calculation are being done by Implementing Agency on Quarterly Basis**
- **Data for Quarterly Calculation of PoC are collected and are ratified as per directives of CERC.**



**Thank
You!!!**

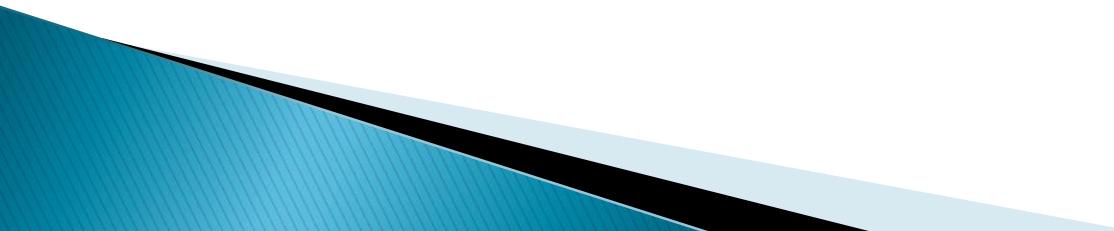
ATC/TTC CALCULATION

SLDC MANIPUR

19-12-17

Total Transfer Capability (TTC)

As defined in the IEGC and Congestion charge Regulations:

- “Total Transfer Capability (TTC)” means Maximum amount of power that can be transferred reliably over the inter-control area transmission system under a given set of operating conditions considering the effect of occurrence of the worst credible contingency.
- 

Available Transfer Capability (ATC)

As defined in the IEGC and Congestion charge regulations

- “Available Transfer Capability (ATC)” means the transfer capability of the inter-control area transmission system available for scheduling commercial transactions (through long term access, medium term open access and short term open access) in a specific direction, taking into account the network security.

- Mathematically:

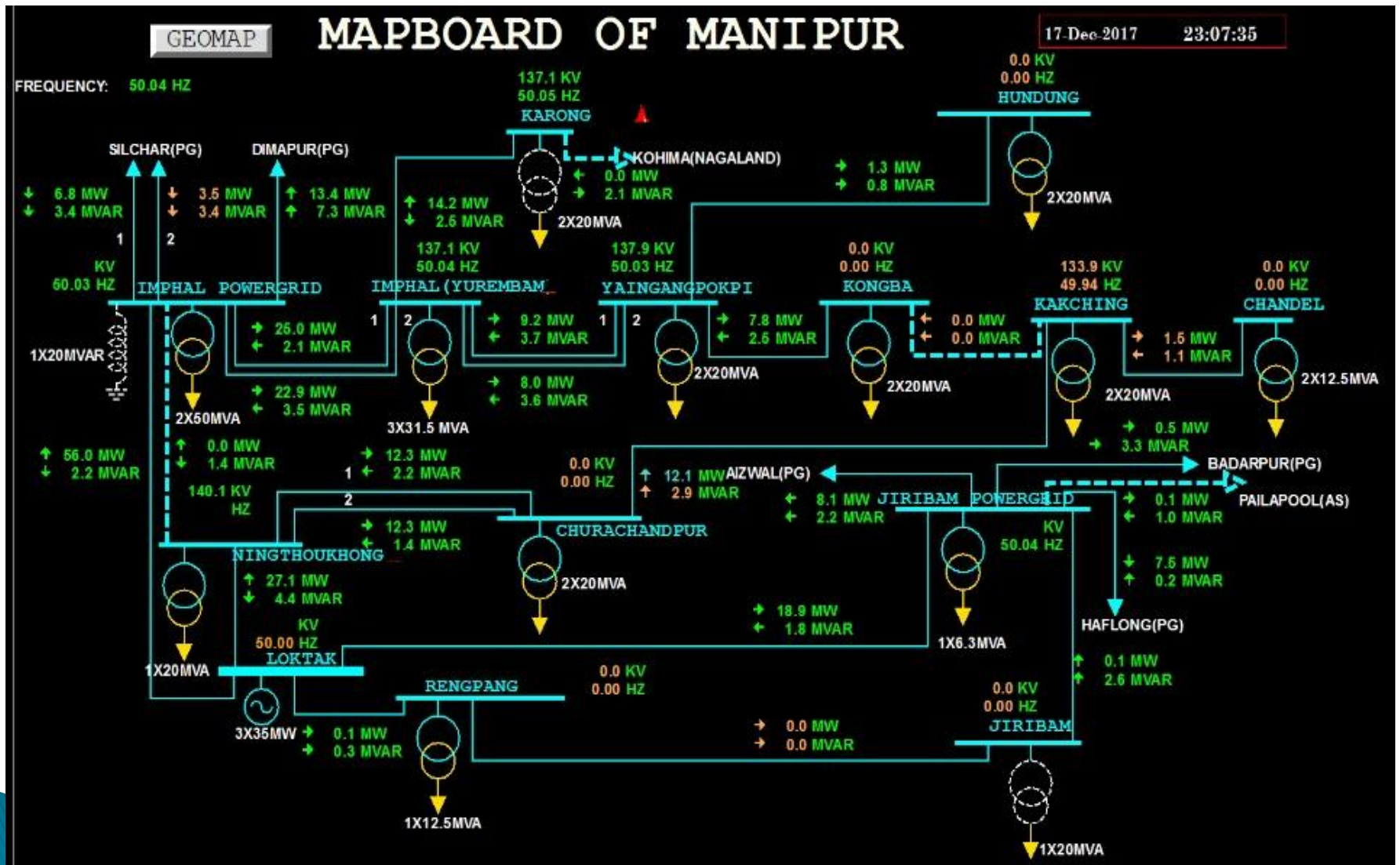
$$ATC = TTC - RM ; RM = \text{Reliability Margin}$$

- ▶ Accurate evaluation of ATC is essential to maximize utilization of existing transmission grids while maintaining system security.

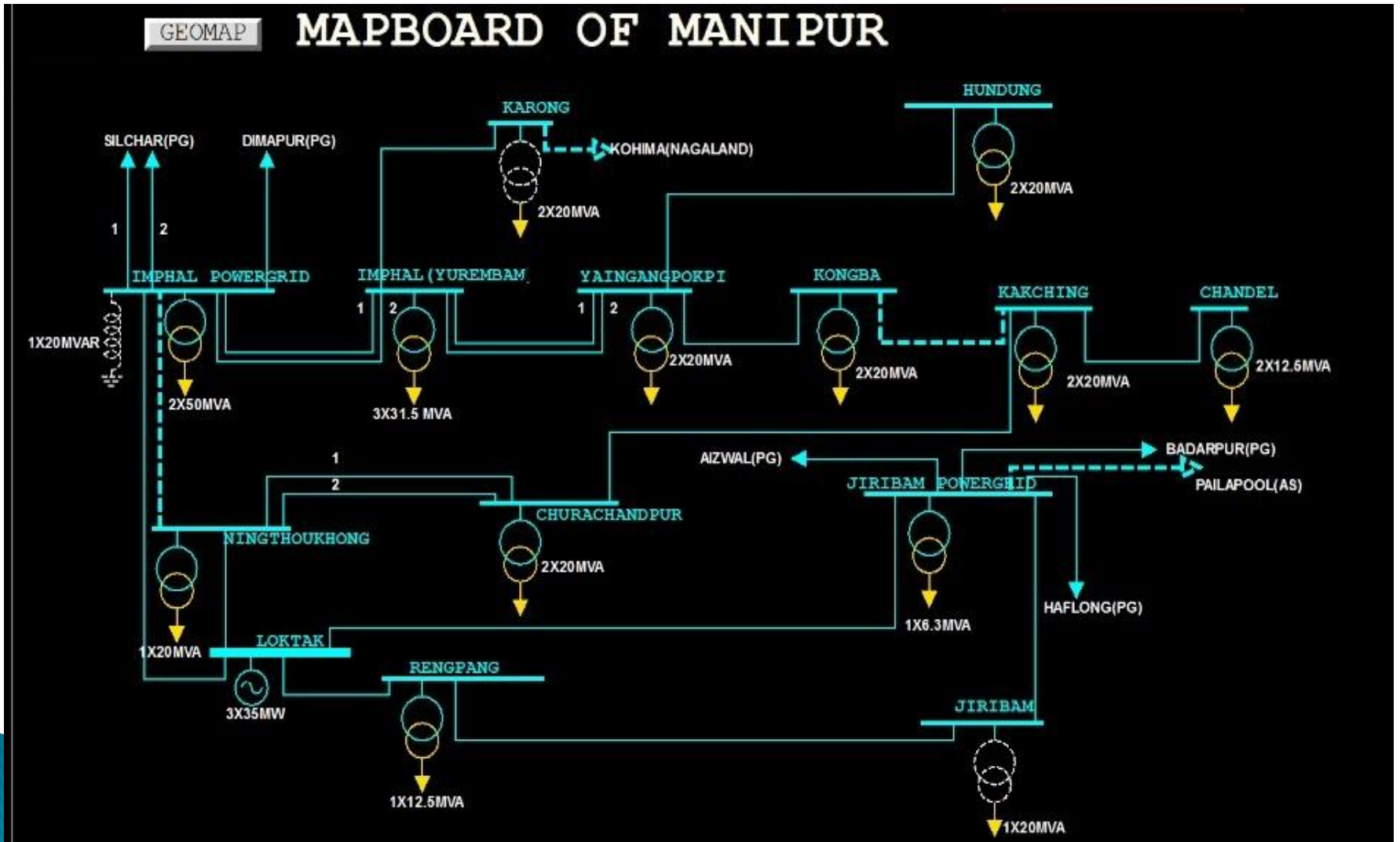
Procedure adopted by NERLDC to calculate TTC/ATC

- **Input Data for Base Case Preparation**
- **Network Topology:** As per network data obtained from CTU and STUs. New transmission elements considered only after commissioning of that asset and duly considering their reliability during initial period.
- **Unit Availability:** As per the maintenance schedule finalized by RPC. New generating units considered only after commissioning of the new units and duly considering their reliability during initial period.
- **Nodal MW demand:** As per the anticipated load provided by SLDCs (**Monthly Data**) or Load Generation Balance Report (LGBR) prepared by CEA or past trend available at RLDCs/ NLDC.
- **Nodal MVAR demand:** As per the anticipated power factor provided by SLDCs.

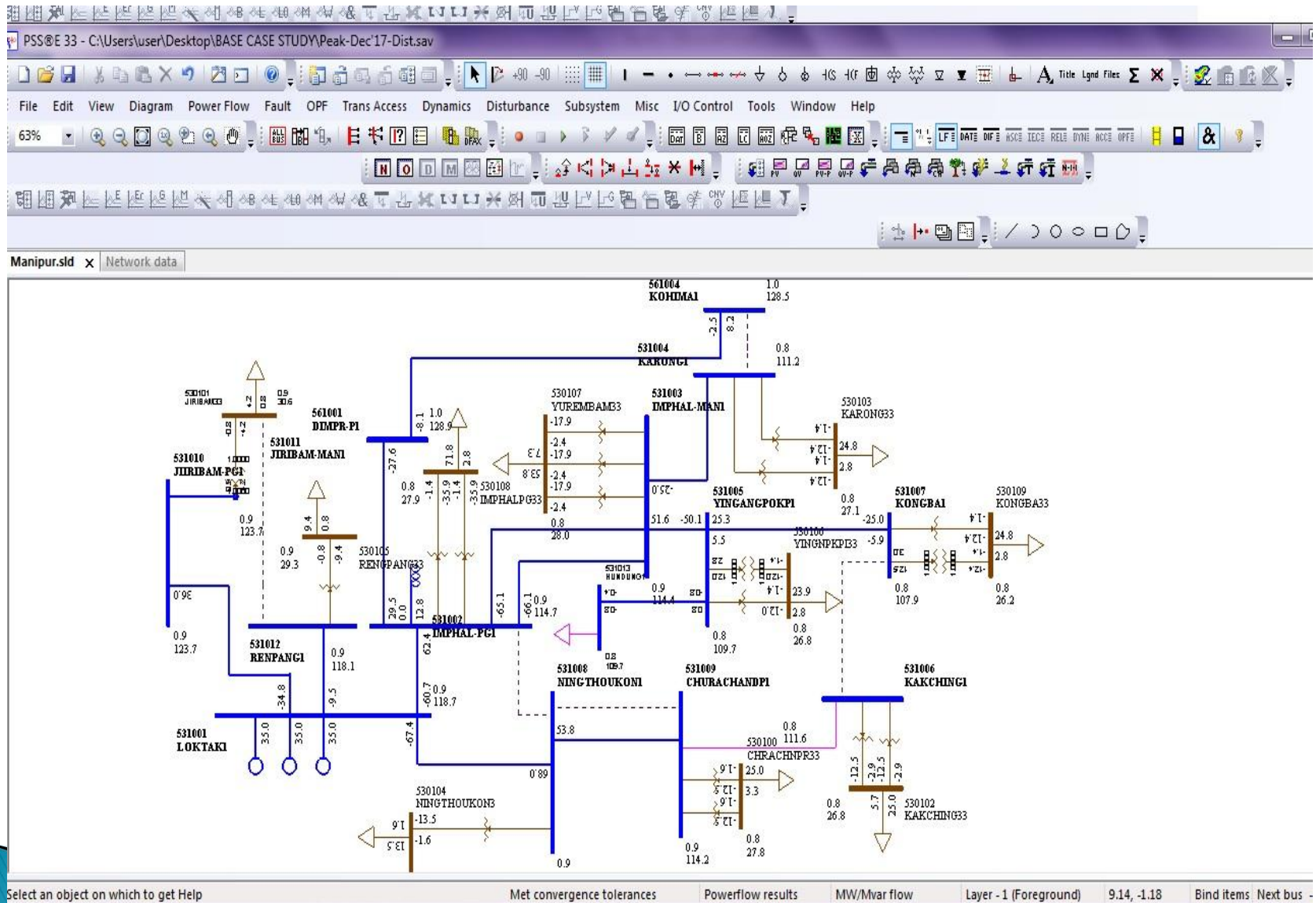
SCADA MAPBOARD OF 132kV RING OF MANIPUR



SCADA MAPBOARD OF 132kV RING OF MANIPUR



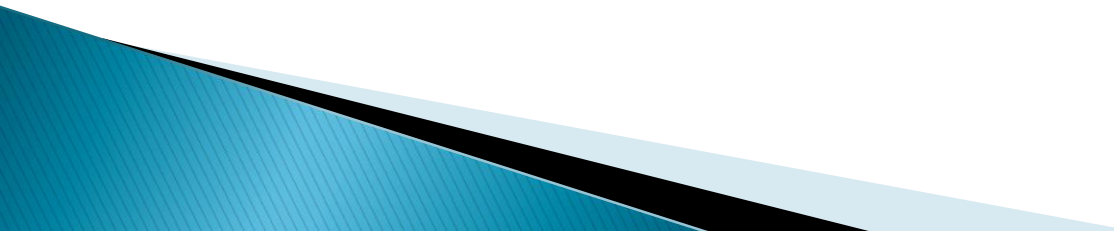
PSSE SOFTWARE SIMULATION OF 132kV RING CKT. OF MANIPUR



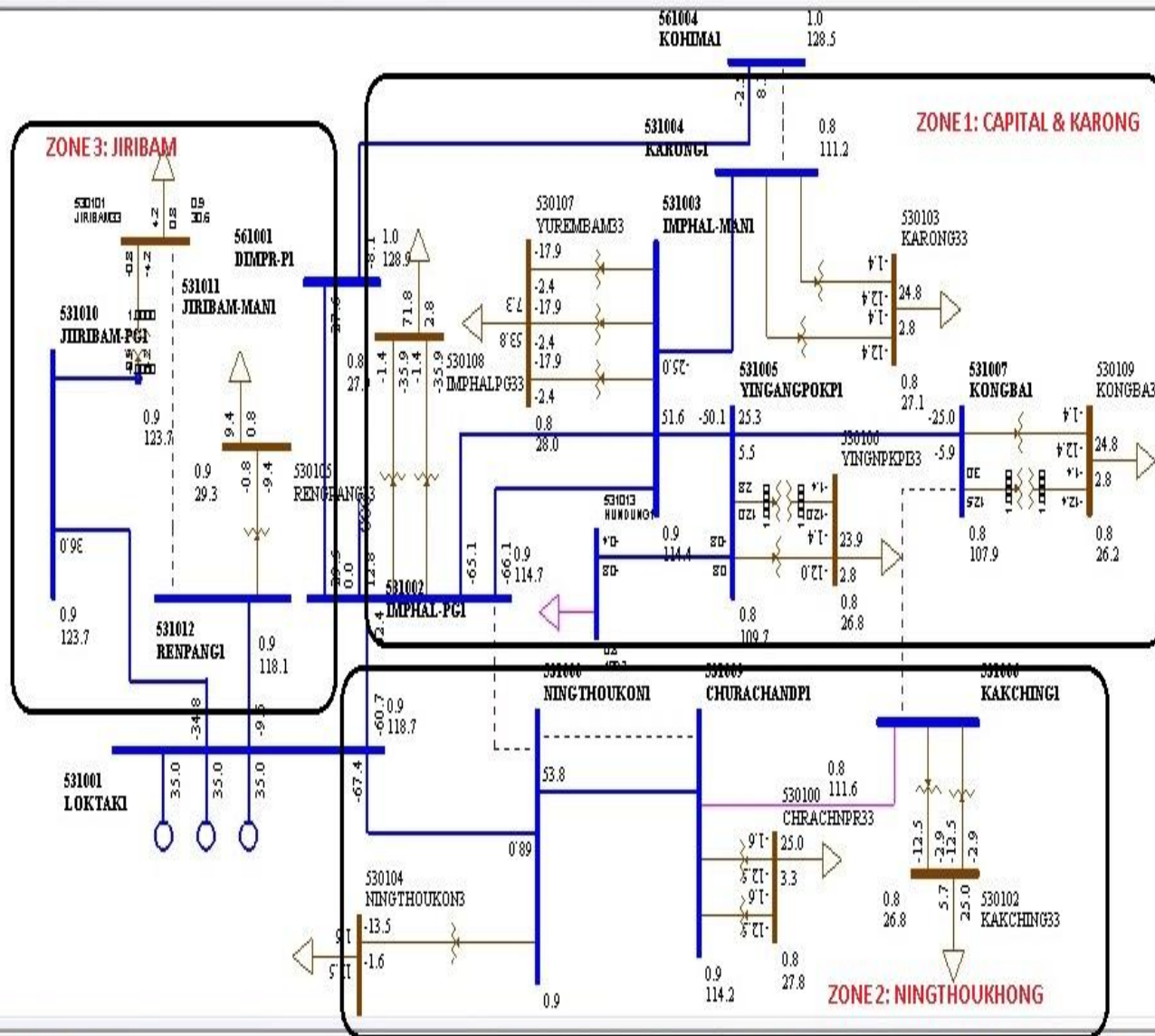
TTC Assessment

- ▶ Total Transfer Capability between two areas assessed by increasing the load in the importing area and increasing the generation in the exporting area or vice versa till the constraints are hit for a credible contingency.
- ▶ Credible Contingency: Outage of single transmission element (N-1) in the transmission corridor or connected system

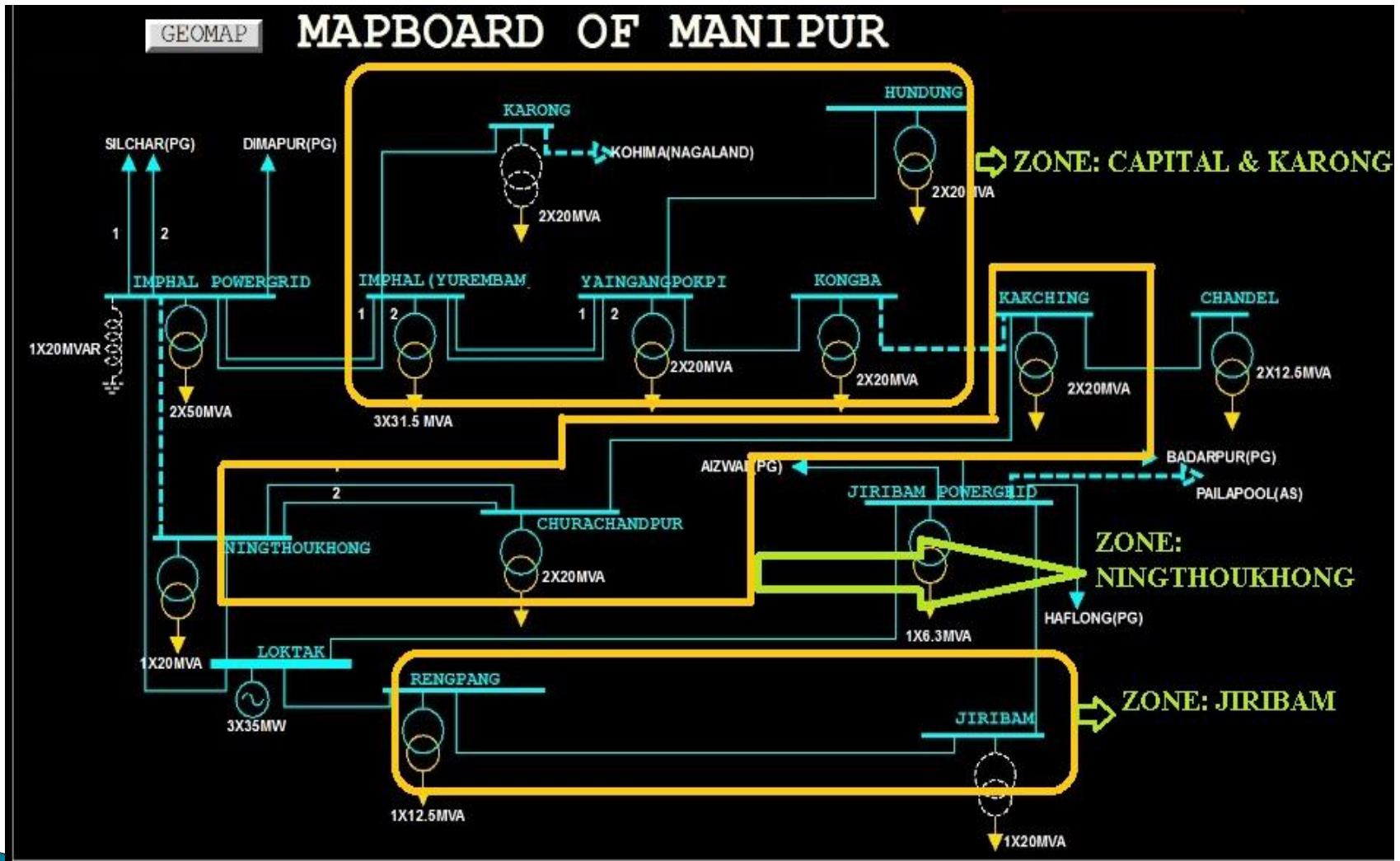
BASECASE

- ▶ MANIPUR GRID IS DIVIDED INTO 3 ZONES:
 - ▶ ZONE 1: CAPITAL & KARONG
 - ▶ ZONE 2: NINGTHOUKHONG
 - ▶ ZONE 3: JIRIBAM
- 

