North Eastern Regional Power Committee

MINUTES OF THE 123rd OPERATION COORDINATION SUB-COMMITTEE MEETING OF NERPC

Date : 12/07/2016 (Tuesday)

Time : 10:00 hrs

Venue : "Hotel Nandan", Guwahati.

The List of Participants in the 123rd OCC Meeting is attached at **Annexure – I**

Shri P.K. Mishra, Member Secretary, NERPC welcomed all the participants to the 123rd OCC meeting. He noted the presence of participants from all the utilities except NHPC. The absence of NHPC representative for 3rd successive meeting was viewed very seriously by him and decided to communicate to highest management of NHPC for resolution. MS, NERPC highlighted that Demand-Supply gap as illustrated in LGBR 2016-17 indicates energy shortage for the region, which is contradictory to the prevalent situation of surrendering of ISGS' power. So he requested NERLDC/NERPC to kindly make a comparison between the projected and actual requirement/availability month-wise in the upcoming meetings.

Thereafter, Member Secretary requested Shri B. Lyngkhoi, Director/SE(O)to take up the agenda items for discussion.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 122nd MEETING OF OPERATION SUB-COMMITTEE OF NERPC.

SE (O) informed that minutes of 122nd meeting of Operation Sub-committee held on 9th June, 2016 at Guwahati were circulated vide letter No. NERPC/SE (O)/OCC/2015/4556-4591 dated 17th June, 2016.

The Sub-committee confirmed the minutes of 122nd OCCM of NERPC as no comments/observations were received from the constituents.

ITEMS FOR DISCUSSION

B.1. OPERATIONAL PERFORMANCE AND GRID DISCIPLINE DURING JUNE, 2016

As per the data made available by NERLDC, the grid performance parameters for June, 2016 are given below:

	Energy Met (MU)		w.r.t. May,16 % inc (+) /dec (-)	Energy Reqr. (MU)		w.r.t. May,16 % inc (+) /dec (-)	% inc (+) /dec (-) of energy reqr vs met. In June, 16
States	**June-16**	**May-16**		**June-16**	**May-16**		
Ar. Pradesh	54.91	52.0	5.60	56.51	54.0	4.65	-2.91
Assam	822.74	689.9	19.25	853.96	733.3	16.45	-3.79
Manipur	57.02	55.3	3.11	58.53	58.3	0.39	-2.65
Meghalaya	141.78	130.1	8.98	141.78	130.1	8.98	0.00
Mizoram	37.75	37.6	0.40	38.58	39.0	-1.08	-2.20
Nagaland	58.23	54.4	7.04	59.36	55.9	6.19	-1.94
Tripura	171.46 (including Bangladesh)	150.15 (including Bangladesh)	14.19	173.16 (including Bangladesh)	156.06 (including Bangladesh)	10.96	-0.99
Region	**1172.43**	**1019**	**15.06**	**1208.73**	**1071**	**12.86**	**-3.10**

	Demand Met (MW)		w.r.t. May,16 % inc (+) /dec (-)	Demand in (MW)		w.r.t. May,16 % inc (+) /dec (-)	% inc (+) /dec (-) of Demand vs met. In June, 16
States	**June-16**	**May-16**		**June-16**	**May-16**		
Ar. Pradesh	130	119.0	9.24	131	118.7	10.36	-0.77
Assam	1458	1423.0	2.46	1511	1496.7	0.96	-3.64
Manipur	151	144.3	4.64	152	144.6	5.12	-0.66
Meghalaya	312	282.2	10.56	311	281.5	10.48	0.32
Mizoram	80	88.0	-9.09	81	88.0	-7.95	-1.25
Nagaland	119	105.0	13.33	119	106.9	11.32	0.00
Tripura	273 (including Bangladesh)	249 (Excluding Bangladesh)	9.64	274.71 (including Bangladesh)	252.2 (Excluding Bangladesh)	8.93	-0.63
Region	**2475**	**2401**	**3.08**	**2479**	**2487**	**-0.32**	**-0.16**