ZONE-WISE CALCULATION



ZONE-WISE CALCULATION



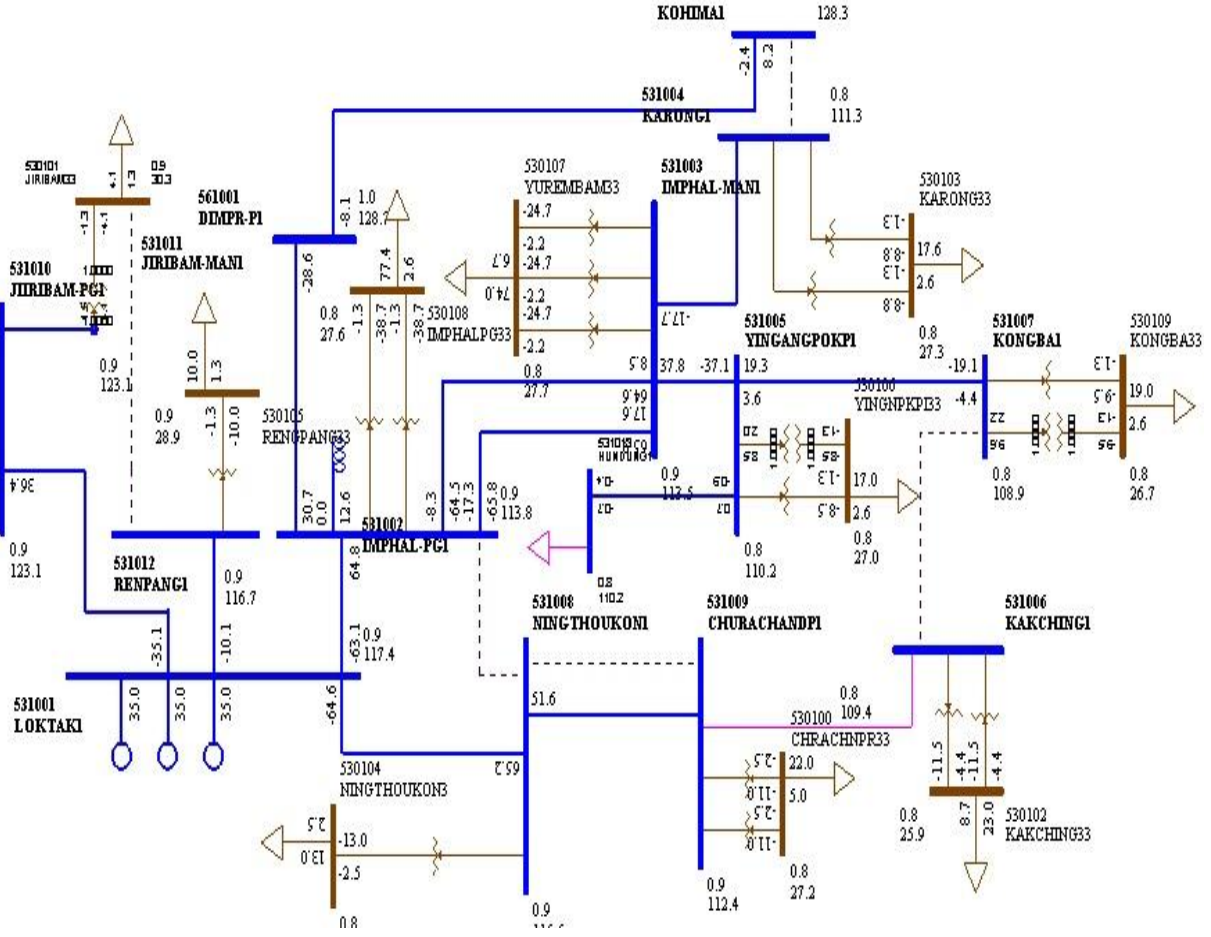
MANIPUR STATE TTC = 283MW

(WITH N-0 CONTINGENCY)

(N-0) CONTINGENCY

MANIPUR POWER SYSTEM

State	Generation	Load	TTC
Manipur	0.0 MW	282.8 MW	282.8 MW
Capital and Karong	0.0 MW	205.8 MW	205.8 MW
Ningthoukung	0.0 MW	63.0 MW	63.0 MW
Jiribam	0.0 MW	14.1 MW	14.1 MW



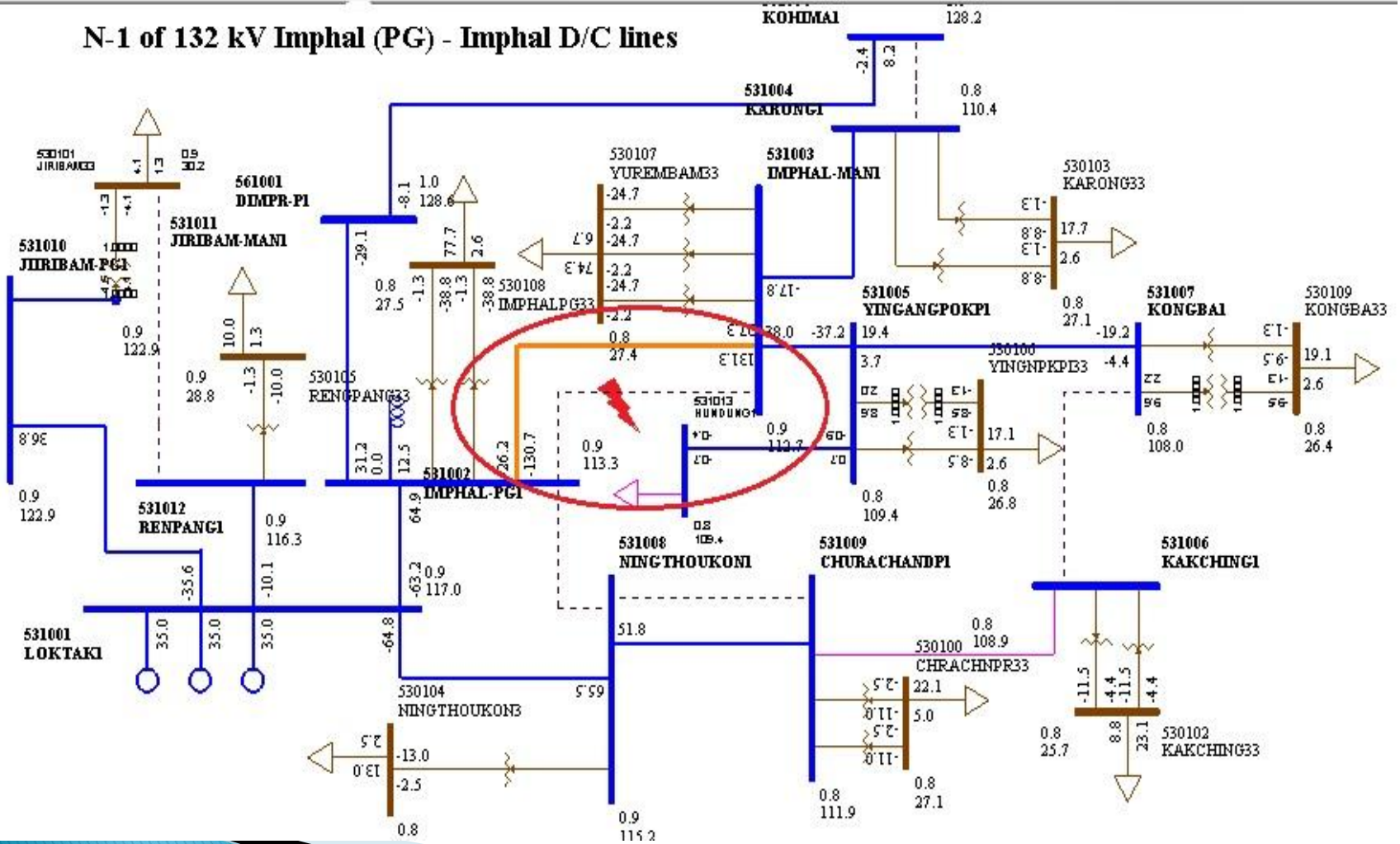
MANIPUR STATE TTC = 283MW

(WITH N-0 CONTINGENCY)

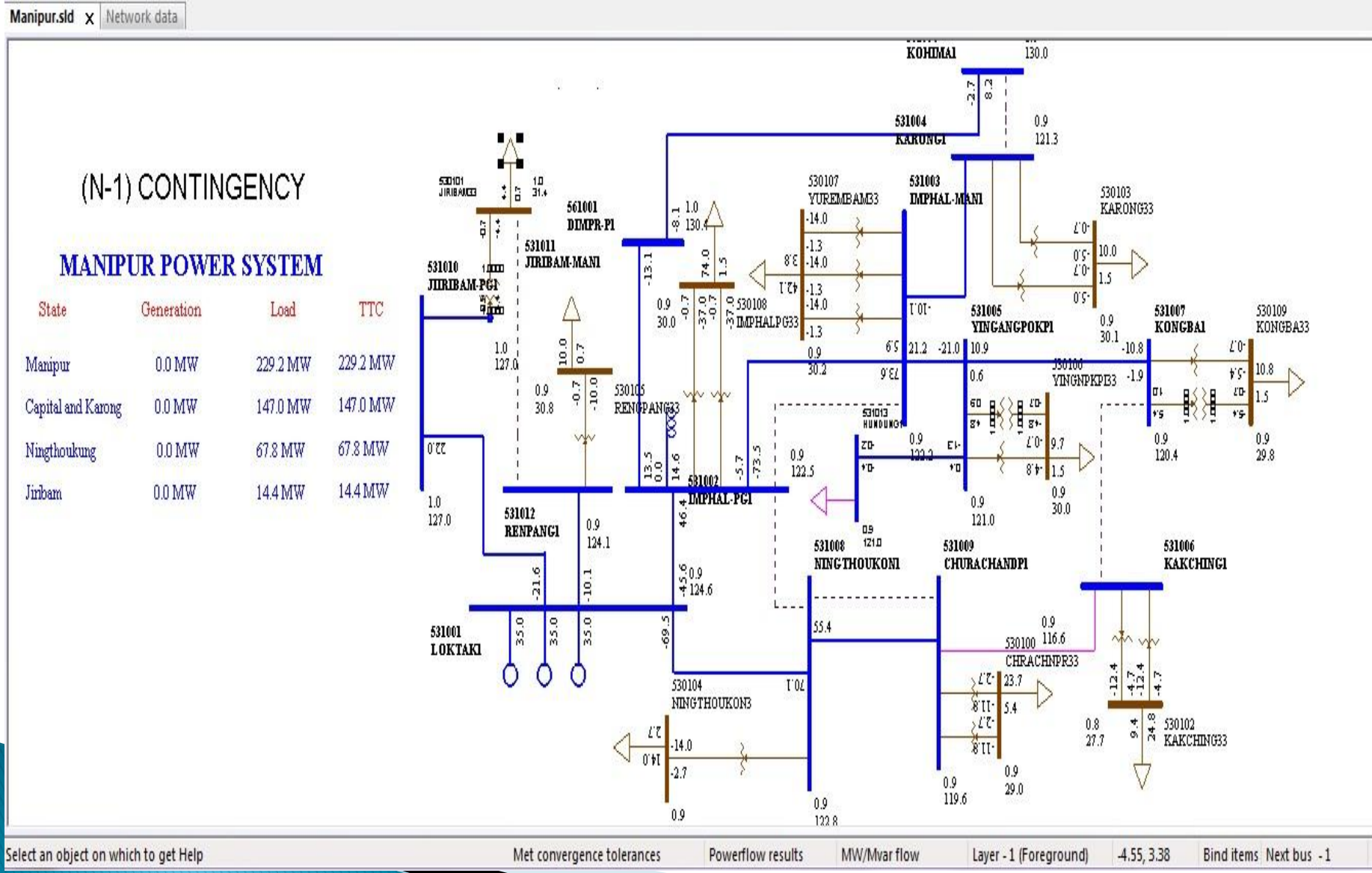
Network data		x		Manipur.sld	
Bus Number	Bus Name	Zone Num	Zone Name	Pload (MW)	
530100	CHRACHNPR33 3	5402	MANIPUR-NING	23.4073	
530101	JIRIBAM33 33.0	5403	MANIPUR-OTS	4.2827	
530102	KAKCHING33 33	5402	MANIPUR-NING	29.2539	
530103	KARONG33 33	5401	MANIPUR-CPTL	19.9600	
530104	NINGTHOUKON3	5402	MANIPUR-NING	9.7793	
530105	RENGPANG33 3	5403	MANIPUR-OTS	9.9273	
530106	YINGNPKPI33 33	5401	MANIPUR-CPTL	22.5062	
530107	YUREMBAM33 3	5401	MANIPUR-CPTL	62.5825	
530108	IMPHALPG33 33	5401	MANIPUR-CPTL	74.4855	
530109	KONGBA33 33	5401	MANIPUR-CPTL	25.6399	
530110	HUNDUNG33 33	5401	MANIPUR-CPTL	0.3933	
530112	ELANPOKPI33 33	5402	MANIPUR-NING	3.3594	
*					

N-1 CONTINGENCY CALCULATION

N-1 of 132 kV Imphal (PG) - Imphal D/C lines



RESULT: MANIPUR TTC = 230MW ; WITH N-1 CONTINGENCY



STATE SUB-SYSTEM TRANSFER CAPABILITIES

ZONE 1: CAPITAL & KARONG

- ▶ FULL LOAD: 252MW
- ▶ TTC OF THIS ZONE
- ▶ A) N-0; TTC= 206 MW
- ▶ B) N-1; TTC= 147 MW
- ▶ Contingency: N-1 of 132 kV Imphal (PG) – Imphal D/C lines;
- ▶ Limits: High loading of other circuit of 132 kV Imphal – Imphal D/C

ZONE 2: NINGTHOUKHONG

- ▶ FULL LOAD: 140 MW
- ▶ TTC OF THIS ZONE
- ▶ A) N-0; TTC= 63 MW
- ▶ B) N-1; TTC= 48 MW
- ▶ Contingency: N-1 of 132/33 kV Xfmr at Kakching
- ▶ Limits: High loading of other Xfmr at Kakching

ZONE 3:

- ▶ FULL LOAD: 15MW
- ▶ TTC OF THIS ZONE
- ▶ A) N-0; TTC= 14.2 MW
- ▶ B) N-1; TTC= 4.2 MW
- ▶ Contingency & Limits: N-1 of 132/33kV 12.5 MVA Transformer at Rengpang

CASE STUDY

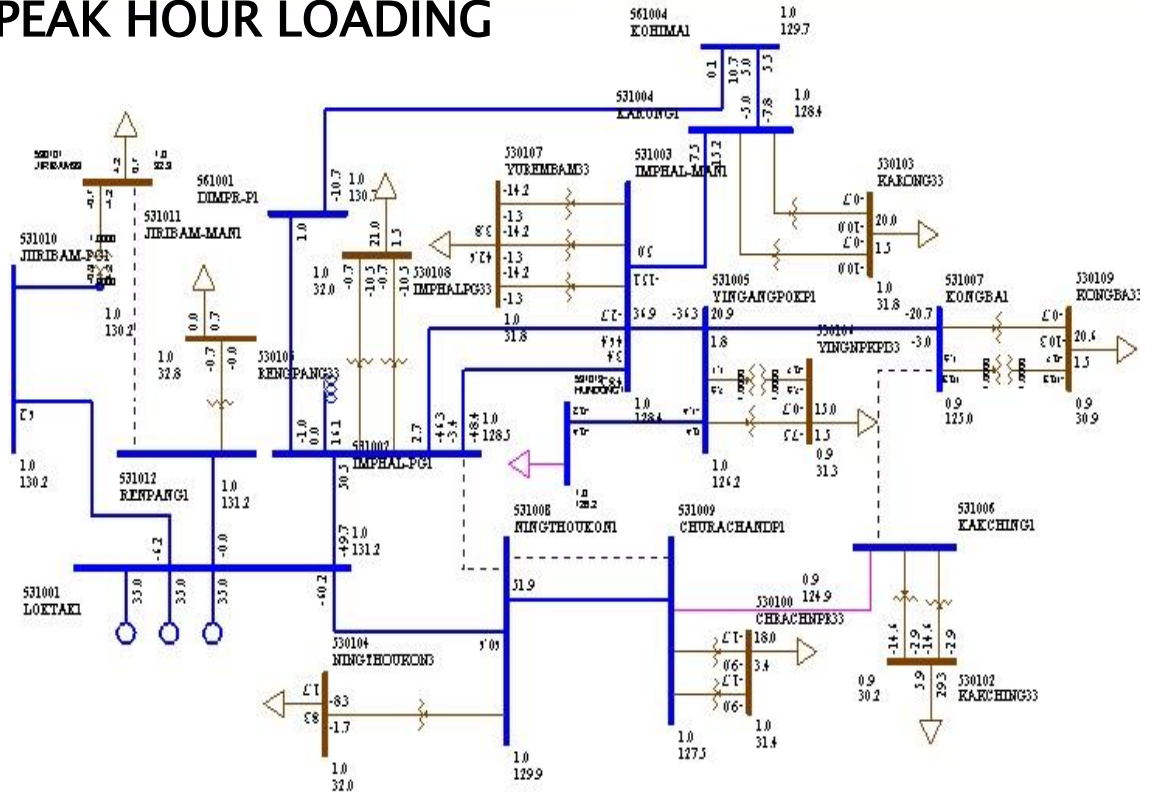
CASE 1: IMP-IMP CKT 1 S/D

Network data RT1.sld x

MANIPUR POWER SYSTEM

State	Generation	Load	TTC
Manipur	0.0 MW	182.7 MW	182.7 MW
Capital and Karong	0.0 MW	119.6 MW	119.6 MW
Ningthoulang	0.0 MW	58.9 MW	58.9 MW
Jiribam	0.0 MW	4.2 MW	4.2 MW

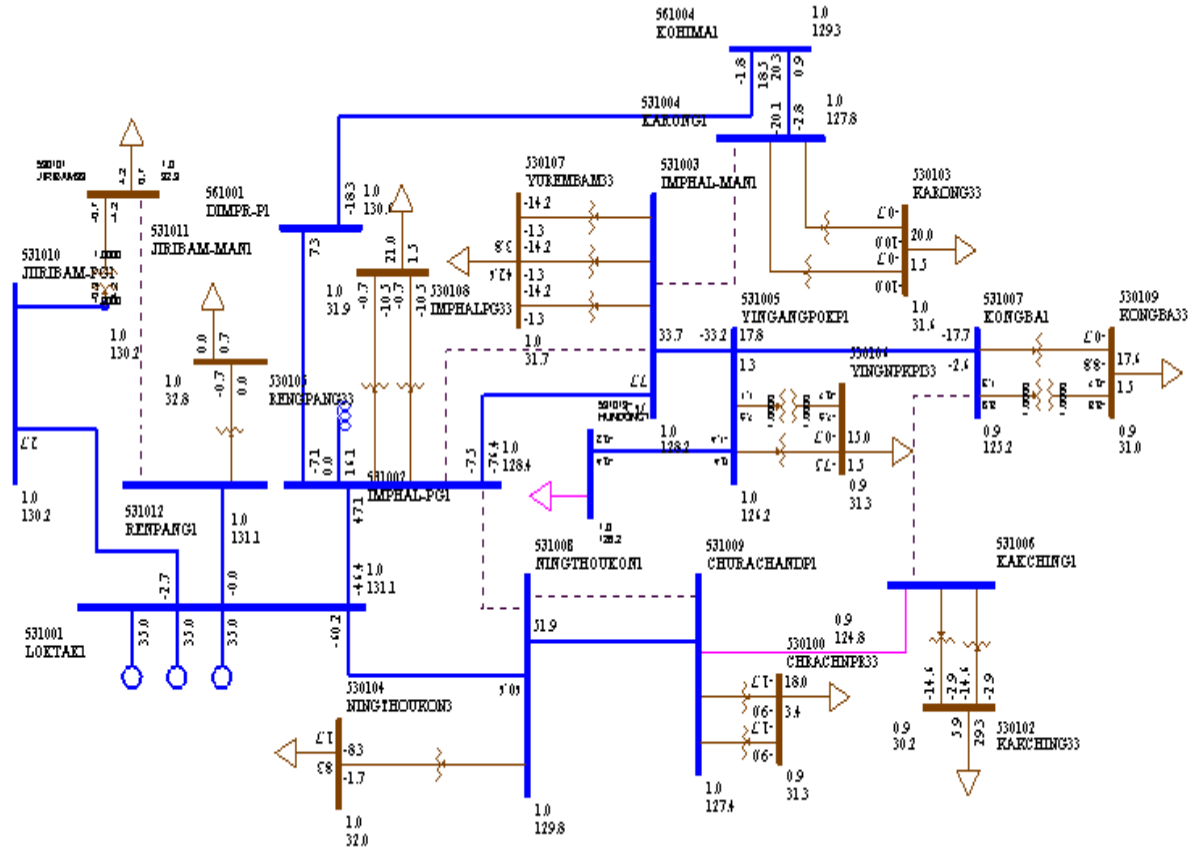
PEAK HOUR LOADING



CASE 1: IMP-IMP CKT 1 S/D; WITH 132kV KARONG S/S LOADING FROM KOHIMA

MANIPUR POWER SYSTEM

State	Generation	Load	TTC
Manipur	0.0 MW	179.7 MW	179.7 MW
Capital and Karong	0.0 MW	116.6 MW	116.6 MW
Ningthoulang	0.0 MW	58.9 MW	58.9 MW
Jiribam	0.0 MW	4.2 MW	4.2 MW

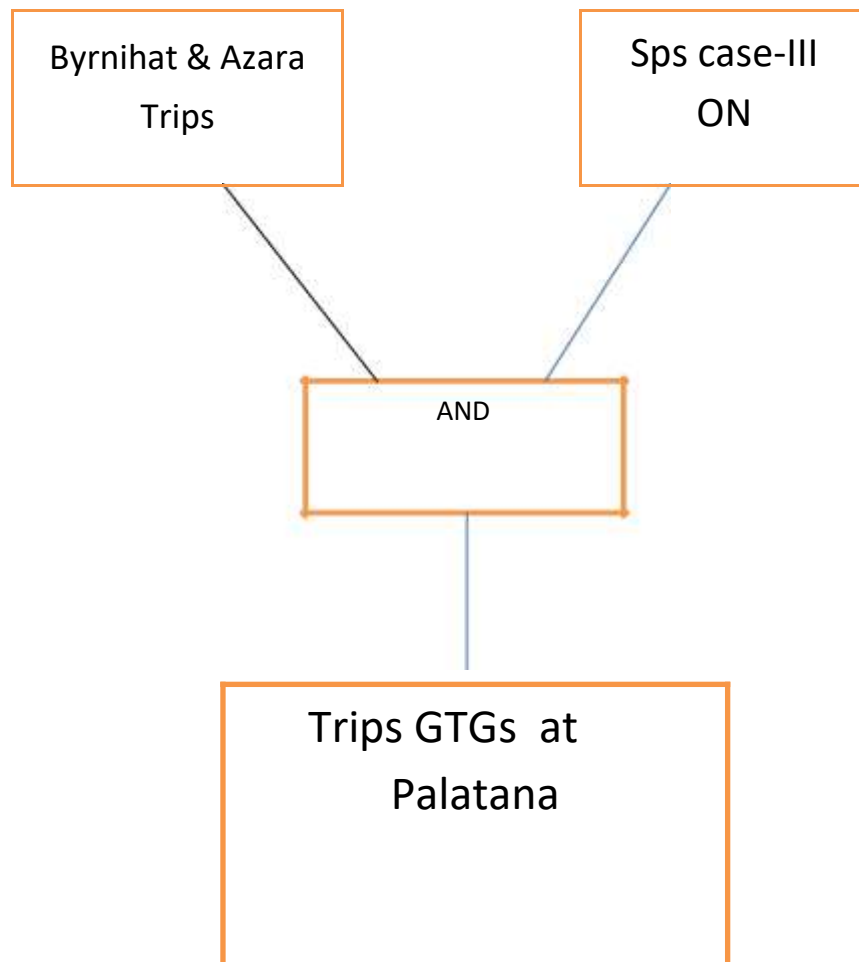


▶ THANK YOU.

SEQUENCE OF OPERATION FOR MOCK TEST OF SPS 2 and SPS 3.

Before start of mock test , engineers of both substation shall confirms the GPS sync timing of their system.

Special Protection Scheme CASE-III (for actuation at silchar)

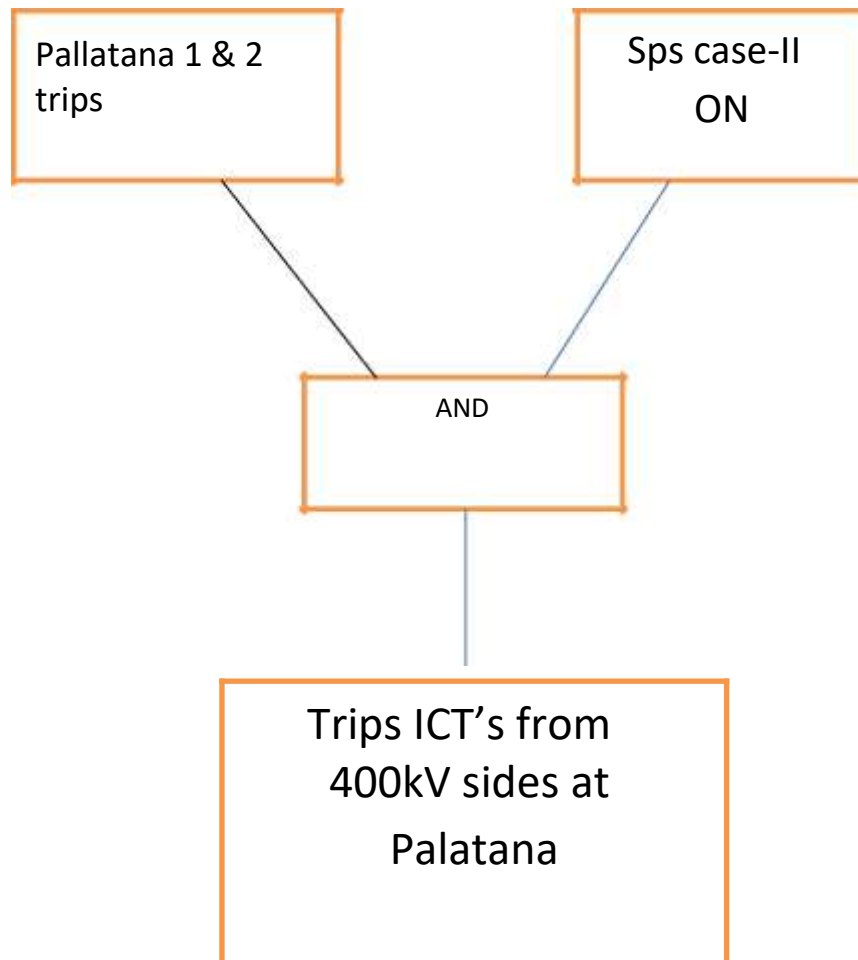


FOR SPS # 3 (Without Shutdown)

1. Both sides should confirm with each other the PLCC panel (TX and RX) and PLCC channel via which DT shall be extended for SPS # 3 operation.
2. Both end shall record the PLCC counter reading before testing.
3. All other PLCC panels which may result in spurious SPS DT send / Receive to be turned OFF.
4. Palatana shall confirm Opening trip output wires from BCU for each affected lines as per scheme.
5. All other SPS schemes except SPS # 3 should be turned OFF (in both stations)

6. Silchar shall forcefully make the status of main and tie breakers (Byrnihat and Azara) open in BCU. (Also 03 different condition to be subsequently tested for 86A optd , 86B optd and 85 LO (AR LO) optd.)
7. This should result in SPS # 3 events in the SCADA of Sichar Substation and Palatana.
8. The time of DT send signal generated (DTs) at sichar and DT received signal generated (DRs) at palatana to be recorded , and DT transmission delay (DTtd)= DTs – DRs should be calculated.
9. Record event of associated trip event at palatana end to be recorded and forwarded to NERLDC for verification.
10. SCADA events at silchar to be recorded.
11. PLCC counter increment for the effected channel to be recorded .
12. Repeat the step for different test condition as detailed in SI. No. 06.
13. Normalization / reconnection of trip output wires at palatana end.

Special Protection Scheme CASE-II (for actuation at silchar)



FOR SPS # 2 (Without Shutdown)

1. Both site should confirm with each other the PLCC panel (TX and RX) and PLCC channel via which DT shall be extended for SPS # 2 operation.
2. Both end shall record the PLCC counter reading before testing.
3. All other PLCC panels which may result in spurious SPS DT send / Receive to be turned OFF
4. Palatana shall confirm Opening trip output wires from BCU for each affected lines as per scheme.
5. All other SPS schemes except SPS # 2 should be turned OFF (in both stations)

6. Silchar shall forcefully make the status of main and tie breakers (Palatana 1 & 2) high in BCU. (Also 03 different condition to be subsequently tested for 86A optd , 86B optd and 85 LO (AR LO) optd.)
7. This should result in SPS # 2 events in the SCADA of Schar Substation and Palatana.
8. The time of DT send signal generated (DTs) at sichar and DT received signal generated (DRs) at palatana to be recorded , and DT transmission delay (DTtd)= DTs – DRs should be calculated.
9. Record event of associated trip event at palatana end to be recorded and forwarded to NERLDC for verification.
14. SCADA events at silchar to be recorded.
10. PLCC counter increment for the effected channel to be recorded .
11. Repeat the step for different test condition as detailed in SI. No. 06.
12. Normalization / reconnection of trip output wires at palatana end.

Details of Special Energy Meters at inlet points of NER States					
SL NO	STATE	LOCATION	EXISTING	FUTURE	TOTAL
1	AR. PRADESH	RANGANADI	3	1	4
2	AR. PRADESH	NIRJULI	1	0	1
3	AR. PRADESH	ITANAGAR	0	2	2
4	AR. PRADESH	PARE	0	3	3
5	ASSAM	AGIA	1	0	1
6	ASSAM	AZARA	2	0	2
7	ASSAM	BNC	2	2	4
8	ASSAM	BALIPARA	3	0	3
9	ASSAM	DULLAVCHERRA	1	0	1
10	ASSAM	HAFLONG	2	0	2
11	ASSAM	KATHALGURI	3	0	3
12	ASSAM	PANCHGRAM	3	0	3
13	ASSAM	MISA	4	2	6
14	ASSAM	SALAKATI	2	0	2
15	ASSAM	RANGIA	1	4	5
16	ASSAM	SILCHAR(PG)	2	0	2
17	ASSAM	SILCHAR(S)	4	0	4
18	ASSAM	KHANDONG	1	0	1
19	ASSAM	MARIANI(S)	3	0	3
20	ASSAM	NTPC	1	1	2
21	ASSAM	MOKOK(S)	2	0	2
22	ASSAM	MARIANI(PG)	0	4	4
23	ASSAM	SONAPUR	0	2	2
24	MANIPUR	IMPHAL	5	2	7
25	MANIPUR	JIRIBAM	3	0	3
26	MANIPUR	LOKTAK	2	2	4
27	MANIPUR	KARONG	1	0	1
28	MANIPUR	THOUBAL	0	2	2
29	MEGHALAYA	UMTRU	4	0	4
30	MEGHALAYA	KHLRT	2	0	2
31	MEGHALAYA	BYRNIHAT	2	0	2
32	MIZORAM	MELRIAT	3	0	3
33	MIZORAM	AIZWAL	1	0	1
34	MIZORAM	KOLASIB	2	0	2
35	NAGALAND	DIMAPUR	4	0	4
36	NAGALAND	DOYANG	2	0	2
37	NAGALAND	NEW KOHIMA	0	2	2
38	TRIPURA	KUMARGHAT	1	0	1
39	TRIPURA	AGTCCPP	2	2	4
40	TRIPURA	PALATANA	2	1	3
41	TRIPURA	SURAJMANI NAGAR	0	2	2
42	TRIPURA	PKBARI	0	2	2
TOTAL METER			77	36	113

General Electric Model 9FA.03 Gas Turbine ONGC, Tripura

Estimated Performance

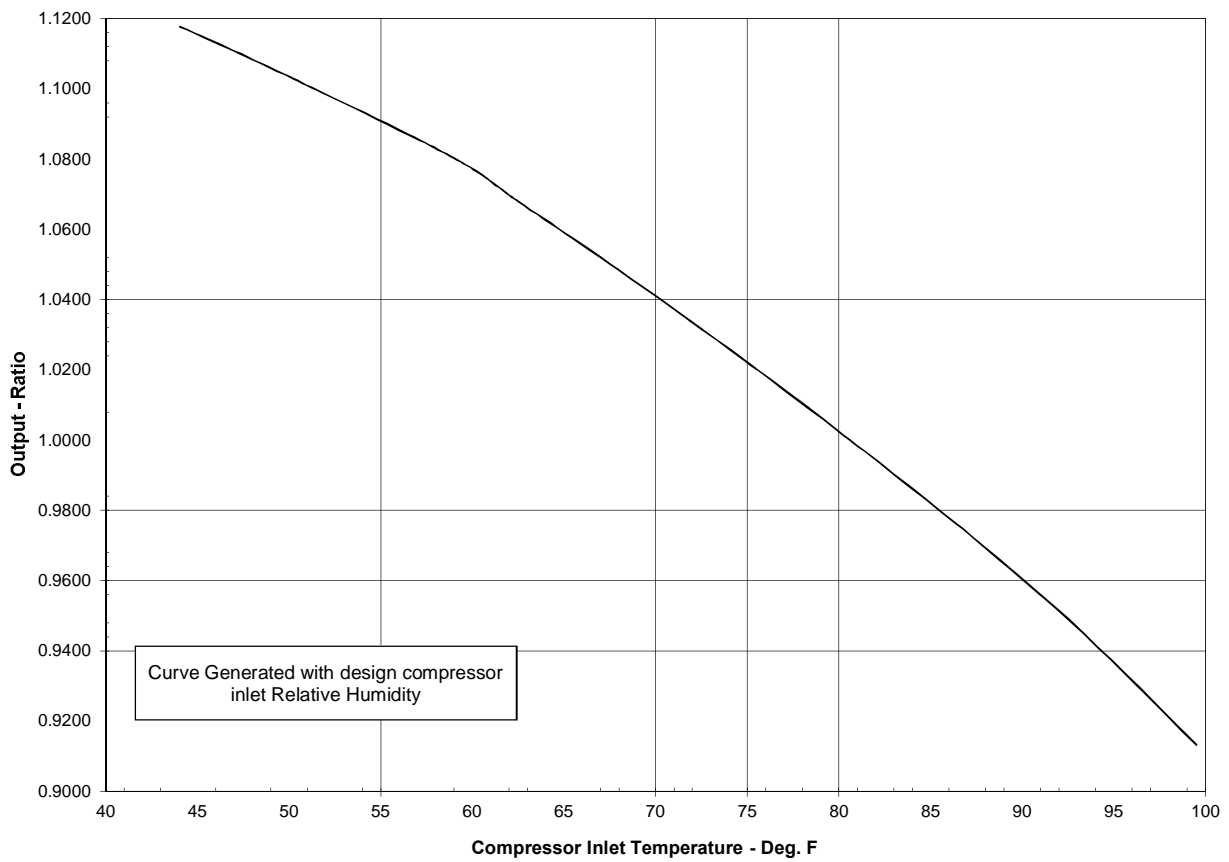
Effect of Compressor Inlet Temperature on Output

Design Values Referenced on 103H6047 Rev A Sheet 1

Fuel: Gas

Mode: Base

Gas Turbine Generator(s) GT2-298872 ONLY



	Units										
Compressor Inlet Temperature	F	44.06	50.22	59.00	62.54	68.70	74.86	80.60	87.18	93.34	99.50
Output Ratio		1.11771	1.10289	1.08029	1.06780	1.04581	1.02268	1.00000	0.97285	0.94498	0.91322

Venu Gorantla
03/07/15

103H6047 Rev A
Sheet 3

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**Grid Disturbance in
Southern Part of NER Grid
on 17.12.17 at 06:37 Hrs**

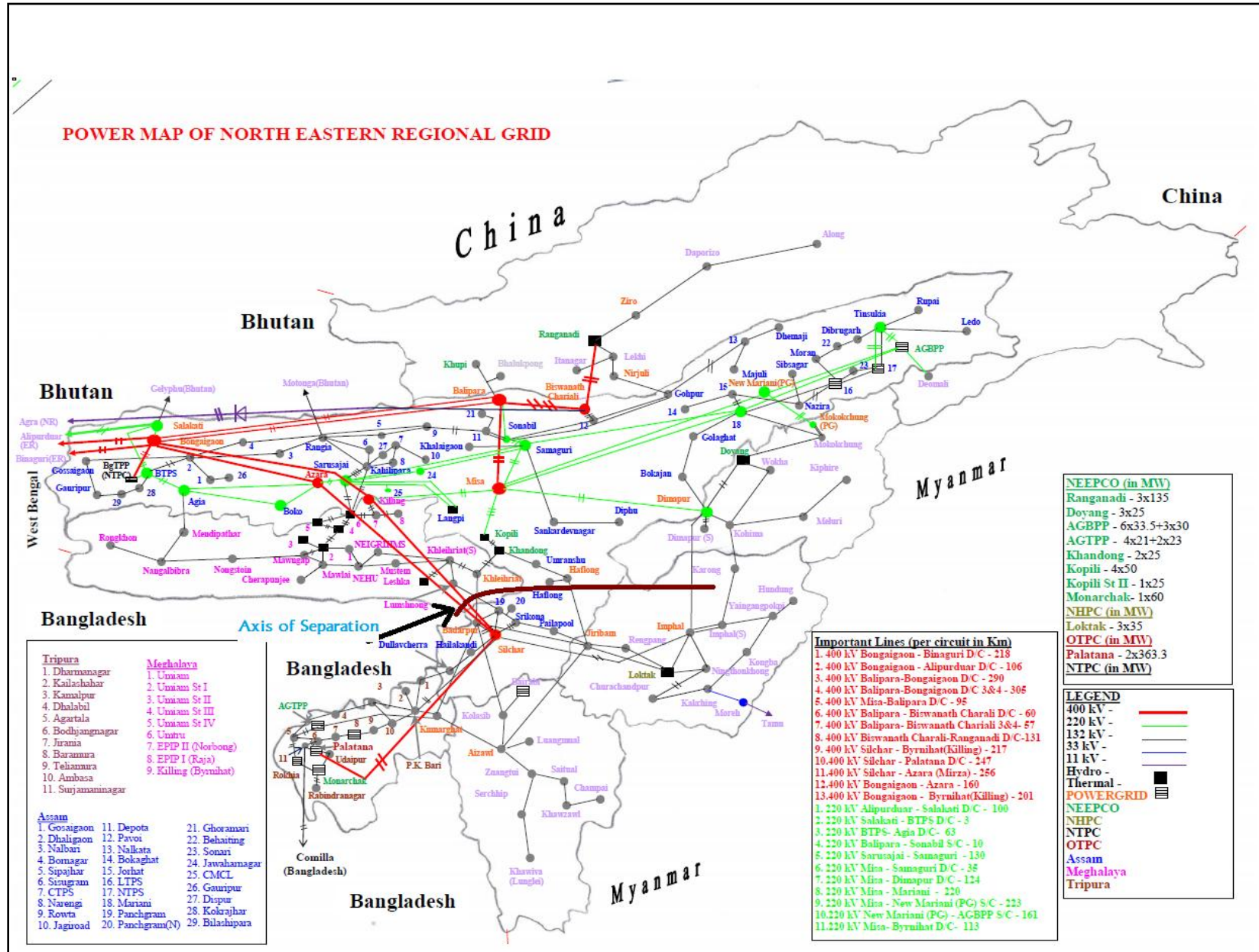
Summary



- ❑ **Disturbance occurred in Southern Part of NER Grid on 17.12.17 at 06:37 Hrs comprising of the following Power Systems:**
 - i) Tripura**
 - ii) South Assam**
 - iii) Manipur**
 - iv) Mizoram**
 - v) Bangladesh(South Comilla)**

- ❑ **These Power Systems were connected with rest of NER Grid through the following links:**
 - i) 400 kV Silchar - Azara line**
 - ii) 400 kV Silchar - Byrnihat line**
 - iii) 132 kV Badarpur – Khliehriat line**
 - iv) 132 kV Haflong – Jiribam line &**
 - v) 132 kV Dimapur – Imphal line.**

Axis of Separation





Major Lines/Unit Under Outage:

S.No	Name of line/Machine	Remarks
1	400 kV Bongaigaon – Balipara-III	Over Voltage Opened
2	400 kV BNC- Ranganadi I	Over Voltage Opened
3	132 kV Agartala- AGTCCPP II	Under S/D
4	132 kV PK Bari - Silchar II	Faulty
5	220 kV Mariani – Mokokchung II	Over Voltage Opened
6	AGTCCPP Unit 2	Low gas Pressure
7	Doyang Unit 2	E/S/D since 20-11-17



Antecedent Conditions

S.No	Area / Region	Before	After
1	Frequency(HZ)	50.02	49.90
2	Regional Demand(MW)	1592	1252
3	Regional Generation (MW)	1807	964
3	NR-NER Flow (MW)	700 (Export)	699 (Export)
4	NER-ER Flow (MW)	638 (Import)	963 (Import)
5	NET NER (MW)	62 (Export)	264 (Import)



Sequence of Event

- At 06:26:52 Hrs, **400 kV Silchar – Byrnihat** line tripped
- At 06:37:01 Hrs, **400 kV Silchar – Azara** line tripped.
- Due to non –operation of SPS-3, Palatana was not able to reduce to the desired level and eventually **132 kV Badarpur – Khliehriat** line tripped at 06:37:05 Hrs due to over-current at Badarpur end.
- **132 kV Jiribam – Haflong** line tripped at 06:37:10 Hrs at Jiribam end on Over current .
- **132 kV Dimapur – Imphal** line tripped at 06:37:10 Hrs at Imphal end on Over-current.
- Due to tripping of these lines, Southern part of NER grid including South Comilla (Bangladesh load) was separated from rest of NER Grid and subsequently collapsed due to Load Generation Mismatch.