REGIONAL GENERATION & INTER-REGIONAL EXCHANGE IN MU

Month---->	**June-16**	**May-16**
Total Generation in NER (Gross)	1482.58	1284.80
Total Central Sector Generation (Gross)	1147.12	1011.21
Total State Sector Generation (Gross)	335.46	273.59
Inter-Regional Energy Exchange		
(a) NER-ER	83.71	8.22
(b) ER-NER	124.81	257.38
(c)NER-NR	132.10	313.28
(d)NR-NER	1.82	0.00
© Net Import	-89.18	-64.12

AVERAGE FREQUENCY (Hz)

Month---->	**June-16**	**May-16**
	% of Time	% of Time
Below 49.9 Hz	7.63	6.11
Between 49.9 to 50.05 Hz	74.09	68.64
Above 50.05 Hz	18.28	25.25
Average	49.99	50.00
Maximum	50.37	50.44
Minimum	49.65	49.56

Manager, NERLDC while presenting the monthly Grid Performance for June-2016 highlighted the glaring contradictions as follows:

1) Shortfall figure given by states and corresponding under-drawal from grid.
2) Systematic less requisition from ISGS and over-drawal from grid.
3) Differences between SEM based data and drawal data as provided by states which is reflected in Daily Report of NERLDC.

AEGCL representative stated that they had been facing problems in load management due to error in SCADA which is thus resulting in overdrawal in reality. The forum felt that this is mainly due to non-reporting of RTUs in AEGCL system and is specific to Assam only. Assam was advised to take care of the issue of under-requisition from ISGS coupled with sustained over-drawal which is a violation of Regulatory stipulations.

Regarding mismatch between SEM data and operational data, DGM(MO),NERLDC suggested that analysis of one week's data can be done to identify the nodes from which wrong readings are provided daily. States were advised to take care while submitting previous day data to NERLDC and as far as possible, source of energy data should be SEM. The forum also suggested the state utilities to provide break-up for shortfall figure so that particular cause may be ascertained.

The Sub-committee noted as above.

FOLLOW UP ACTION

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

During 123rd OCC meeting, the status as informed by NTPC, NEEPCO, POWERGRID, DoP Ar. Pradesh and DOP, Nagaland is as follows:

SN	Items	Status as given in 123rd OCC Meeting	Status as given in 122nd OCC Meeting
a. New Projects			
1	Trial operation and CoD of Unit -II of Bongaigoan TPS of NTPC	Completion of construction activities expected by 31.08.2016. Synchronization by end of November. Trial run and CoD expected by 31.03.2017	Trial run and CoD expected by 31.03.2017

2	400/220kV, 2x315 MVA ICT of NTPC at Bongaigaon	Commissioning within 31.08.2016. May be done early if NERTS can provide similar bushing.	33kV tertiary bushing failure. Replacement order given. Expected date of commissioning 10.07.2016.
3	Trial operation and CoD 36MW STG of Monarchak GBPP of NEEPCO	November, 2016 (subject to gas availability)	November, 2016 (subject to gas availability)
4	Kameng HEP of NEEPCO two units (2 x 150 MW) Next two units (2x150 MW)	First two units March 2017.	First two units March 2017.
5	Pare HEP of NEEPCO (2 x 55 MW)	June, 2017	June, 2017
6	400 kV D/C Silchar - Melriat line of PGCIL	Tender Evaluation process is going on.	Tender Evaluation process is going on. By end June exact status would be given.
7	220kV Rangia - Salakati of AEGCL	December, 2016	December, 2016
8	132kV Monarchak – Surjamaninagar D/C of TSECL	October, 2016	October, 2016
9	400/132 kV, 2nd 125 MVA ICT at Pallatana	ICT has reached site, but civil structures not yet complete. Expected commissioning by end of August, 2016.	July, 2016
10	132kV Pasighat – Aalong of Ar. Pradesh	December, 2016	December, 2016
11	132kV Doyang– Wokha	Nagaland- Line construction with bay at Wokha end completed. NEEPCO- Breaker installation done at DHEP bay. Testing to be done by 10.08.2016. DoP, Nagaland also requested POWERGRID to do inspection / testing works. Forum suggested that line be charged from Wokha end as anti-theft measure.	Line construction completed. However inspection of breaker at NEEPCO bay is required.