Load Loss vs Generation Loss

- **Total Load Loss = 433 MW (including Bangladesh)**
Tripura=**87 MW**, Manipur=**145 MW**, Mizoram=**69 MW**,
South Assam = **60 MW**, Bangladesh (South Comilla) =**72 MW**
- **Total Central Sector Generation Loss= 664 MW**
Palatana=**488 MW**, Loktak=**105 MW**, AGTCCPP=**71 MW**
- **Total State Generation Loss: 177 MW**
Tripura = **153 MW**, Mizoram=**24 MW**
- **Total Generation Loss: 841 MW**
- **Category of Grid Disturbance: GD III**
(Antecedent Load: 1592 MW; Antecedent Generation: 1803 MW)



Line Flow of Axis from SCADA

Line details	Line Loading at 06:26 Hrs (in MW)	Line Loading at 06:37 Hrs (in MW)
400 kV Silchar – Byrnihat	150	0
400 kV Silchar – Azara	261	243
132 kV Badarpur - Khliehriat	34	Not Available
132 kV Jiribam - Haflong	10	Not Available
132 kV Imphal - Dimapur	12	120

Preliminary Event Analysis



- At 06:26:52 Hrs, **400 kV Silchar- Byrnihat** tripped in Distance Protection (Silchar: **Y-E,Z-II,198.26 km**; Byrnihat: **R-Y, Z-I, E/F, 9.6 km**).
- DR output from Silchar shows R-E fault in ZII and carrier aided trip with fault current upto 1.78 kA.
- Angle between V_r and I_r is about 72-78 deg.
- DR and EL output of Byrnihat has not yet been received

- At 06:37:01 Hrs , **400 kV Silchar – Azara** line tripped in Distance Protection (Silchar: **Y-E, ZII** ; Azara: **Y-E, AR successful**)
- DR output from Silchar shows B-E fault in ZII with fault current upto 1.64 kA.
- Angle between V_b and I_b is about 72-76 deg.
- Fault was cleared in 550 msec. Carrier was not received and hence AR was not attempted.
- DR and EL output of Azara has not yet been received

Preliminary Event Analysis



- At 06:37:05, **132 kV Badarpur – Khliehriat** line tripped.
- DR output of Badarpur shows tripping of line due to operation of Over-current trip with around 800 A in all the phases.

- At 06:37:10 Hrs, **132 kV Haflong – Jiribam** line.
- DR output of Jiribam shows tripping of line due to operation of Over-current trip with around 1.3kA in all the phases.

- At 06:37:10 Hrs, **132 kV Dimapur - Imphal** line tripped on Over-Current.
- DR not received for the line.

- **Due to tripping of these lines, Southern part of NER grid including South Comilla (Bangladesh load) was separated from rest of NER Grid and subsequently collapsed due to Load Generation mismatch.**

Preliminary Event Analysis



- As informed by OTPC, at 06:37:08 hrs both Gas Turbine Generators run back started due to over frequency & finally at 06:37:09 Hrs & 06:37:10 Hrs **GTG-1 & GTG-2** breakers tripped respectively on over frequency.
- **STG-1** tripped at 06:37:25 Hrs and **STG-II** tripped at 06:37:27 Hrs
- Due to tripping of Palatana Units, the following lines tripped on SPS-1 at 06:37:27 Hrs
 1. 132 kV Silchar – Hailakandi I & II
 2. 132 kV Silchar – Srikona I and II
 3. 132 kV Silchar - Panchgram
 4. 132 kV Badarpur - Panchgran
- **AGTCCPP Unit I** tripped at 06:37:15 Hrs, **Unit III, IV, V, VI** tripped at 06:37:23 Hrs.

Preliminary Event Analysis



- Eventually Loktak, Tuirial, Monarchak and Tripura units tripped and led to total blackout in Tripura, Mizoram, Manipur and South Assam.
- From SOE of NERLDC and RTAMC, it is observed that 400 kV Silchar – Palatana I and II line was handtripped from Silchar end at 06:48:22.917 Hrs.
- As informed by OTPC, SPS-2 signal received at Palatana at 06:48:23 Hrs which led to tripping of HV breakers of Palatana ICTs.

Restoration Details



Sl.No.	Name of the line /Equipment	Restoration Time	Remarks
1	400 KV SILCHAR - AZARA	06:54	Power extended upto Silchar
2	132 KV DIMAPUR - IMPHAL	06:56	Imphal Bus Charged
3	132 KV IMPHAL- LOKTAK	07:03	Power extended upto Loktak
4	200 MVA ICT I AT SILCHAR	07:08	
5	132 KV IMPHAL(PG)- IMPHAL I	07:14	Power extended upto Manipur
6	132 KV SILCHAR- PK BARI I	07:15	Power extended upto Tripura
7	132 KV BADARPUR- KHLIEHRIAT	07:15	
8	132 KV KUMARGHAT - BADARPUR	07:15	
9	132 KV AIZAWL-KUMARGHAT	07:18	Power extended upto Mizoram
10	132 KV AIZAWL-ZEMABAWK	07:18	
11	132 KV SILCHAR- SRIKONA I	07:18	Power extended upto South Assam
12	132 KV SILCHAR-BADARPUR I	07:20	

Restoration Details



Sl.No.	Name of the line /Equipment	Restoration Time	Remarks
13	132 KV KUMARGHAT- AGTCCPP	07:20	Power extended upto AGTCCPP
14	132 KV SILCHAR- BADARPUR II	07:22	
15	132 KV SILCHAR-IMPHAL II	07:23	
16	132 KV SILCHAR SRIKONA II	07:23	
17	132 KV KOLSIB- BADARPUR	07:25	
18	132 KV PANCHGRAM BADARPUR	07:25	
19	400 KV SILCHAR- PALATANA II	07:27	Power extended upto Palatana
20	132 KV KUMARGHAT- PK BARI	07:27	
21	132 KV AIZAWL- KOLASIB	07:27	
22	200 MVA ICT II AT SILCHAR	07:28	
23	132 KV AIZAWL- MELRIAT	07:32	
24	132 KV AIZAWL- JIRIBAM	07:32	

Restoration Details



Sl.No.	Name of the line /Equipment	Restoration Time	Remarks
25	132 KV AGRTALA- AGTCCPP I	07:32	
26	132 KV SILCHAR- HAILAKANDI I	07:33	
27	132 KV SILCHAR- HAILAKANDI II	07:33	
28	132 KV JIRIBAM- HAFLONG	07:36	
29	400 KV SILCHAR- PALATANA I	07:37	
30	132 KV JIRIBAM- LOKTAK	07:40	
31	400 KV SILCHAR- BYRNIHAT	07:41	
32	132 KV JIRIBAM- BADARPUR	07:45	
33	132 KV PALATANA- UDAIPUR	07:46	
34	132 KV SURAJMANINAGAR-COMILLA	07:46	Power extended upto Bangladesh
35	132 KV PALATANA- SURAJMANINAGAR	10:39	

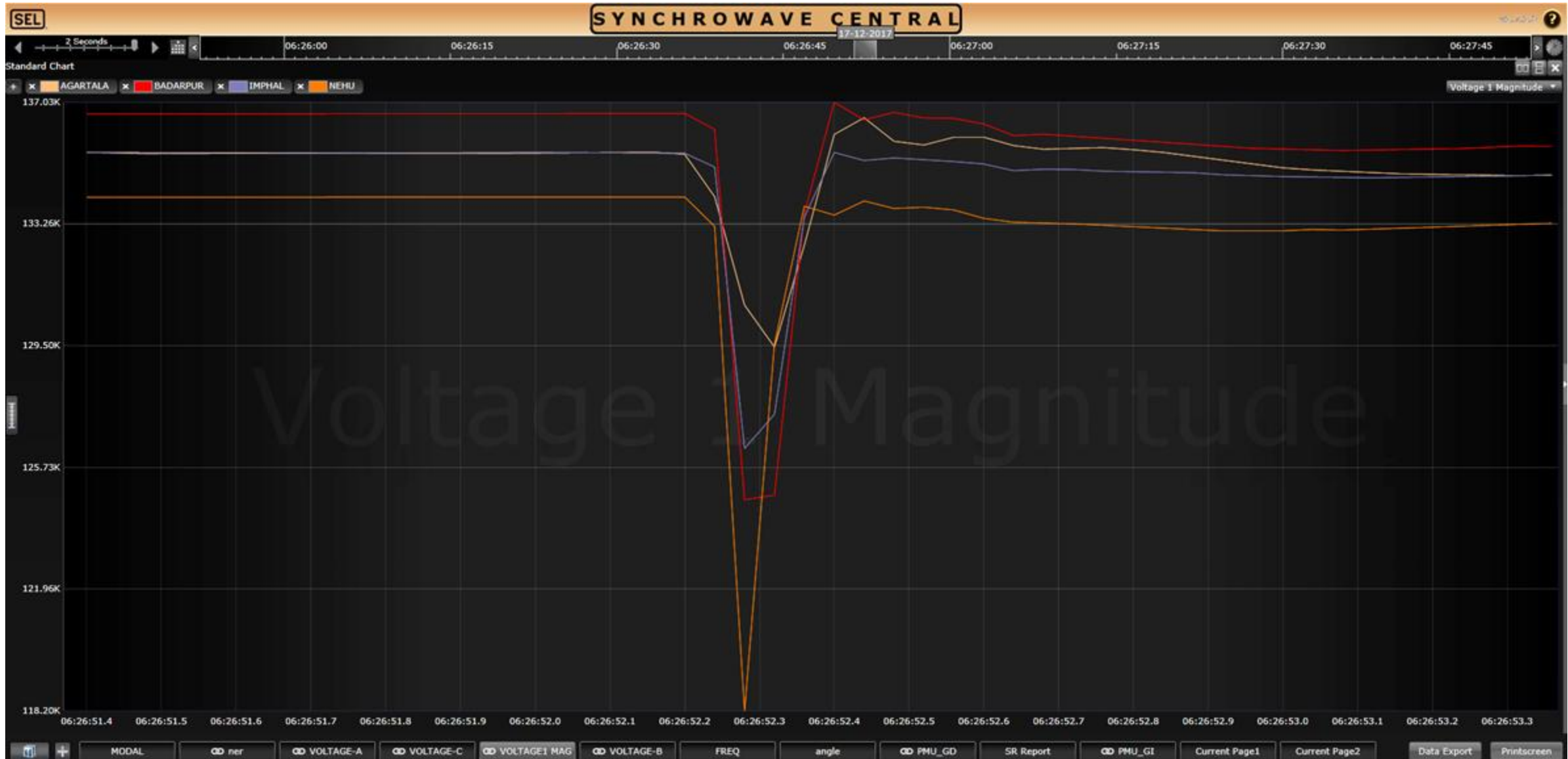


PMU Plots

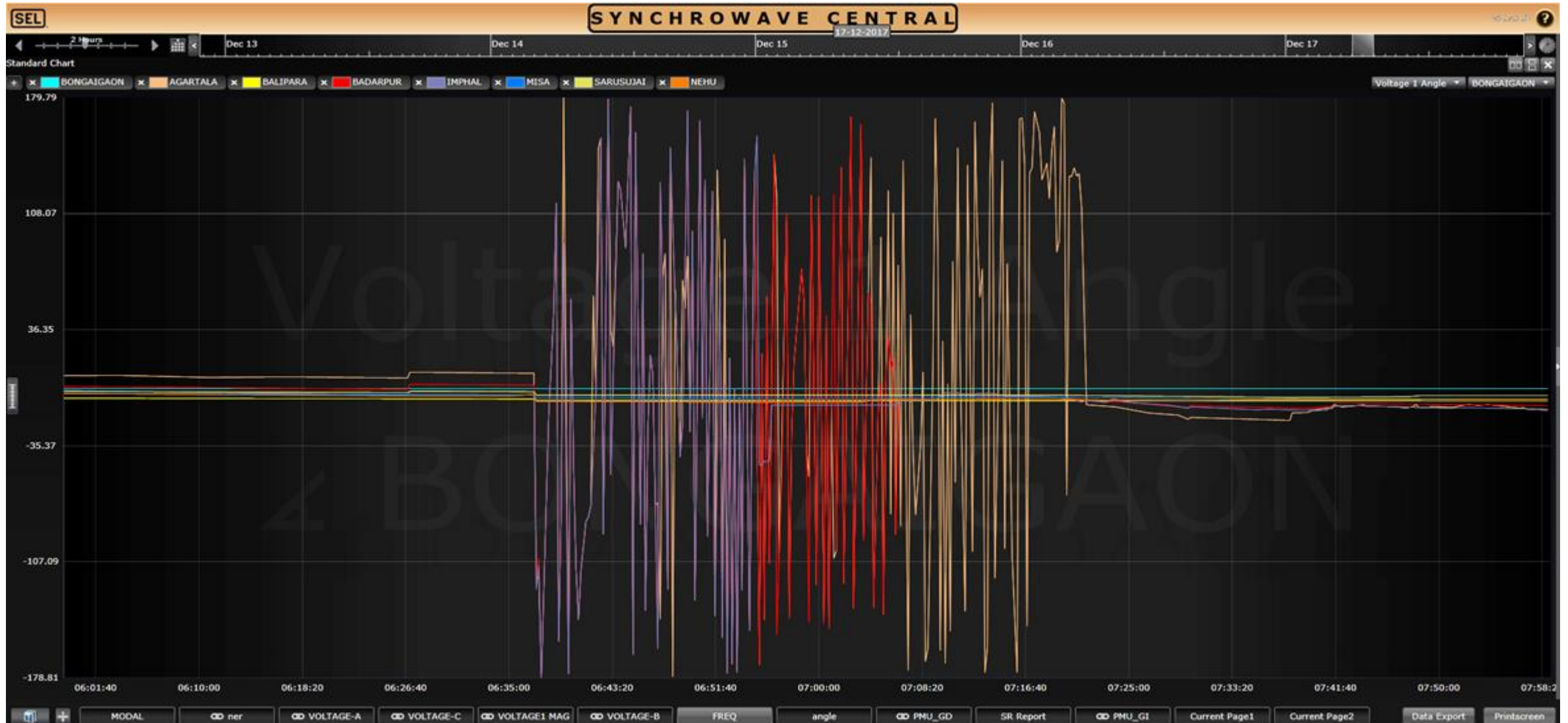
Isolation of Southern Part of NER Grid at 06:37:06:040 Hrs as observed in frequency plot of 132 kV Badarpur, Imphal and Agartala



Voltage of Agartala, Badarpur, Imphal and NEHU at the time of disturbance



Deviation in angle observed in 132 kV Badarpur, Imphal and Agartala PMU at the time of disturbance



Tripping of 400 kV Silchar- Byrnihat at 06:26 Hrs on 17.12.17



Tripping of 400 kV Silchar- Azara at 06:37 Hrs on 17.12.17



Non Operation of Island No. 2



- The frequency before grid disturbance was **50.02 Hz**.
- After the disturbance, the frequency as observed in **132 kV Badarpur -43.93 Hz**, **132 kV Imphal : 44.40 Hz** and **132 kV Agartala:46.05 Hz** (as per PMU Plots).
- During disturbance, total Generation of the Island: **224 MW** and Total Load of the Island : **159 MW**
- **Islanding Scheme comprising of AGTCCPP and Tripura Power System did not operate.**

Non Operation of SPS-3



- As per designed scheme, SPS-3 should operate during tripping of both 400 kV Silchar – Byrnihat line and 400 kV Silchar – Azara line.
- DT signal is to be sent from Silchar to Palatana in order to trip breakers of GTG-I and GTG-II at Palatana.
- During 138th OCC Meeting dated 24.11.17, it was informed that implementation of modified SPS-3 scheme is completed at Silchar, Azara, Byrnihat and Palatana end.
- **However during disturbance, DT signal was not sent by Silchar to Palatana.**

UFR Operation



- **Under Frequency Relay (UFR) based load shedding schemes are meant to provide relief to the power system in case of decline in frequency and arrest further decline.**
- **However, in the case of disturbance on 17th December, 2017, load relief from UFR based load shedding was not reported from Tripura, Mizoram and Manipur.**



**Thank
You!!!**

**North Eastern Region Power System Improvement
Project
(NERPSIP)
&
Comprehensive Scheme for strengthening of T&D
System in A.P**

Executive Summary

- **NER Power System Improvement Project (NERPSIP)**
(Assam, Manipur, Meghalaya, Mizoram, Nagaland & Tripura)
- **Project Cost: Rs. 5111.00 Crore** (Feb'14 PL);(Include LA/R&R payable by GoI)
- **Completion Sch.:** 48 months from release of funds (Dec'18).
- **Funding pattern - 50:50** (Govt. of India : The World Bank)
- **Consultancy Agreement** signed with all the State(s)

Loan	Amount (USD mill.)	Signing	Effective -ness	Closing	Projects
NERPSIP (Loan No-8631- IN)	470	28.11.16	15.12.16	31.03.23	NER Power System Improvement Project (NERPSIP) for six States (Assam, Manipur, Meghalaya, Mizoram, Tripura and Nagaland)

STATE WISE COST BREAK-UP NERPSIP (Feb 2014 price level)

Figures in Crore

State	Transmission	Distribution	Total
Assam	1075.06	383.91	1458.97
Manipur	219.58	207.80	427.38
Meghalaya	591.31	170.79	762.10
Mizoram	289.30	12.63	301.93
Nagaland	573.70	140.88	714.58
Tripura	695.11	662.26	1357.37
Total	3444.06	1578.27	5022.33
Capacity Building			89.00
Grand Total			5111.33

***Capacity Building Expenditure (To be funded by GoI through MoP)**

The above figure of Rs.5111.33 Cr includes POWERGRID Consultancy Fee.

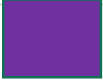
SCOPE UNDER NERPSIP:

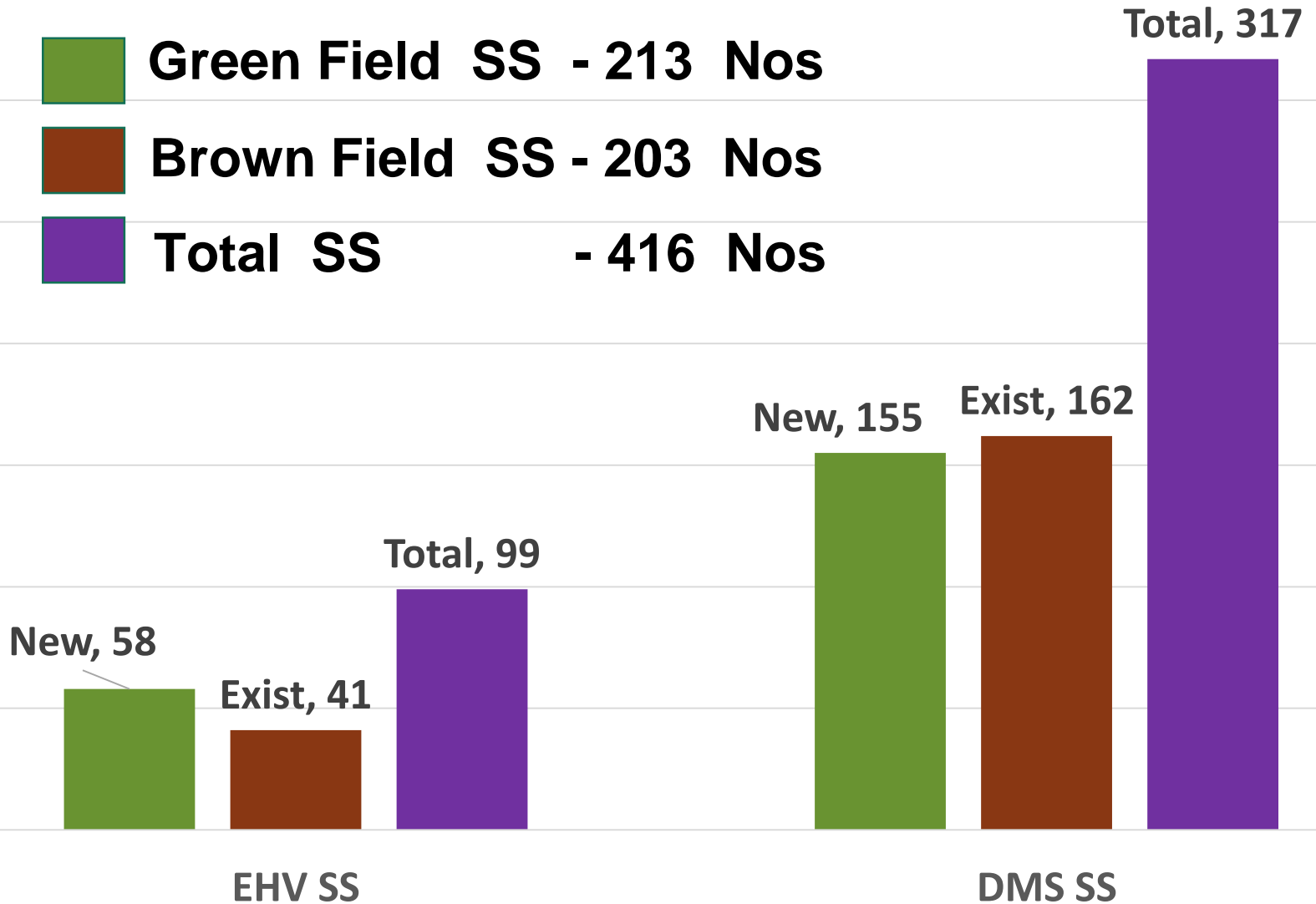
Transmission/ Sub-transmission (132kV & above)				Distribution (Not below 33kV)		
	Line (Ckm)	New S/s (No)	Total MVA (New & Augmentation)	Line Ckm)	New S/s (No)	Total MVA (New & Augmentation)
Assam	376	11	1644	479	16	240
Manipur	317	2	160	111	13	229.4
Meghalaya	416	4	940	263	11	135
Mizoram	214	3	125	5.2	1	6.3
Nagaland	376	5	245	76.5	10	190
Tripura	415	9	1306.5	1096	34	450.5
Total	2114	34	4420.5	2030.7	85	1251.2

Salient Points- Comp Scheme, AP

- **Gol Approval** : **October, 2014**
- **MOU Signed** : **Feb, 2015**
- **Total Estimated Cost** : **3199.45 Crore**
- **Funding of the Project** : **GOI**
- **No. of Sub-stations** : **94**
EHV (132kV)- 24 nos., 529MVA
Distribution (33kV)- 70 nos., 465MVA)
- **No. of Trans. Lines (Km)** : **EHV - 29 nos. (1917 Km),**
Distribution-70 nos. (1923 Km)
- **Schedule Completion** : **Dec, 2018**
- **Anticipated Completion** : **Dec, 2019**

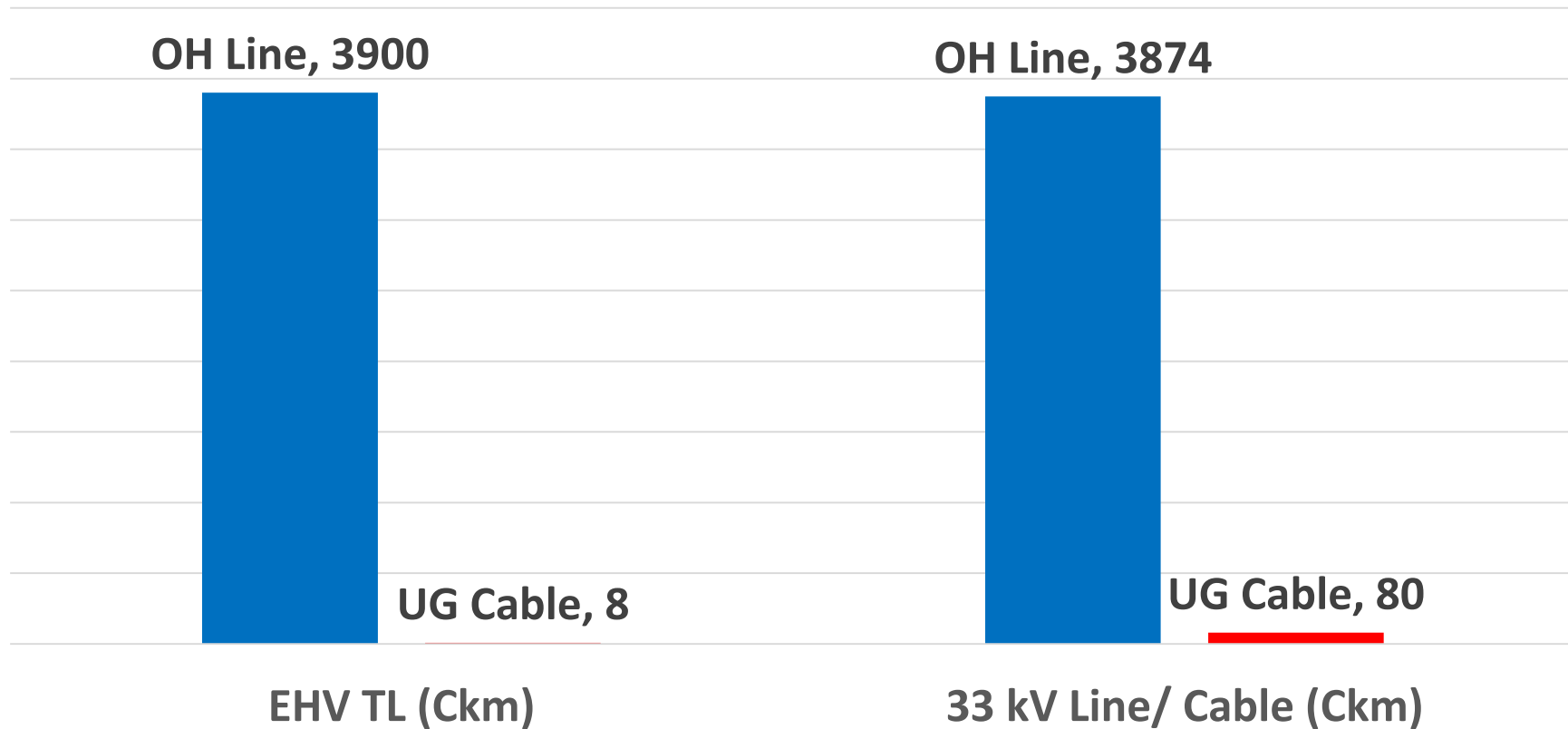
Scope: Substations

-  **Green Field SS - 213 Nos**
-  **Brown Field SS - 203 Nos**
-  **Total SS - 416 Nos**



Scope: OH Lines / UG Cables

 Overhead Lines – 7774 Kms
 Under Ground Cable - 88 Kms



OVERALL PROCUREMENT STATUS- NERPSIP

STATE	ASSAM	MANIPUR	MEGHALAYA	MIZORAM	NAGALAND	TRIPURA	MIXED*	TOTAL
TOTAL	15	7	7	3	10	11	2	55
AWARDED	13	4	7	3	6	11	0	44
UNDER AWARD	0	3	0	0	3	0	0	6
UNDER EVALUATION	0	0	0	0	1	0	0	1
TENDER TO BE OPENED	1	0	0	0	0	0	2	3
TO BE TENDERED	1	0	0	0	0	0	0	1

****One TL package is combined for Nagaland & Manipur and one Communication Equipment Package is combined for all DMS works (except for Meghalaya)**

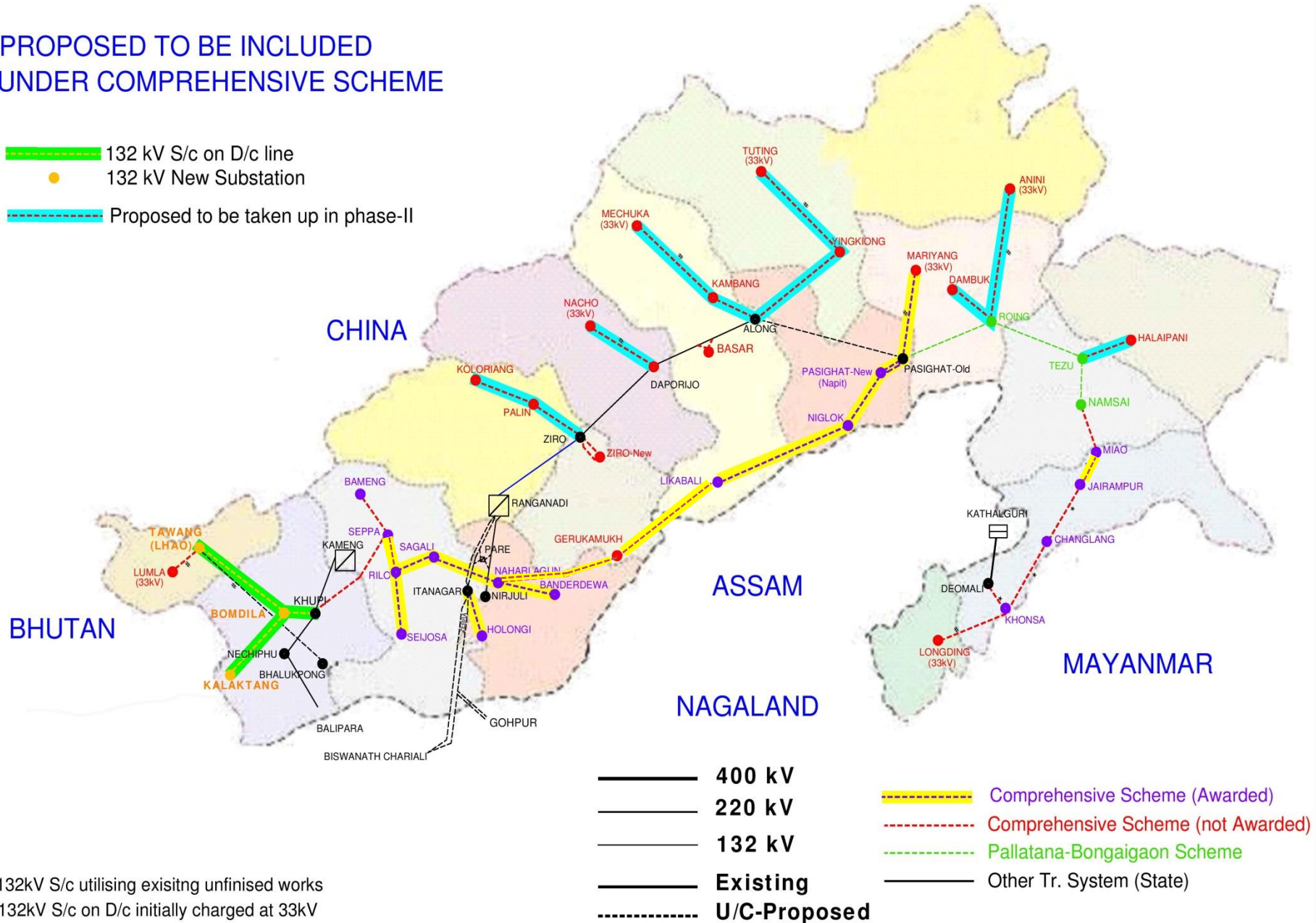
Award Status- Comp Scheme, AP

S. N	Package Status	Nos.
1.	Total packages	37
2.	Awarded	20
3.	Tendering/ re-tendering	17

Comprehensive Strengthening Scheme : Arunachal Pradesh

PROPOSED TO BE INCLUDED
UNDER COMPREHENSIVE SCHEME

- 132 kV S/c on D/c line
- 132 kV New Substation
- - - - - Proposed to be taken up in phase-II



* 132kV S/c utilising existitng unfinisng works
132kV S/c on D/c initially charged at 33kV

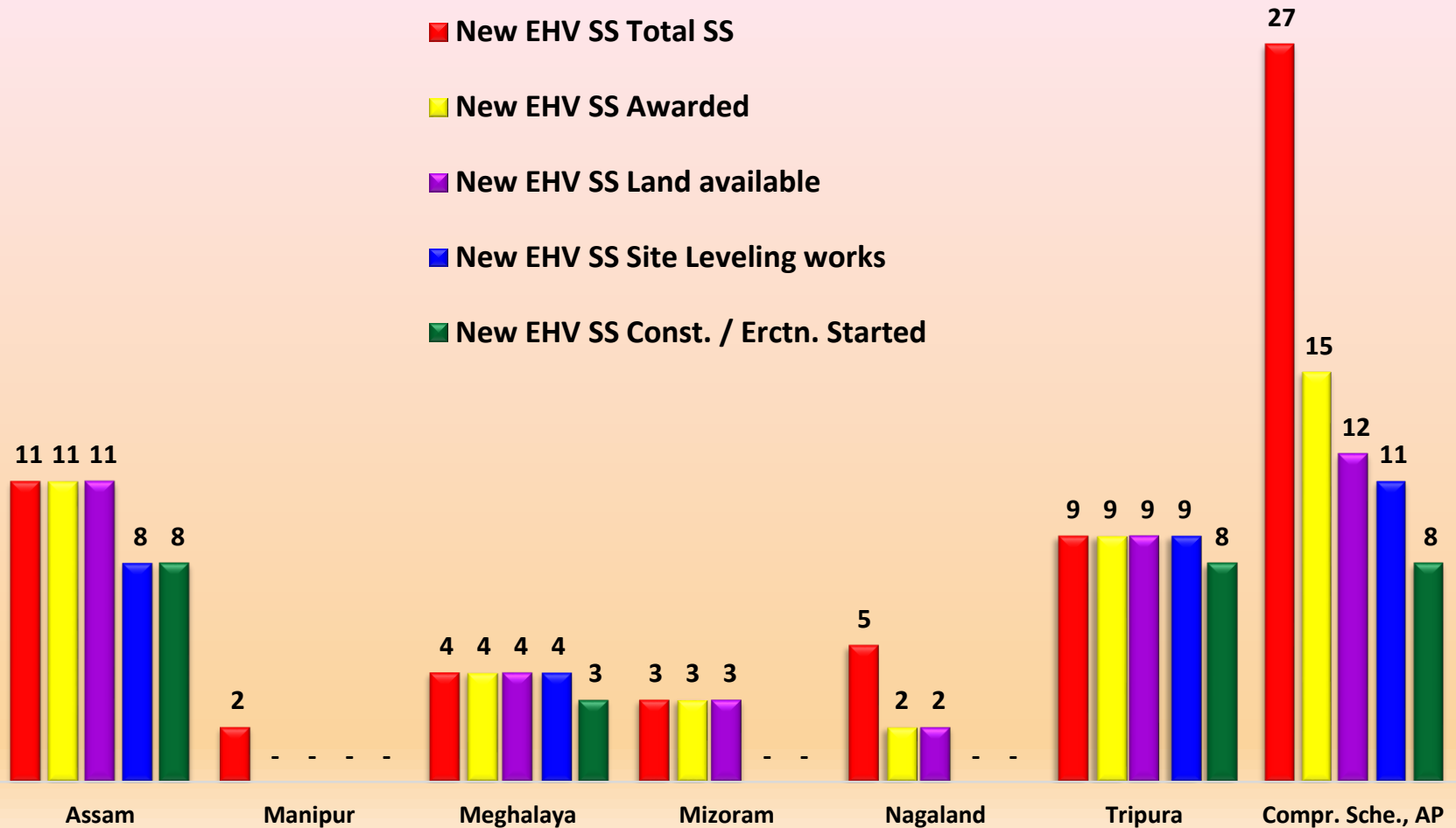
Status at a Glance

Rs. in Cr.

State	Project Cost	Awarded Cost (As on 30-11-17)	Overall Project Progress (%)	Remarks
Assam	1473.80	961.31	15%	
Meghalaya	776.93	518.04	25%	All awarded
Manipur	442.22	204.05	20%	
Tripura	1372.20	1086.95	8%	All awarded
Nagaland	729.42	241.04	6%	
Mizoram	316.76	191.21	5%	All awarded
Arunachal Pradesh	3,199.45	1,662.44	5%	
Total	8,310.78	4,865.05		

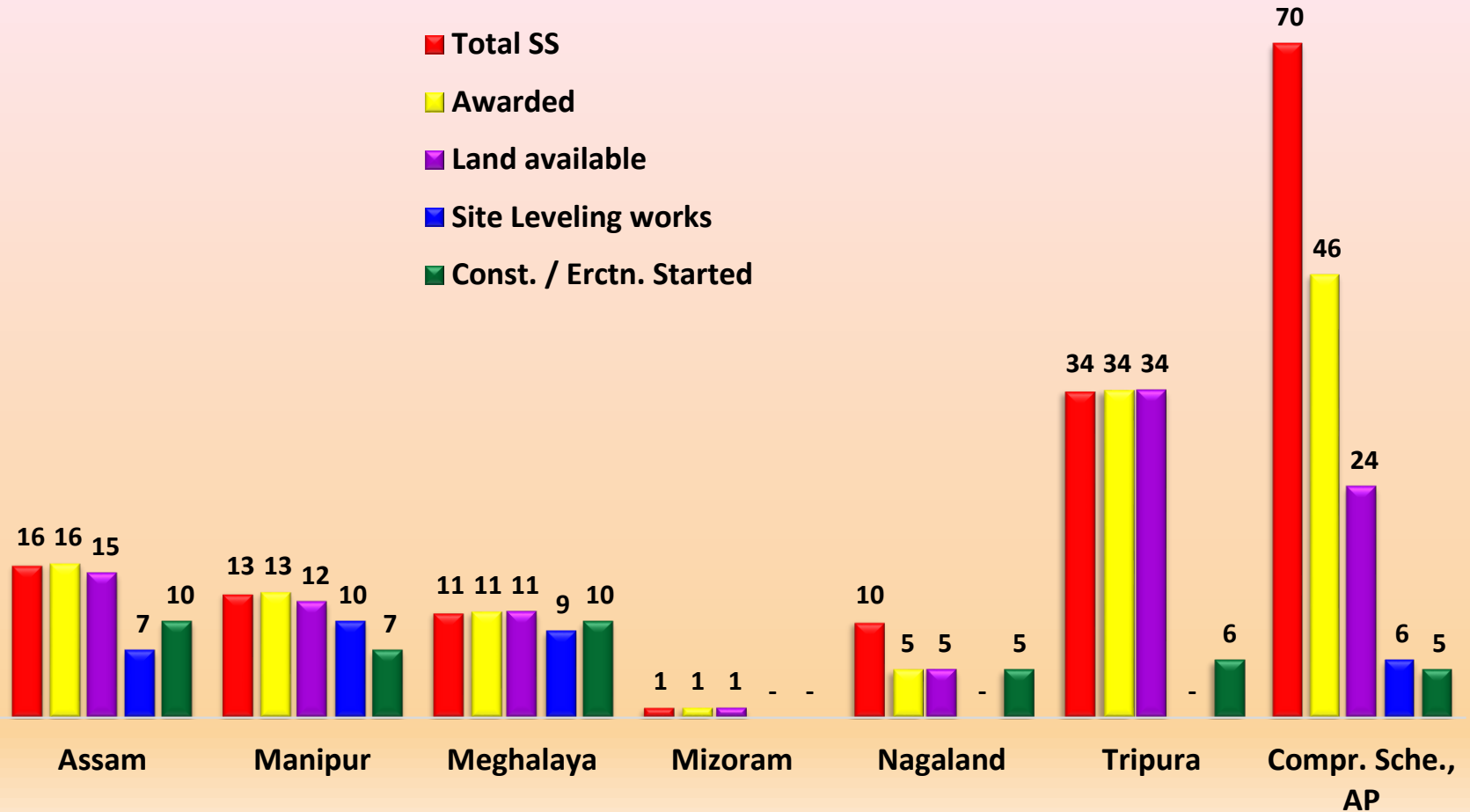
NERPSIP and Comp. T&D Scheme of Ar. Pradesh - at a Glance

New EHV Substation - Overall Work Status

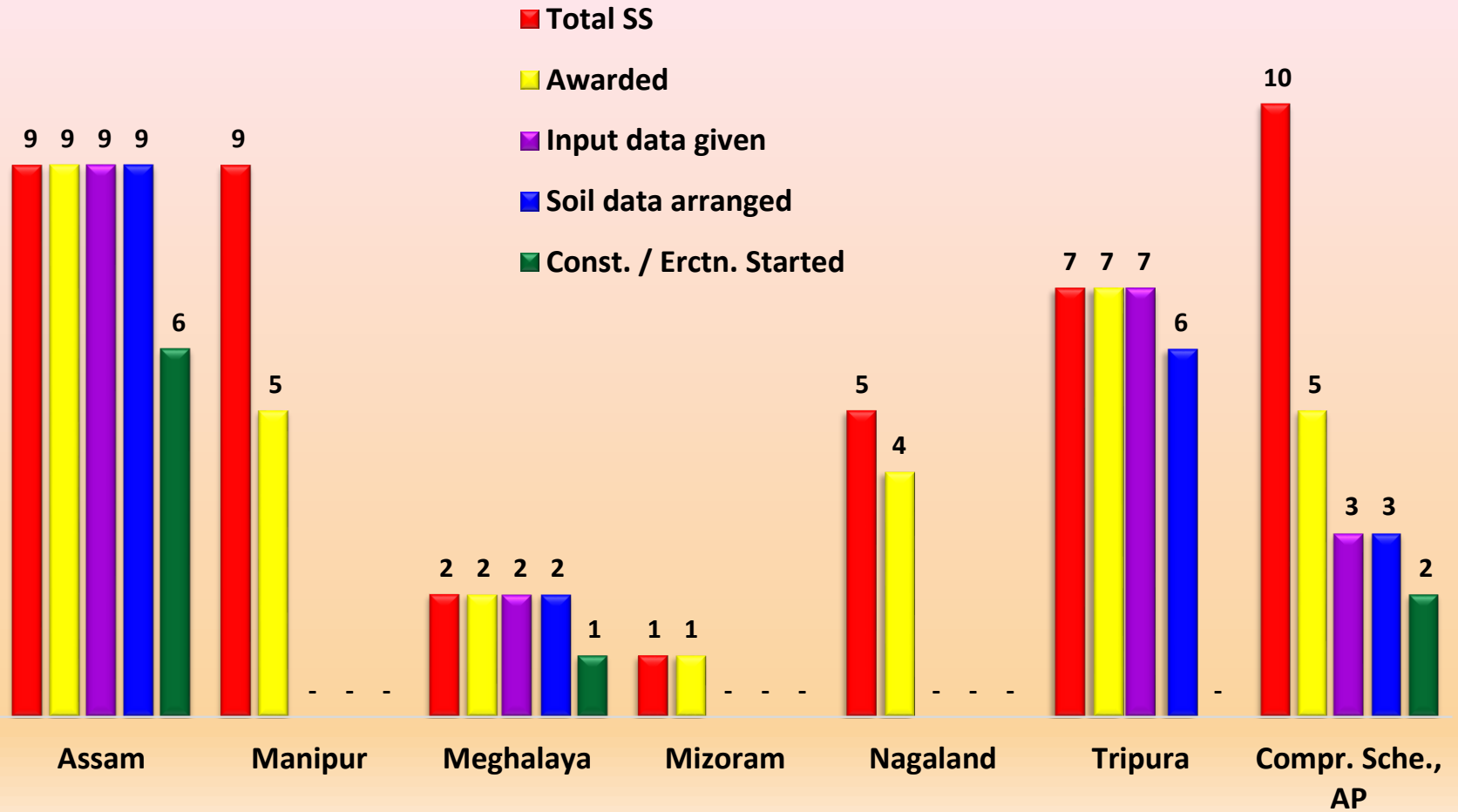


NERPSIP and Comp. T&D Scheme of Ar. Pradesh - at a Glance

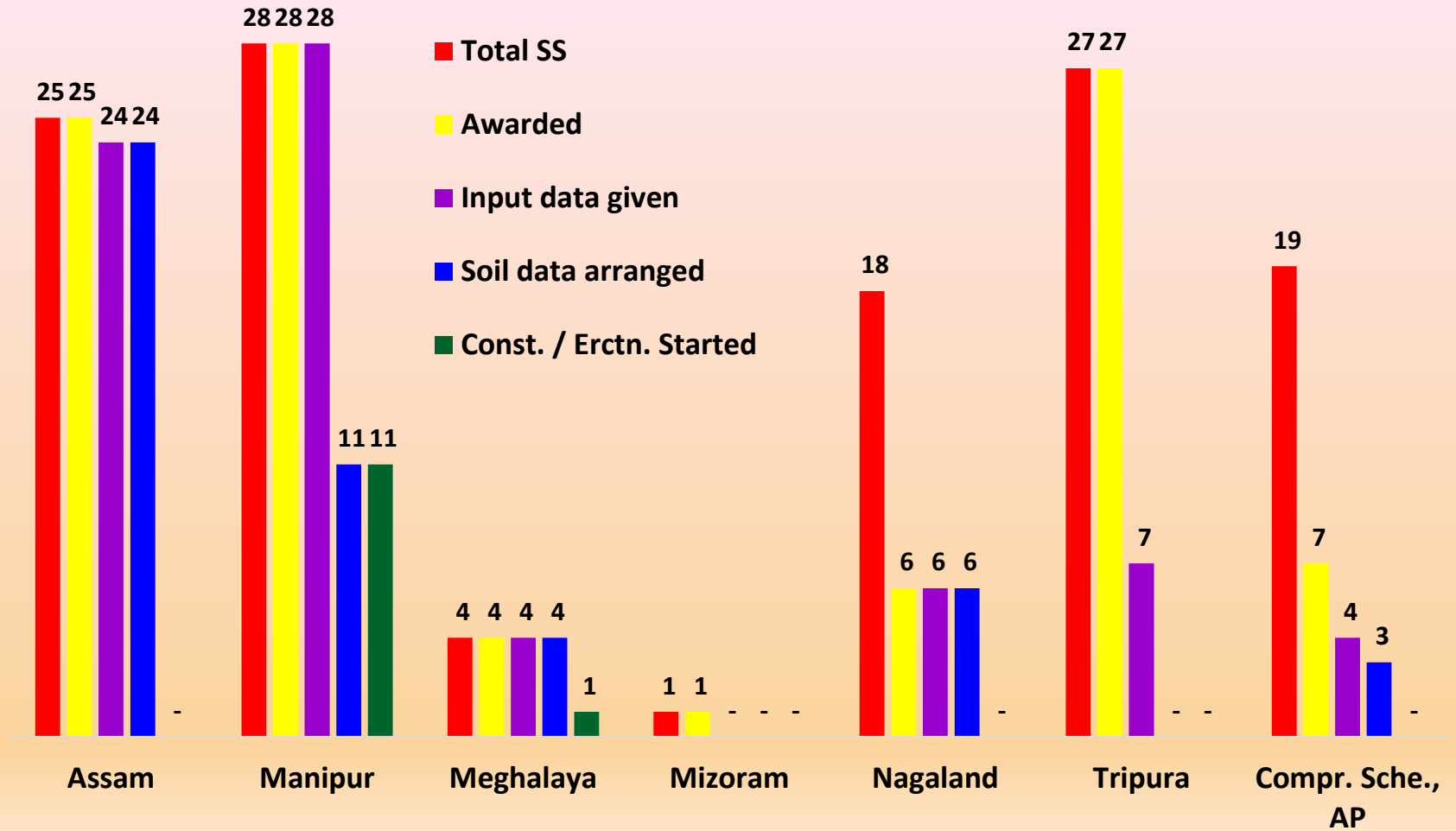
New DMS Substation - Overall Work Status