12	220 kV, 20 MVAR Bus Reactor& bay at AGBPP	To be commissioned within 15.08.2016	July,2016
13	132kV Surjamaninagar Bay at OTPC	Tendering stage.	August, 2016
14	400kV D/C Balipara – Kameng of Ar. Pradesh	December 2016.	Delayed to December 2016 to match with Kameng HEP commissioning.
15	RHEP 80 MVAR Bus Reactor	Referred to next SCM of CEA.	Referred to next SCM of CEA.
16	SLDCs (Ar. Pradesh, Manipur, Mizoram, Nagaland)	MAN- Aug'16,MIZ-Sep'16,NAG-handover of building by Dec'16,AP- Work started.	Sept/Oct, 2016 (Building hand over by respective state by June16). For Manipur-July16 & for Meghalaya-June,16
17	400/220 kV 315 MVA ICT-II at Bongaigaon	ALSTOM awarded work.Aug'17	-
18	220/132 kV, 2x160 MVA ICTs at Balipara	By 31st August 2017.	-
19	220/132 kV, 1x160 MVA ICT with GIS Bay at Kopili	By 31st August 2017.	
20	400/132 kV, 1x315 MVA ICT-III at Silchar	To be reviewed from 124th OCC onwards	
21	Replacement of 2x315 MVA ICTs with 2x500 MVA ICTs at Misa (PG)		
23	400 kV Silchar – Misa D/C		
24	1x125 MVAR Bus Reactor at 400 kV Bongaigoan		
25	1x125 MVAR Bus Reactor at 400 kV Bongaigoan		
26	Bays at Hailakandi		
b. Elements under breakdown/ upgradation			
18	63MVAR Reactor at Byrnihat of Me.PTCL	Forum suggested to MePTCL that winding is to be bought and reactor be repaired at site by selected vendor.	Order placed to M/s CGL. Commissioning by Dec'16

19	Up-gradation of 132 kV Lumshnong-Panchgram line	Line survey work deferred due to bad weather.	Line Survey Work(s) going on.
20	Switchable line Reactors at 400kV Balipara & Bongaigoan	Balipara - Sept'16 Bongaigaon - Dec'16.	Balipara- August 2016 Bongaigaon- September, 2016
21	PLCC Panels at Loktak end of Loktak – Ningthoukhong 132 kV feeder and Loktak - Rengpang 132 kV feeder	August 2016	July 2016
22	LILO of 132kV Ranganadi – Nirjuli at Pare of NEEPCO by PGCIL	August 2016	T/L at Loc.87 to be shifted by NEEPCO. Target date of completion July 2016
23	LILO of 132kV Ranganadi – Itanagar (Chimpu) at Pare of Ar. Pradesh	March 2017	March 2017.

The Sub-committee noted as above.

C.2 CT Ratio of Transmission Lines & Enhancement of Loadability of lines in NER:

The latest status as informed in 123rd OCC meeting is as follows:

Sl.No.	Name of the line	CT Ratio at either end (current)		CT Ratio at either end (required)		No. Of CTs required		Current Status
		Stn A	Stn B	Stn A	Stn B	Stn A	Stn B	
1	132KV D/C RC Nagar-Agartala-I**	600/1	400/1	800/1	800/1	3 by PGCIL	4 by PGCIL	Mar'2017
2	132KV D/C RC Nagar-Agartala-II**	600/1	400/1	800/1	800/1	3 by PGCIL	4 by PGCIL	Mar'2017
3	132 KV S/C Jiribam-Aizwal	400/1	400/1	600/1	600/1	3 by PGCIL	4 by PGCIL	Mar'2017
4	132 KV S/C Jiribam-Haflong	400/1	400/1	600/1	600/1	3 by PGCIL	4 by PGCIL	Mar'2017