EHV Ext. / Aug. Substation - Overall Work Status

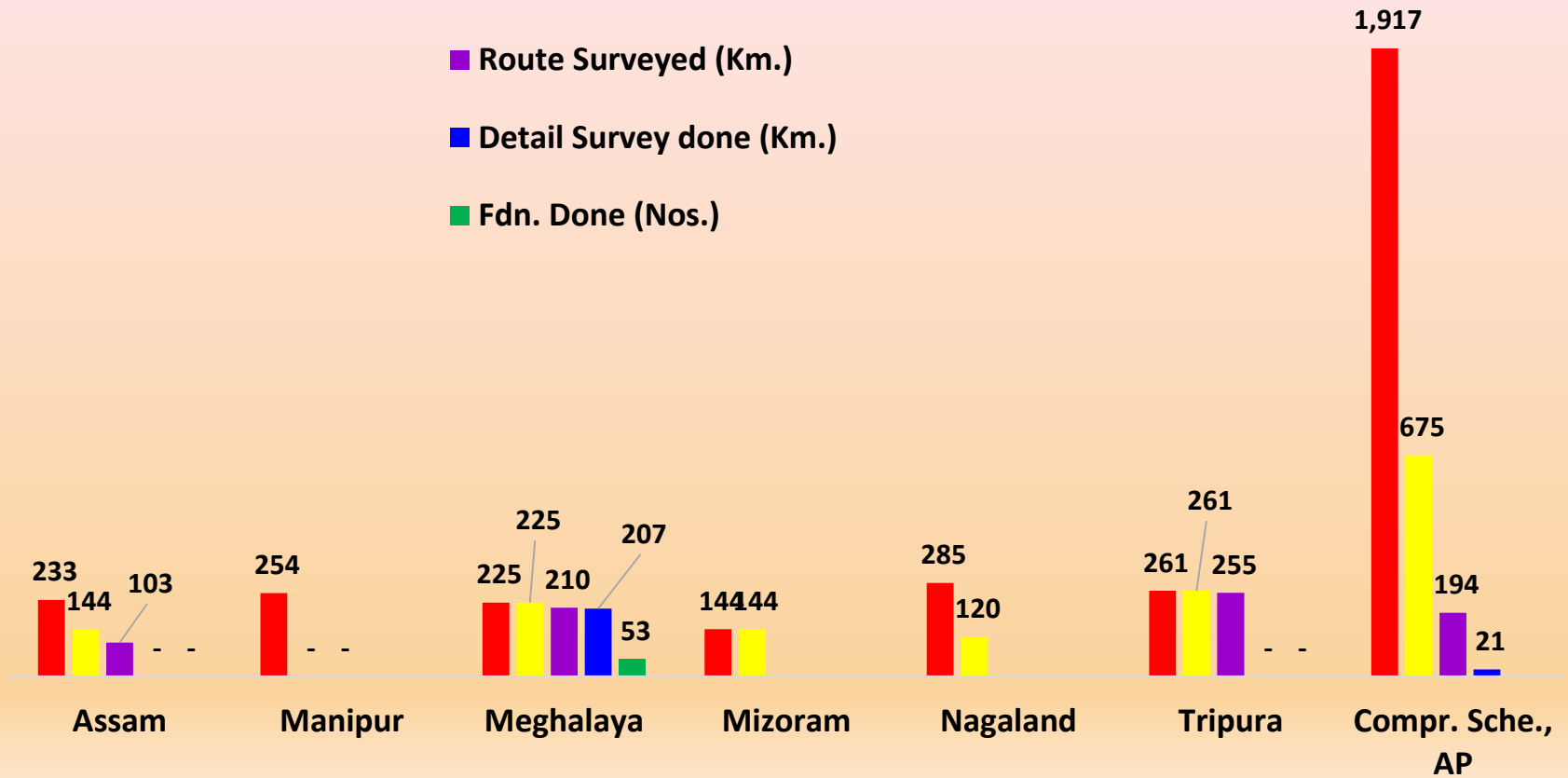


DMS Ext. / Aug. Substation - Overall Work Status

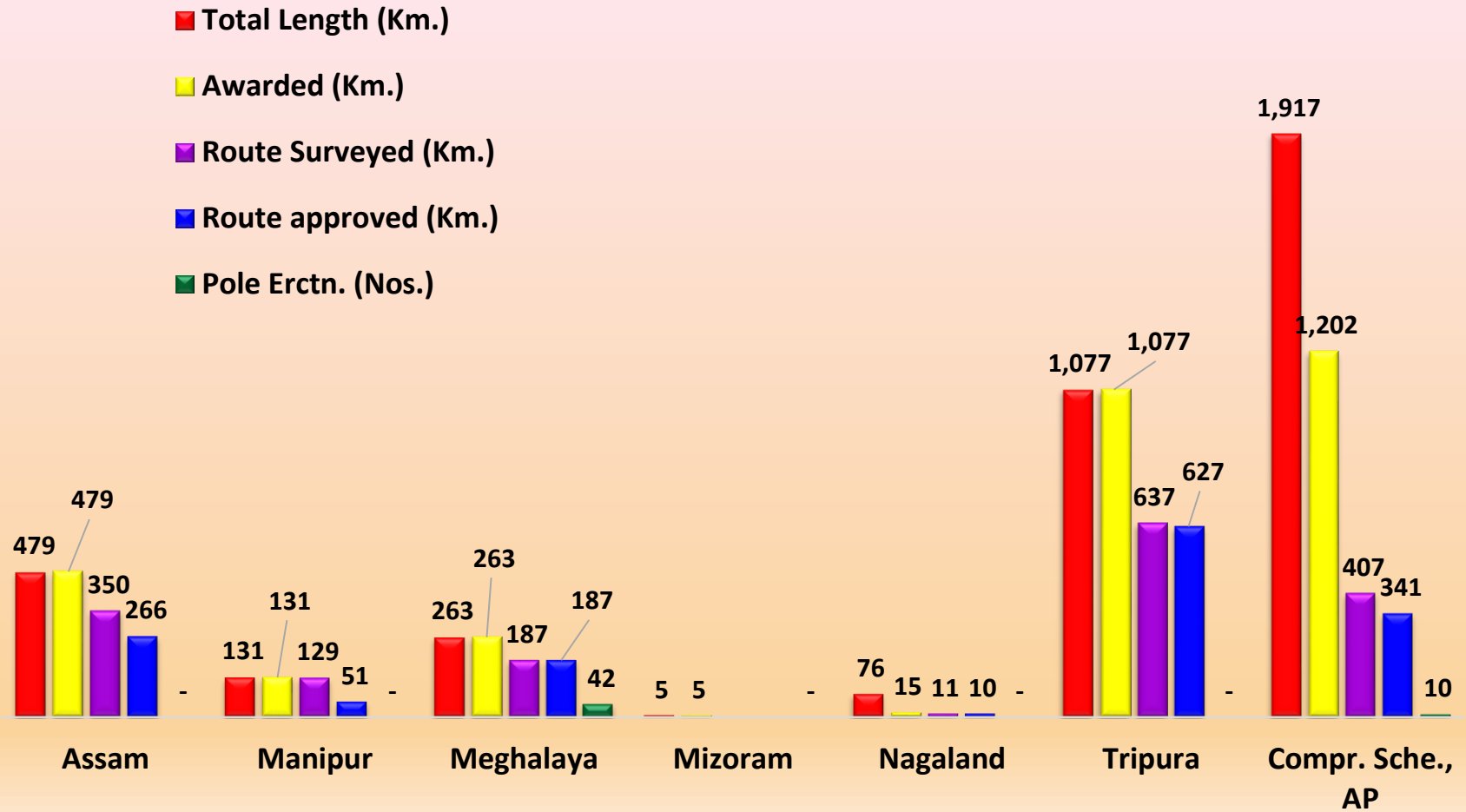


EHV Lines - Overall Work Status

- Total Length (Km.)
- Awarded (Km.)
- Route Surveyed (Km.)
- Detail Survey done (Km.)
- Fdn. Done (Nos.)



DMS Lines - Overall Work Status



Thank you!



Detail award Status of Assam

Sl. No.	Pkg. Name	Date of NOA	Name of Agency	Completion Schedule
1	ASM DMS01	20.10.2016	Neccon Power & Infra Ltd.	20.07.2019
2	ASM DMS02	23.12.2016	Sterling & Wilson Pvt. Ltd	23.09.2019
3	ASM DMS03	23.12.2016	Sterling & Wilson Pvt. Ltd	23.09.2019
4	ASM DMS04	08.07.2016	Neccon Power & Infra Ltd., Jorhat	08.04.2019
5	ASM P01	18.09.2017	Meher Foundation & Civil Engg. Pvt. Ltd.	18.03.2020
6	ASM SS01	12.08.2016	Neccon Power & Infra Ltd.	12.08.2019
7	ASM SS02	12.08.2016	Neccon Power & Infra Ltd.	12.08.2019
8	ASM SS03	12.08.2016	Neccon Power & Infra Ltd.	12.08.2019
9	ASM SS04 (GIS)	06.05.2016	JV Techno & Seiyuan	06.03.2019
10	ASM TR01	08.09.2016	T & R (India) Ltd., Ahmedabad	08.06.2019
11	ASM TW02	10.10.2017	Power Mech Projects Ltd.	10.04.2020
12	ASM TW04	08.09.2017	Teems India Towerlines Private Ltd.	08.03.2020
13	ASM TW05	01.09.2017	Power Mech Projects Ltd.	01.03.2020

Detail award Status of Meghalaya



Sl. No.	Pkg. Name	Date of NOA	Name of Agency	Completion Schedule
1	MEG DMS01	13.07.2016	M/s Neccon Power & Infra Ltd, Jorhat	13.04.2019
2	MEG DMS02	27.05.2016	M/s Neccon Power & Infra Ltd, Jorhat	27.02.2019
3	MEG DMS03	27.05.2016	M/s Neccon Power & Infra Ltd, Jorhat	27.02.2019
4	MEG SS01	12.08.2016	M/s Neccon Power & Infra Ltd, Jorhat	12.08.2019
5	MEG SS02 (GIS)	06.06.2016	M/s Techno Electric & Engineering Company Ltd., Kolkata	06.04.2019
6	MEG TW01	29.06.2016	M/s Unique Structures & Towers Ltd, Bhilai	29.06.2019
7	MEG TW02	29.06.2016	M/s Unique Structures & Towers Ltd, Bhilai	29.06.2019

Detail award Status of Tripura



Sl. No.	Pkg. Name	Date of NOA	Name of Agency	Completion Schedule
1	TRP DMS01	22.02.2017	Technofab Engg. Ltd., Faridabad	22.11.2019
2	TRP DMS02	20.01.2017	Technofab Engg. Ltd., Faridabad	20.10.2019
3	TRP DMS03	22.02.2017	Technofab Engg. Ltd., Faridabad	22.11.2019
4	TRP DMS04	20.01.2017	Technofab Engg. Ltd., Faridabad	20.10.2019
5	TRP DMS05	22.02.2017	Technofab Engg. Ltd., Faridabad	22.11.2019
6	TRP SS01	04.11.2016	SPML Infra Ltd., Kolkata	04.11.2019
7	TRP SS02	04.11.2016	SPML Infra Ltd., Kolkata	04.11.2019
8	TRP SS03	04.11.2016	SPML Infra Ltd., Kolkata	04.11.2019
9	TRP TW01	12.06.2017	EMC Limited, Kolkata	12.02.2020
10	TRP TW02	12.06.2017	EMC Limited, Kolkata	12.02.2020
11	TRP TW03	12.06.2017	EMC Limited, Kolkata	12.02.2020

Detail award Status of Nagaland



Sl. No.	Pkg. Name	Date of NOA	Name of Agency	Completion Schedule
1	NAG DMS-03	22.09.2016	Sterling & Wilson Pvt. Ltd., Kolkata	22.06.2019
2	NAG DMS-04	22.09.2016	Sterling & Wilson Pvt. Ltd., Kolkata	22.06.2019
3	NAG TW-01	21.09.2017	Shyama Power India Ltd.	21.03.2020
4	NAG TW-05	21.09.2017	Shyama Power India Ltd.	21.03.2020
5	NAG SS-02	30-11-2017	Power Mech Projects Ltd.	30.05.2020
6	NAG SS-04	13-12-2017	Power Mech Projects Ltd.	13-06-2020

Detail award Status of Mizoram



Sl. No.	Pkg. Name	Date of NOA	Name of Agency	Completion Schedule
1	MIZ SS01	02.11.2017	KSA Power Infra Pvt. Ltd.	02.05.2020
2	MIZ SS02	13.10.2017	S&W	13.04.2020
3	MIZ TW01	27.09.2017	KSA Power Infra Pvt. Ltd.	27.03.2020

Detail award Status of Manipur

Sl. No.	Pkg. Name	Date of NOA	Name of Agency	Completion Schedule
1	MAN DMS01	03.03.2017	Winpower Infra Pvt. Ltd.	03.12.2019
2	MAN DMS02	16.12.2016	Winpower Infra Pvt. Ltd.	16.09.2019
3	MAN DMS03	18.03.2016	Siddartha Engg	18.12.2018
4	MAN DMS04	18.03.2016	Siddartha Engg	18.12.2018

Award Status - Substations



	Total no. of S/S	Status
EHV Substations	27 (3 nos. newly added)	15 Awarded 12 Under tendering
Distribution Substations	70	46 Awarded 24 Under tendering
Total	97	61 Awarded

Land Availability Status

		Available
EHV Substations	27	15
Distribution Substations	70	23
Total	97	38

Award Status – Transmission Lines



Total No. of EHV Lines	29 (1917 km)
Total No. of Distribution Lines	70 (1923 km)

EHV lines awarded

Rilo – Seijosa (85 km)
Rilo – Sagali (55 km)
Niglok – Napit (47 km)
Likabali – Niglok (75 km)
Napit – Pasighat (5 km)
Chimpu – Holongi (35 km)
Pasighat – Mariyang (80 km)
Sagali – Naharlagun (45 km)
Naharlagun – Banderdewa (10 km)
Seppa - Rilo (56 km)
Jairampur – Miao (40 km)
Gerukamukh – Likabali (60 km)
Naharlagun – Gerukamukh (90 km)

**13
(675 Kms)**

Lines being Awarded

Miao – Namsai (45 km)

1 (45 Kms)

NIT annulled due to High Price – Being Re-tendered

Deomali – Khonsa (40 km)
Khonsa – Longding (45 km)
Khonsa – Changlang (45 km)
Changlang – Jairampur (60 km)
Ziro(PG) – Ziro(new) (2 km)
LILO of Daporijio-Along line at Basar (5 km)

**6
(197 km)**

Award Status – Transmission Lines



NIT Re-issued (Earlier NIT annulled due to High Price)

Khupi – Seppa (60 km) Seppa – Bameng (40 km) Tawang – Lumla (40 km)	3 (140 km)
Khupi – Bomdila (60 km) * Bomdila – Tawang (100 km) * Bomdila – Kalakthang (42 km) * * New Elements	3 (202 km)

Lines to be taken up later

Ziro – Palin - Koloriang (125 km) Daporijo – Nacho (85km) Along - Kambang – Mechuka (170km) Along - Yingkiong – Tuting (207km) Dambuk - Roing - Anini (165km) Tezu – Halaipani (100 km)	6 (852 km)
--	------------------------------

Award Status – DMS Lines



Total Nos. (Kms) of Distribution Lines	70 (1923 Kms)
Awarded Distribution Lines	45 Nos. (1202 Kms)

1.0 Transmission / Sub-transmission

220kV and 132kV Lines	11 nos., 376 ckm. (including 5 LILOs)
220/132kV Sub-Station	2 nos. – New, 520MVA 1 no. – Augmentation, 320MVA
132/33 kV Sub-Station	9 nos. – New, 664MVA 2 nos. – Augmentation, 140MVA

2.0 Distribution

33 kV Line	479 ckm.
33/11 kV Sub-Station	16 nos., 240MVA

3.0 Cost

	<i>Feb., 2014 price level</i>
Total	Rs. 1473.80 Cr.
<i>Trans/Sub-trans</i>	<i>Rs. 1082.48 Cr.</i>
<i>Distribution</i>	<i>Rs. 391.32 Cr.</i>

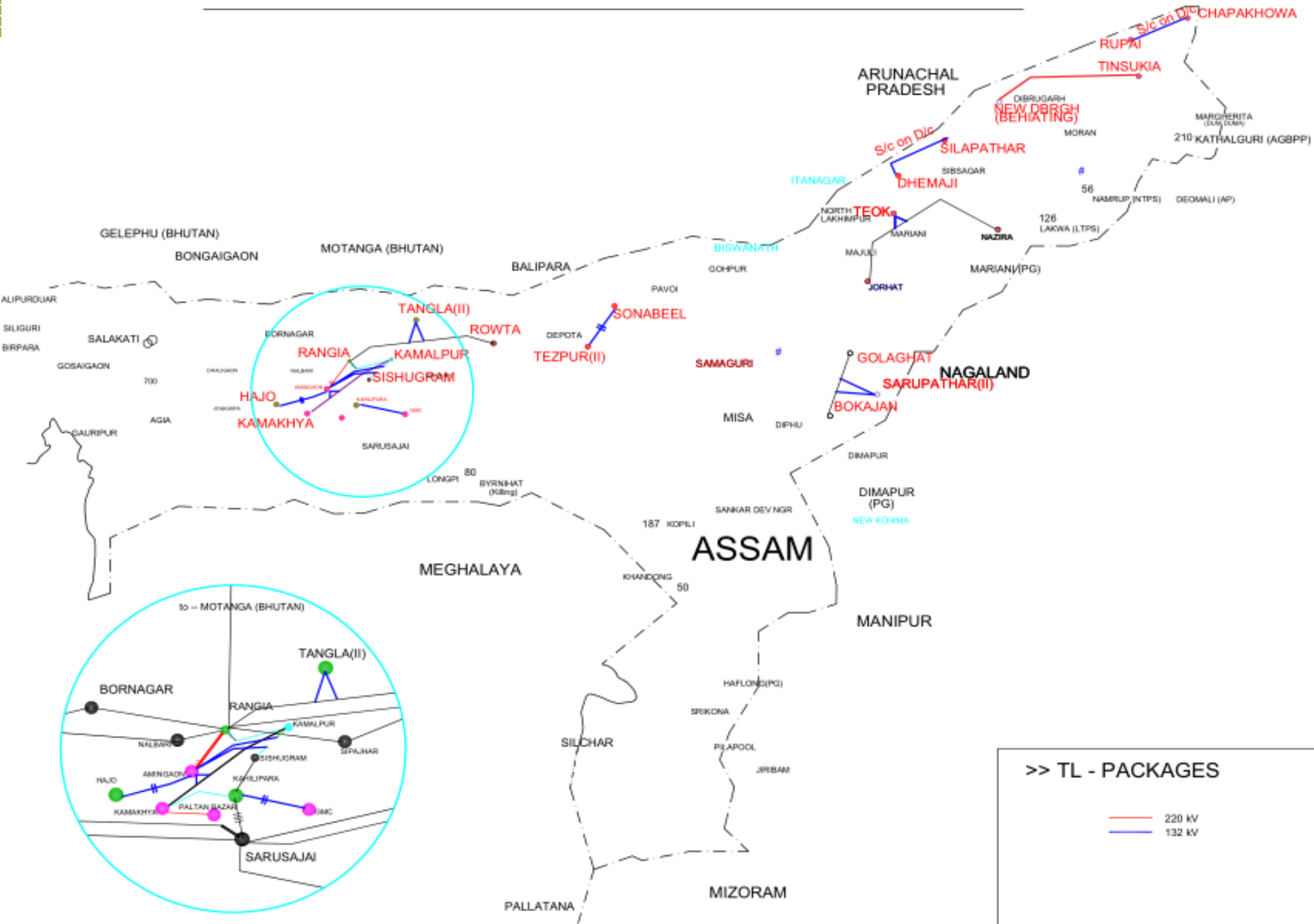
EHV Substations

SN	Name of Substation	Voltage levels (kV)	Transformation Capacity (in MVA)
New Substation			
1	Behiating (Dibrugarh)	220/132/33	3-Ph, 2X100
2	Amingaon	220/132/33	3-Ph, 2X160
3	Guwahati Medical College	132/33	3-Ph, 2X50
4	Paltanbazar	132/33	3-Ph, 2X50
5	Silapathar	132/33	3-Ph, 2X31.5
6	Tezpur	132/33	3-Ph, 2X50
7	Chapakhowa	132/33	1-Ph, 4X8.33
8	Sarupathar	132/33	3-ph, 2X31.5
9	Teok	132/33	3-Ph, 2X31.5
10	Tangla	132/33	3-Ph, 2X31.5
11	Hazo	132/33	3-Ph, 2X31.5
Augmentation Substation			
12	Samaguri	220/132	Repl. 3-Ph, 2X160
		132/33	3-ph, 1X50MVA
13	Dhaligaon	132/33	Repl. 3-Ph, 1X25
		132/33	Addl. 3-Ph, 1X50

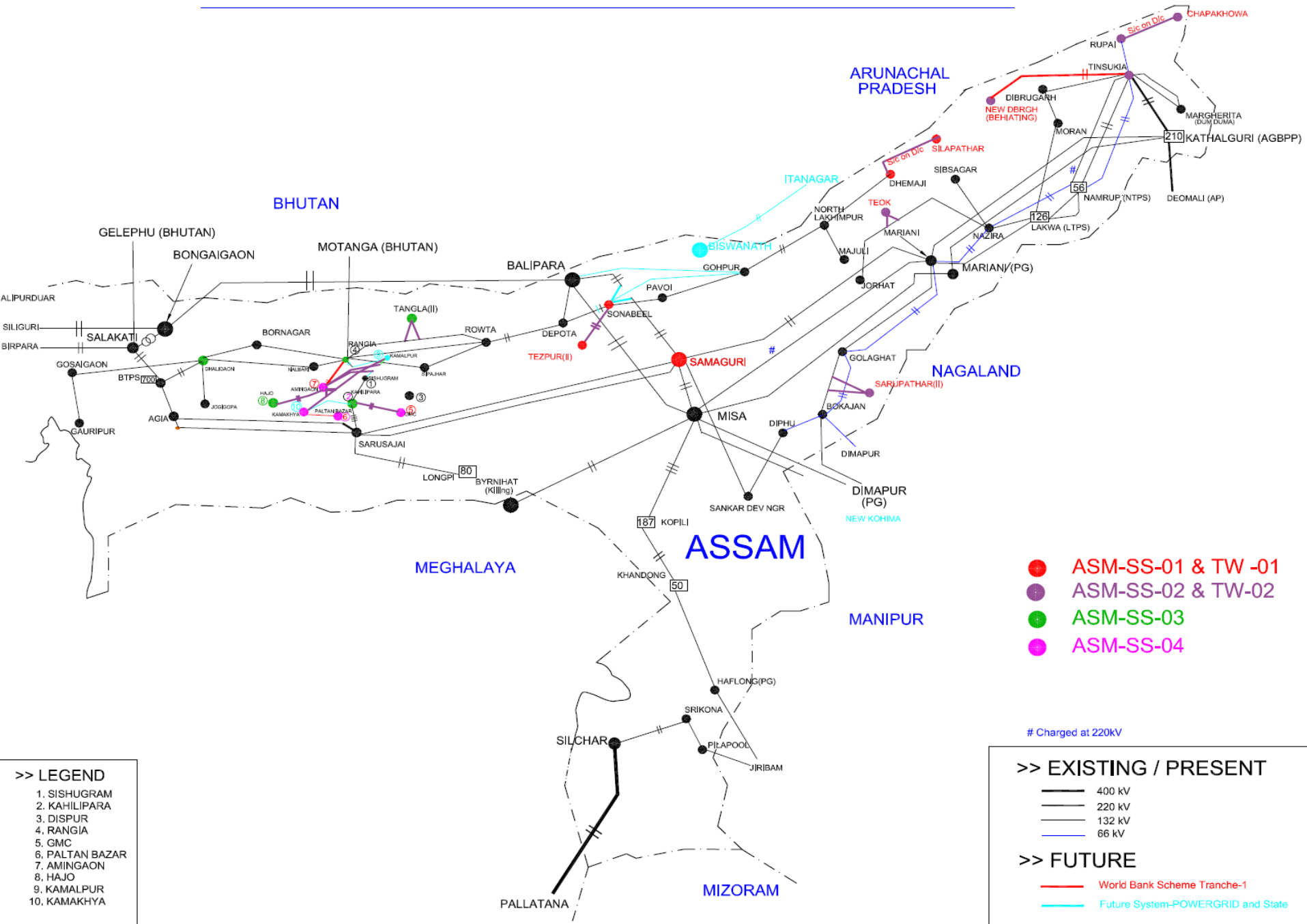
TRANSMISSION LINES

SN	Name of the Line / Element	Voltage Level (kV)	No. of Circuits	Total length (in Kms)
1	Rangia-Amingaon	220	D/C	33.00
2	Tinsukia-Behiating	220	D/C	55.00
3	Kahilipara-Guwahati Medical College	132	D/C	3.00
4	Rupai-Chapakhowa	132	S/C (on D/C tower)	53.00
5	Dhemaji-Silapathar	132	S/C (on D/C tower)	36.00
6	Amingaon-Hazo	132	D/C	16.00
7	LILO of Rangia-Rowta at Tangla	132	S/C	10.00
8	LILO of Golaghat-Bokajan at Sarupathar	132	S/C	5.00
9	Sonabil-Tezpur	132	D/C	15.00
10	LILO of Jorhat-Nazira at Teok	132	S/C	5.00
11	LILO of Kamalpur-Sishugram at Amingaon	132	S/C	1.00
12	LILO of Kamalpur-Khamakhya at Amingaon	132	S/C	1.00

World Bank Funded Scheme : Assam



World Bank Funded Scheme : Assam



□ Meghalaya Scheme

1.0 Transmission / Sub-transmission

220kV and 132kV Lines	3 nos., 416 ckm. (including 1 LILO)
220/132/33kV Sub-Station	1 no. – New, 320MVA + 100MVA
220/132kV Sub-Station	1 no. – New, 320MVA
132/33 kV Sub-Station	2 nos. – New, 200MVA

2.0 Distribution

33 kV Line	263 ckm.
33/11 kV Sub-Station	11 nos., 135MVA

3.0 Cost

	<i>Feb, 2014 price level</i>
Total	Rs. 776.93 Cr.
<i>Trans/Sub-trans</i>	<i>Rs. 598.73 Cr.</i>
<i>Distribution</i>	<i>Rs. 178.21 Cr.</i>

□ Meghalaya Scheme

EHV Substations

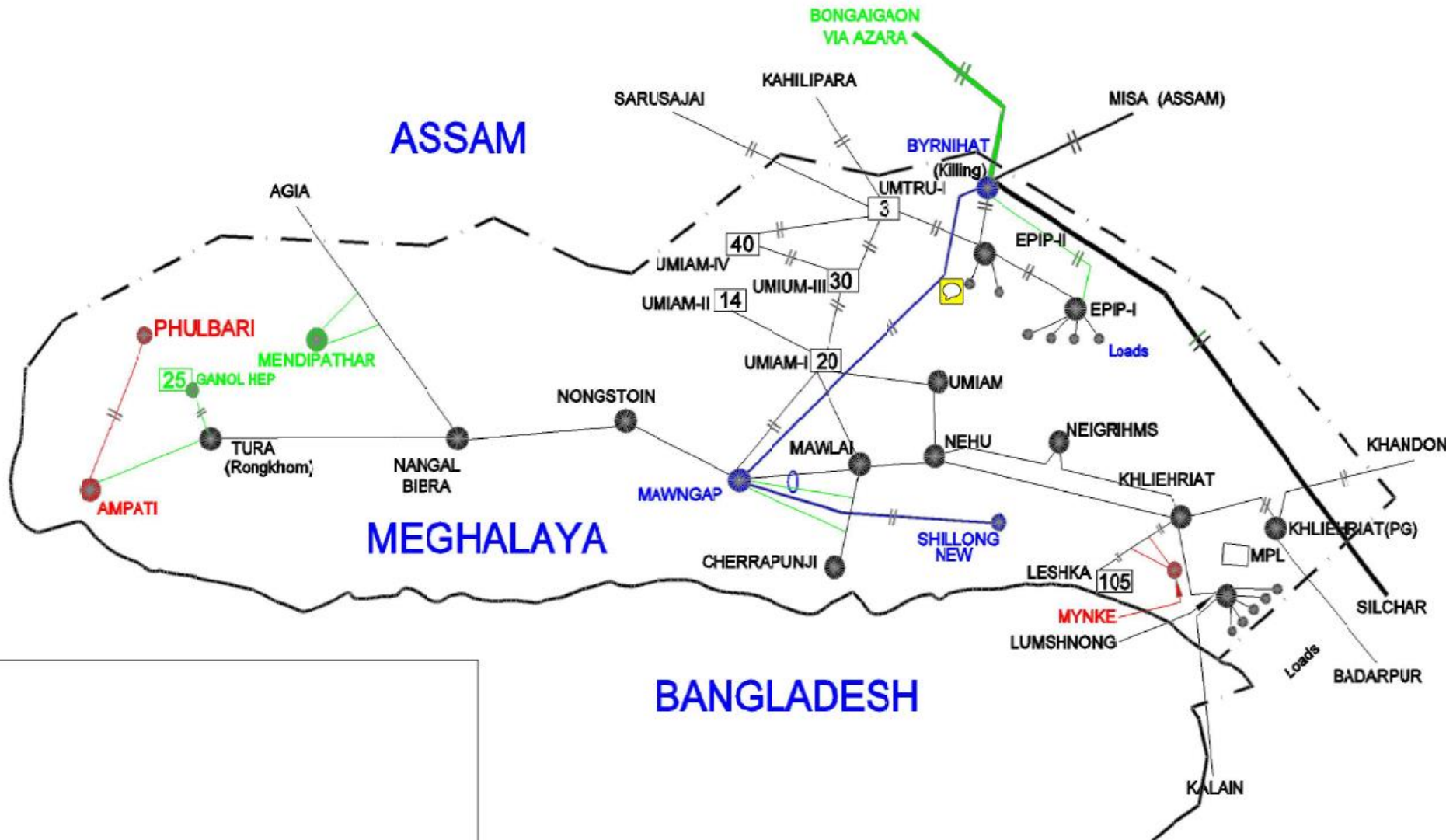
SN	Name of Substation	Voltage levels (kV)	Transformation Capacity (in MVA)
	New Substation		
1	New Shillong	220/132/33	3-Ph, 2X160
		132/33	3-Ph, 2X50
2	Mynkre	132/33	3-Ph, 2X50
3	Phulbari	132/33	3-Ph, 2X50
	Augmentation/ Upgrade Substation		
4	Mawngap	220/132/33	3-Ph, 2X160

□ Meghalaya Scheme

TRANSMISSION LINES

SN	Name of the Line / Element	Voltage Level (kV)	No. of Circuits	Total length (in Kms)
1	Killing(Byrnihat)- Mawngap- New Shillong	220	D/C	122
2	Phulbari - Ampati	132	D/C	69
3	LILO of both Ckts of MLHEP-Khliehriat at Mynkre	132	D/C	17

World Bank Funded Scheme : Meghalaya



- SS01 & TW 02 Package
- SS02 and TW 01 Package

□ Manipur Scheme

1.0 Transmission / Sub-transmission

132kV Lines	7 nos., 317 ckm. (including 1 LILO)
132/33 kV Sub-Station	2 nos. - New, 80MVA 4 nos. - Augmentation, 80MVA

2.0 Distribution

33 kV Line	111 ckm.
33/11 kV Sub-Station	13 nos., 229.4MVA

3.0 Cost

	<i>Feb., 2014 price level</i>
Total	Rs. 442.22 Cr.
<i>Trans/Sub-trans</i>	<i>Rs. 227.00 Cr.</i>
<i>Distribution</i>	<i>Rs. 215.22 Cr.</i>

□ Manipur Scheme

EHV Substations

SN	Name of Substation	Voltage levels (kV)	Transformation Capacity (in MVA)
	New Substation		
1	Gamphajol	132/33	3-Ph, 2X20
2	Tamenglong	132/33	3-Ph, 2X20
	Augmentation Substation		
3	Jiribam	132/33	Addl. 3-Ph, 1X20
4	Ukhrul	132/33	Addl. 3-Ph, 1X12.5

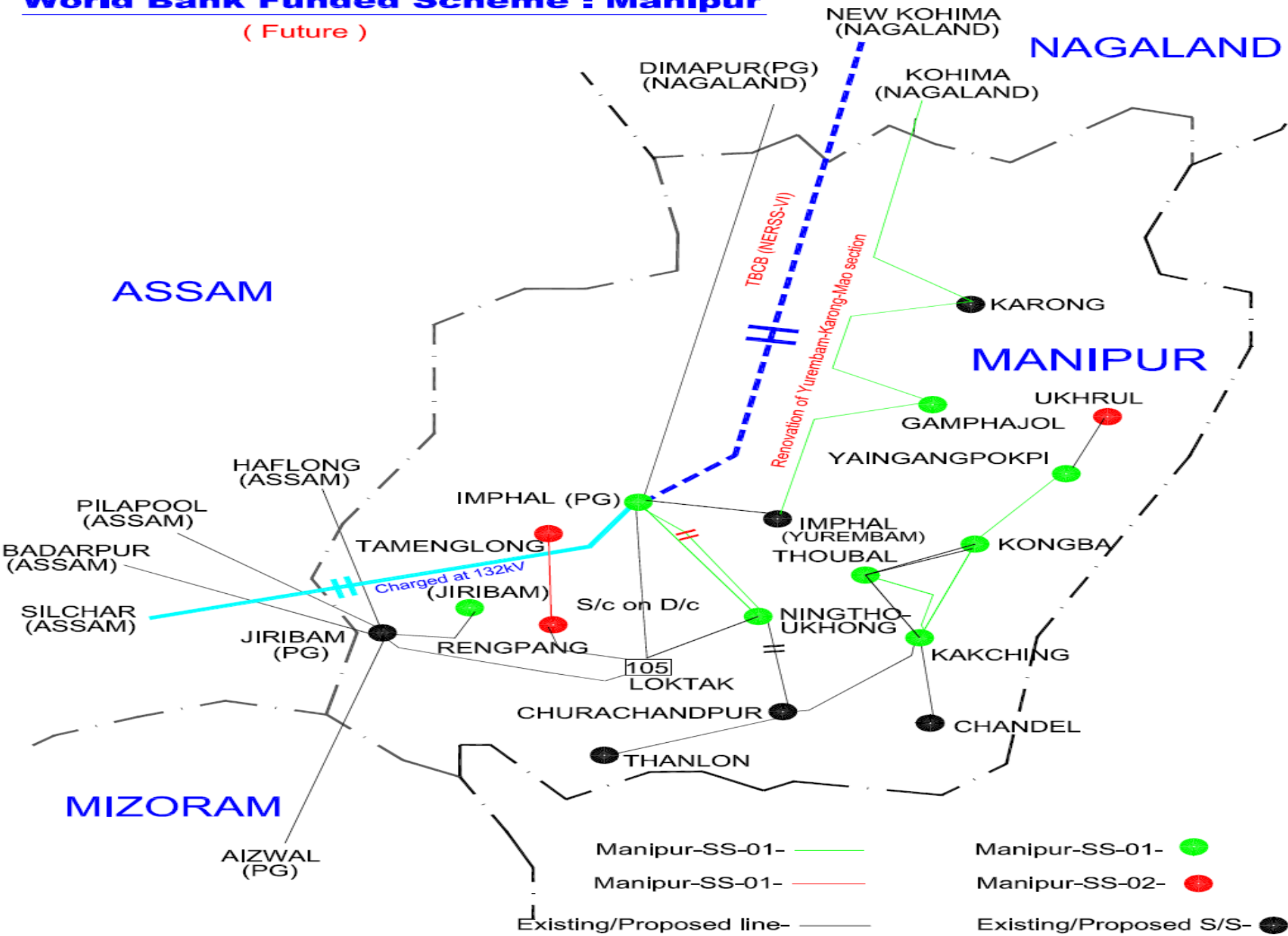
□ Manipur Scheme

TRANSMISSION LINES

SN	Name of the Line / Element	Voltage Level (kV)	No. of Circuits	Total length (in Kms)
1	Imphal(PG)- Ningthoukhong	132	D/C	34
2	LILO of one circuit of Kongba-Kakching at Thoubal	132	D/C	16
3	LILO of Yurenbam(Imphal)-Karong at Gamphajol	132	S/C	6
4	Stringing of second circuit of Yaingangpokpi – Kongba	132	D/C	33
5	Stringing of second circuit of Kakching–Kongba	132	D/C	45
6	Renovation of Yurenbum-Karong-Mao section of Yurenbum-Karong-Kohima	132	S/C	91
7	Rengpang-Tamenglong	132	S/C (on D/C tower)	29

World Bank Funded Scheme : Manipur

(Future)



Manipur-SS-01- ———
Manipur-SS-01- ———
Existing/Proposed line- ———

Manipur-SS-01- ●
Manipur-SS-02- ●
Existing/Proposed S/S- ●

□ Mizoram Scheme

1.0 Transmission / Sub-transmission

132kV Lines	3 nos., 214 ckm.
132/33 kV Sub-Station	3 nos. – New, 75MVA 1 no. – Augmentation, 50MVA

2.0 Distribution

33 kV Line	5.2 ckm.
33/11 kV Sub-Station	1 nos., 6.3MVA

3.0 Cost

	Feb., 2014 price level
Total	Rs. 316.76 Cr.
Trans/Sub-trans	Rs. 296.72 Cr.
Distribution	Rs. 20.04 Cr.

Mizoram Scheme

EHV SUBSTATIONS

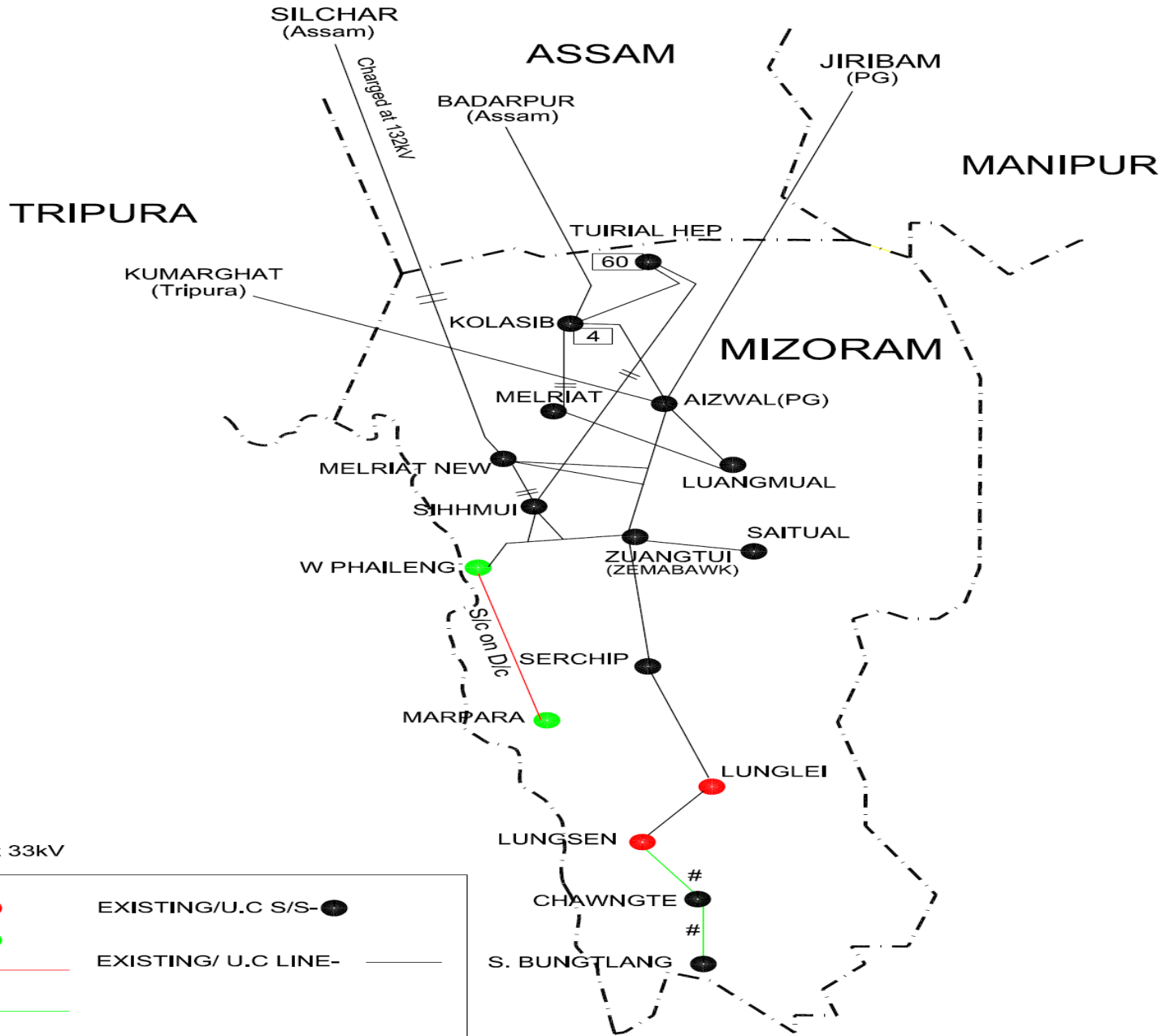
SN	Name of Substation	Voltage levels (kV)	Transformation Capacity (in MVA)
	New Substation		
1	Lungsen	132/33	3-Ph, 2X12.5
2	West Phaileng	132/33	3-Ph, 2X12.5
3	Marpara	132/33	3-Ph, 2X12.5

TRANSMISSION LINES

SN	Name of the Line / Element	Voltage Level (kV)	No. of Circuits	Total length (in Kms)
1	West Phaileng- Marpara	132	S/C (on D/C tower)	59
2	Lungsen-Chawngte	132	S/C (on D/C tower)	39
3	Chawngte- S.Bungtlang	132	S/C (on D/C tower)	45

World Bank Funded Scheme : Mizoram

(Future)



Charged at 33kV

MIZ-SS-01 ●

MIZ-SS-02 ●

MIZ-TW-01 —

MIZ-TW-02 —

EXISTING/U.C S/S- ●

EXISTING/ U.C LINE- —

□ Nagaland Scheme

1.0 Transmission / Sub-transmission

132kV Lines	7 nos., 376 ckm. (including 3 LILOs)
132/33 kV Sub-Station	5 nos. – New, 220MVA 1 no. – Augmentation, 25MVA

2.0 Distribution

33 kV Line	76.5 ckm.
33/11 kV Sub-Station	10 nos., 190MVA

3.0 Cost

	Feb, 2014 price level
Total	Rs. 729.42 Cr.
Trans/Sub-trans	Rs. 581.12 Cr.
Distribution	Rs. 148.30 Cr.

□ Nagaland Scheme

EHV S/S

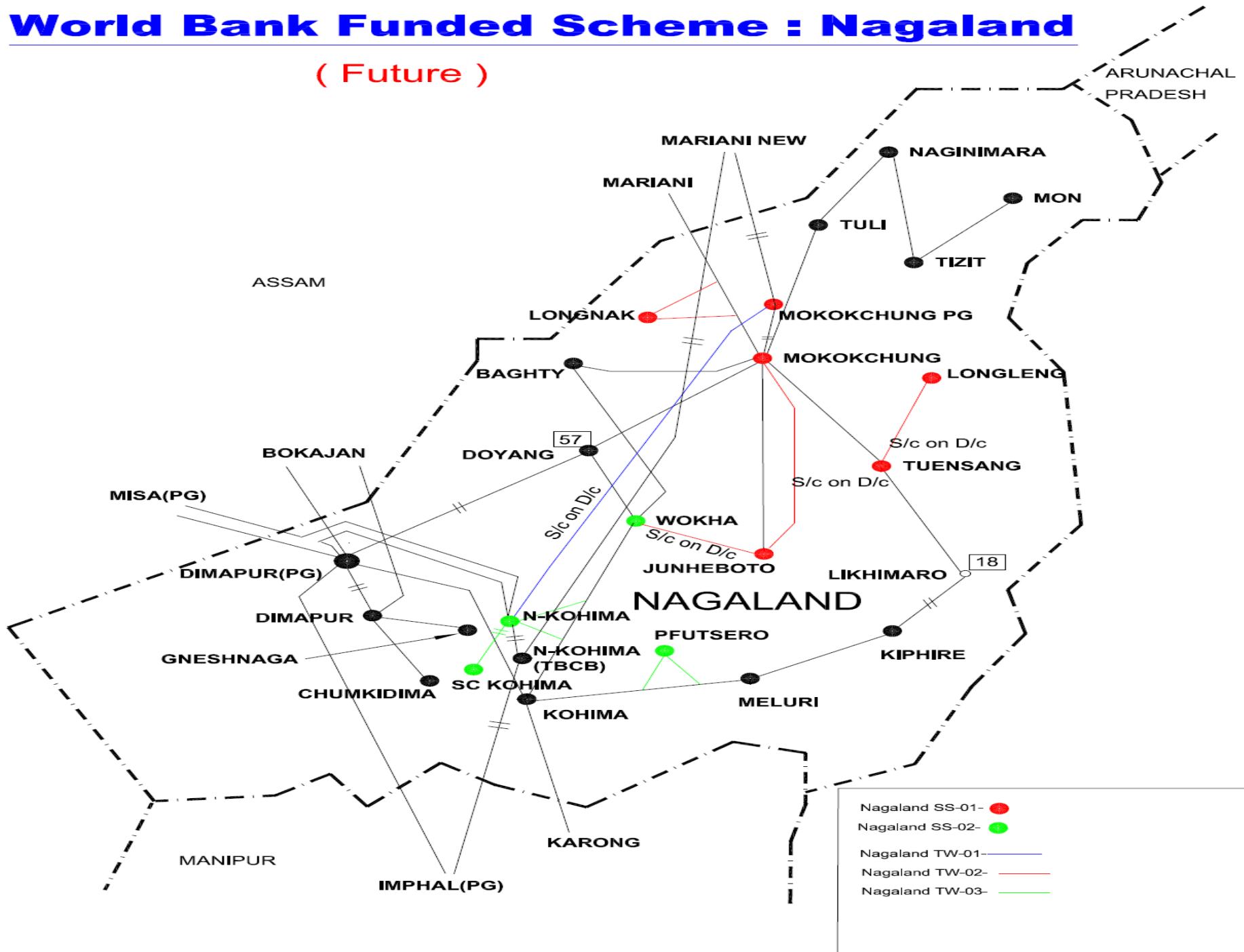
SN	Name of Substation	Voltage levels (kV)	Transformation Capacity (in MVA)
	New Substation		
1	Longnak	132/33	3-Ph, 2X25
2	Longleng	132/33	3-Ph, 2X10
3	Zunheboto	132/33	3-Ph, 2X25
4	Secretariat Complex Kohima	132/33	3-Ph, 2X25
5	Pfutsero	132/33	3-Ph, 2X25
	Augmentation Substation		
6	Wokha	132/33	Addl. 3-Ph, 1X25

SN	Name of the Line / Element	Voltage Level (kV)	No. of Circuits	Total length (in Kms)
1	New Kohima- Mokokchung (PG) via Workha	220	S/C (on D/C tower)	92
2	LILO of Mokokchung(State)- Mariani(State) at Longnak	132	S/C	0.5
3	Tuensang - Longleng	132	S/C (on D/C tower)	36
4	Wokha-Zunheboto-Mokokchung (State)	132	S/C (on D/C tower)	97
5	New Kohima (Zadima) - New Secretariat Complex, Kohima	132	D/C	28
6	LILO of Kohima - Wokha at New Kohima	132	S/C	15
7	LILO of both circuits of Kohima - Meluri (Kiphire) at Pfutsero	132	D/C	16

TL

World Bank Funded Scheme : Nagaland

(Future)



□ Tripura Scheme

1.0 Transmission / Sub-transmission

132kV Lines	14 nos.,(415km)
132/33 kV Sub-Station	8 nos. – New & 5 nos. – Augmentation Total = 1306.5MVA

2.0 Distribution

33 kV Line	1096 ckm.
33/11 kV Sub-Station	34 nos., 450.5MVA

3.0 Cost

	Feb., 2014 price level
Total	Rs. 1372.20 Cr.
Trans/Sub-trans Distribution	Rs. 702.53 Cr. Rs. 669.68 Cr.

Tripura Scheme

EHV SUBSTATIONS

SN	Name of Substation	Voltage levels (kV)	Transformation Capacity (in MVA)
	New Substation		
1	Belonia	132/33	3-Ph, 2X50
2	Bagafa	132/33	3-Ph, 2X50
3	Sabroom	132/33	3-Ph, 2X31.5
4	Satchand	132/33	3-Ph, 2X31.5
5	Rabindra Nagar	132/33	3-Ph, 2X50
6	Gokul Nagar	132/33	3-Ph, 2X50
7	Mohanpur	132/33	3-Ph, 2X31.5
8	Manu	132/33	3-Ph, 2X50
9	Amarpur	132/33	3-Ph, 2X31.5
	Augmentation Substation		
10	Jirania	132/33	Addl. 3-Ph, 1X31.5
11	Udaipur	132/33	Addl. 3-Ph, 2X50
12	Kailasahar	132/33	Repl. 3-Ph, 2X50
13	Ambassa	132/33	Addl. 3-Ph, 1X31.5
12	Dhalabil (Khowai)	132/33	Addl. 3-Ph, 2X31.5

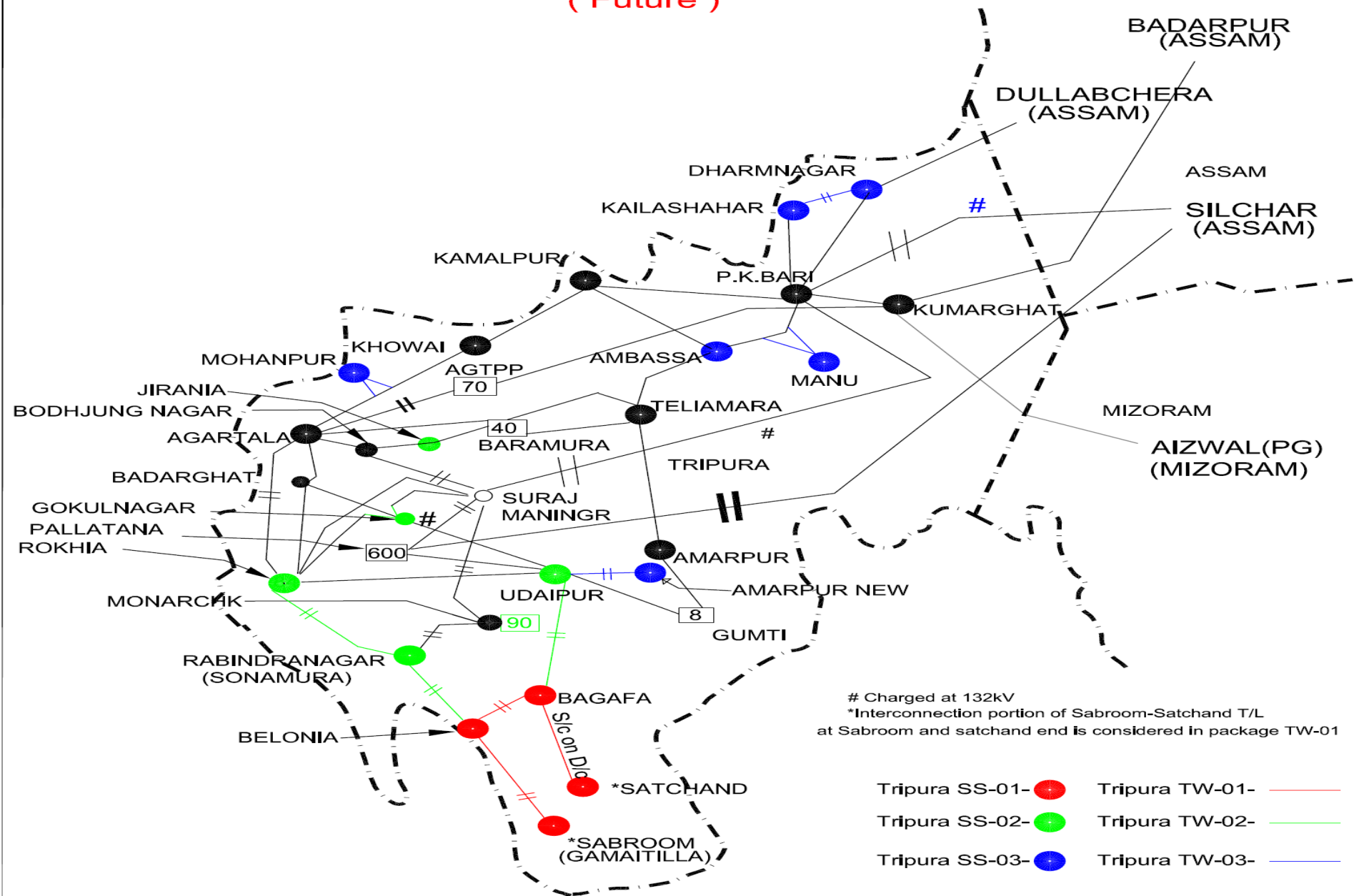
Tripura Scheme

TRANSMISSION LINES

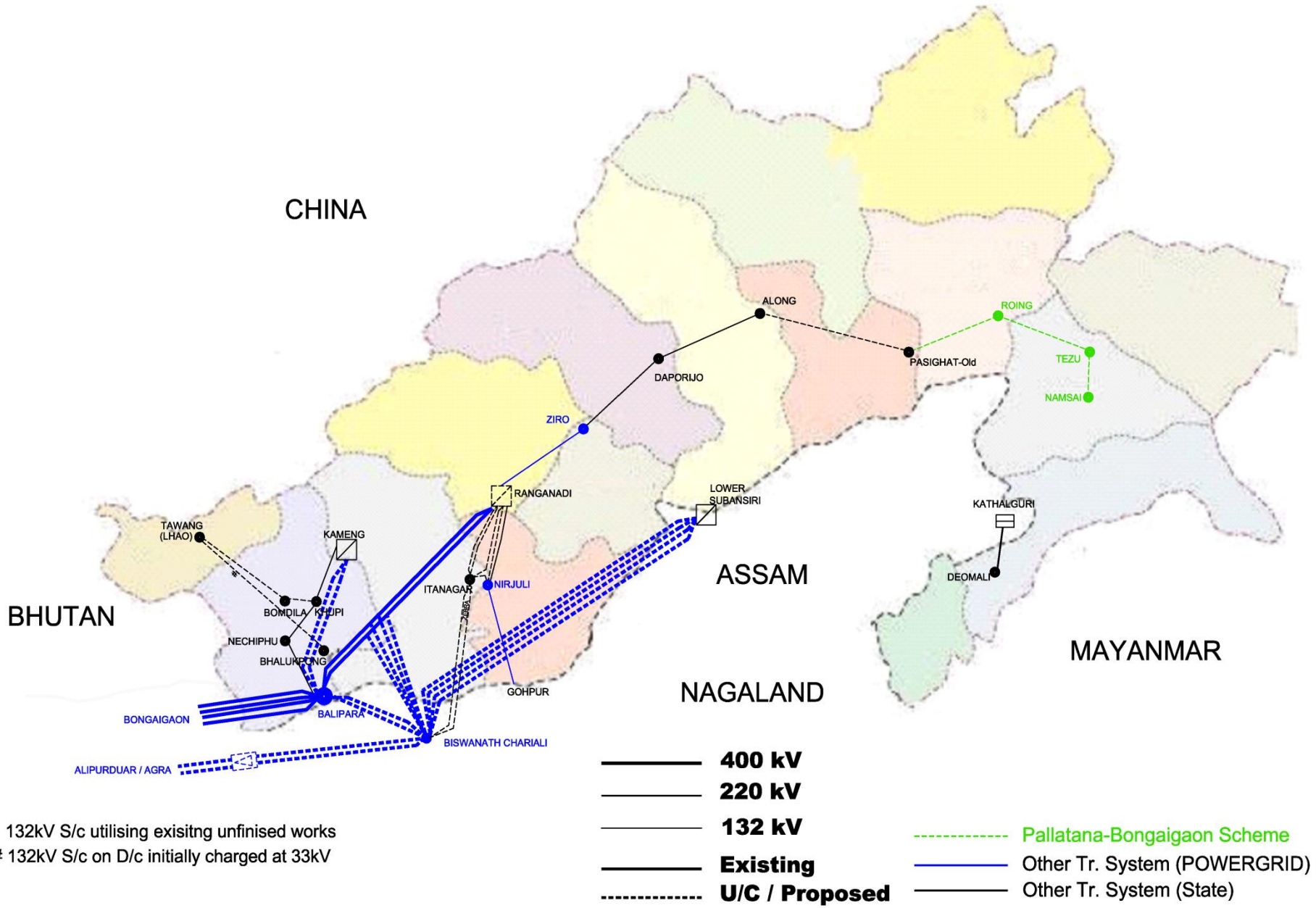
SN	Name of the Line / Element	Voltage Level (kV)	No. of Circuits	Total length (in Kms)
1	Bagafa-Belonia	132	D/C	14
2	Belonia - Sabroom (At 66kV)	132	D/C	42
3	Bagafa - Satchand	132	S/C (on D/C tower)	40
4	Interconnection portion of Sabroom-Satchand at Sabroom end	132	S/C	0.6
5	Interconnection portion of Sabroom-Satchand at Satchand end	132	S/C	0.6
6	Rabindranagar-Rokhia	132	D/C	24
7	Rabindranagar - Belonia	132	D/C	40
8	Udaipur - Bagafa	132	D/C	32
9	LILO of Surajmaninagar-Rokhia line at Gokulnagar	132	S/C	6
10	Kailashahar- Dharamnagar	132	D/C	24
11	LILO of Agartala (79 Tilla) - Dhalabil at Mohonpur	132	S/C	2
12	Udaipur- Amarpur	132	D/C	30
13	LILO of 132kV S/C Ambasa-P.K Bari at Manu	132	S/C	4

World Bank Funded Scheme : Tripura

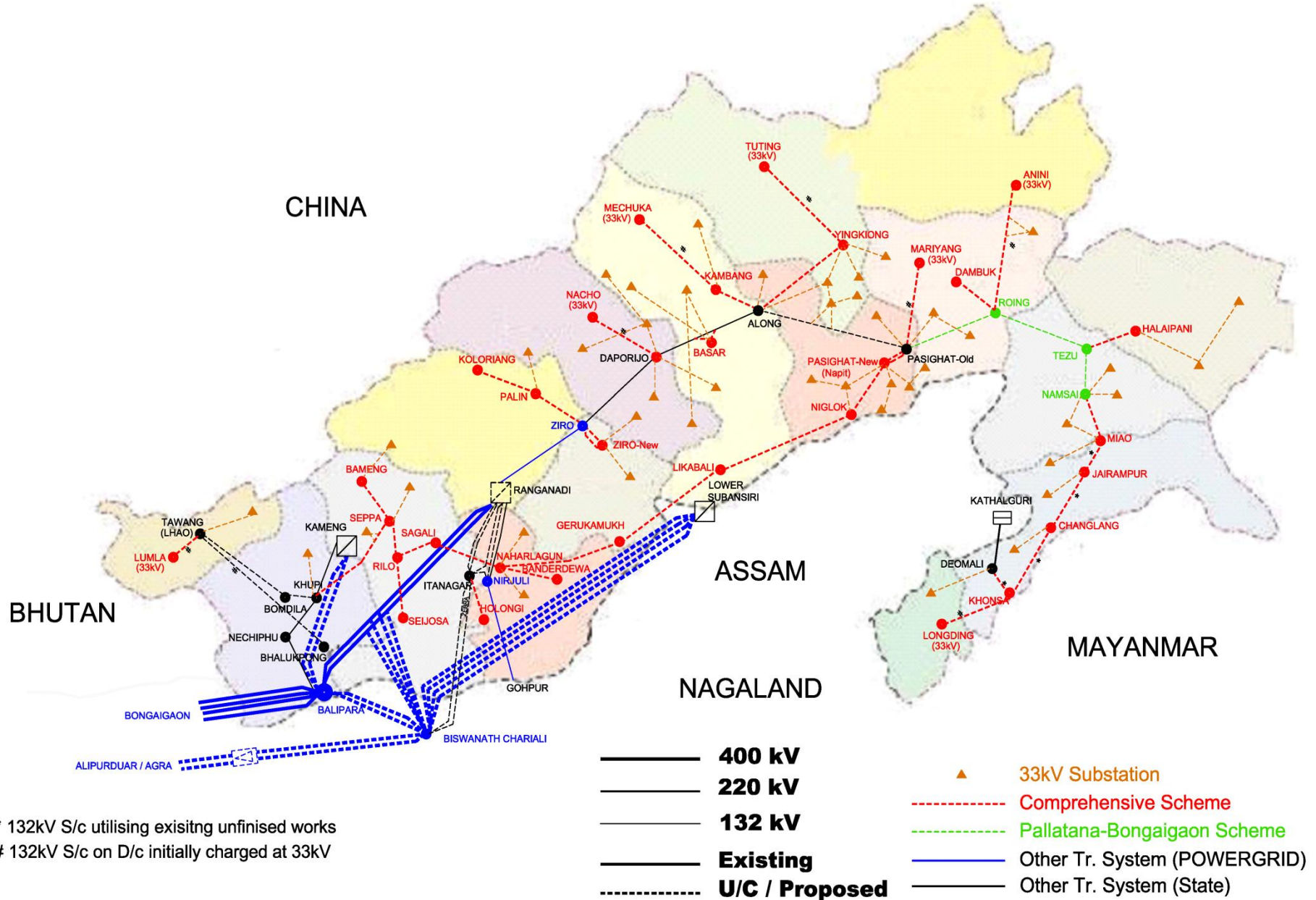
(Future)



Without Comprehensive Strengthening Scheme : Arunachal Pradesh



Comprehensive Strengthening Scheme : Arunachal Pradesh



* 132kV S/c utilising existing unfinished works
 # 132kV S/c on D/c initially charged at 33kV