5	132KV S/C Khandong - Umrangso- Haflong	300/1	400/1	600/1	600/1	3 at Khandong by NEEPCO, 3 at Umrangso by AEGCL	3 at Umrangso by AEGCL, 3 at Haflong by PGCIL	PGCIL - Mar'2017 AEGCL- Mar'2017 NEEPCO- Mar'2017
6	132 KV S/C Loktak - Imphal-II	400/1	600/1	600/1	600/1	3 by NHPC	0	**NHPC- to be informed**
7	132 KV D/C Doyang - Dimapur	300/1	600/1	300/1	600/1	3 by PGCIL & 6 by NEEPCO	0	**PGCIL - March, 2017 NEEPCO- to be informed**

Further POWERGRID has proposed that all lines where CT ratio up-gradation is to be done, double jumpering is to be ensured.

Deliberation of the Sub-Committee

The Sub-Committee agreed to the proposal of double-jumpering and recommended double jumpering of bay and line for the above elements before the CT upgradation work is completed, so that full capacity of CTs can be utilized for loading the lines. Forum also agreed to include 132kV Doyang-Dimapur I & II for CT Ratio upgradation.

The Sub-Committee noted as above.

C.3 Finalization of Operating Procedures of State Grid of NER:

As per clause no 5.1.g of IEGC, detailed operating procedures for each state grid shall be developed and maintained by the respective SLDC.

Deliberation of the sub-Committee:

Status as intimated during 123rd OCC forum of NERPC is as follow:-

Sl No	Description	Status of approval from OCC forum of NERPC
1	Operating Procedure of Ar. Pradesh 2015	**Draft Submitted**
2	Operating Procedure of Assam 2015	Submitted
3	Operating Procedure of Manipur 2015	**By 31.07.2016 (Manipur to send draft to NERPC)**
4	Operating Procedure of Meghalaya 2015	Submitted
5	Operating Procedure of Mizoram 2015	Submitted
6	Operating Procedure of Nagaland 2015	Submitted
7	Operating Procedure of Tripura 2015	**By 31.07.2016 (TSECL to send draft to NERPC)**

The Sub-committee noted as above.

Action: DoP Ar .Pradesh, MSPCL & TSECL.

C.4 Monthly MU requirement & availability of each state of NER as per format:

The following figures of state wise MU requirement and availability were taken from draft LGBR 2016-17 of NERPC. State wise MU requirement and availability for these months are to be checked. Constituents may kindly verify if the above data are correct.

Requirement:

Name of State	Apr16	May16	Jun16	Jul16	Aug16	Sep16
Ar. Pradesh	67	71	68	73	73	73
Assam	775	791	816	872	872	847
Manipur	82	77	76	80	80	80
Meghalaya	170	175	165	175	175	170
Mizoram	42	42	42	45	45	45
Nagaland	65	68	72	77	77	72
Tripura	112	122	122	122	128	122
NER	**1313**	**1346**	**1361**	**1424**	**1450**	**1409**

Name of State	Oct16	Nov16	Dec16	Jan17	Feb17	Mar17
Ar. Pradesh	73	68	68	68	59	74
Assam	816	714	714	714	648	740
Manipur	85	88	95	92	88	90
Meghalaya	185	195	210	220	185	190
Mizoram	46	46	48	48	42	42
Nagaland	74	68	71	69	68	68
Tripura	133	112	122	128	102	128
NER	**1412**	**1291**	**1328**	**1339**	**1192**	**1332**

Availability:

Name of State	Apr16	May16	Jun16	Jul16	Aug16	Sep16
Ar. Pradesh	46	58	82	92	79	74
Assam	483	544	649	737	703	682
Manipur	58	69	85	108	102	99
Meghalaya	100	149	191	250	258	258
Mizoram	38	44	54	63	59	57
Nagaland	42	51	66	83	79	77
Tripura	185	204	204	222	213	208
NER	**950**	**1119**	**1330**	**1557**	**1493**	**1455**

Name of State	Oct16	Nov16	Dec16	Jan17	Feb17	Mar17
Ar. Pradesh	67	52	54	51	45	55
Assam	648	567	580	567	502	564
Manipur	95	81	76	71	61	69
Meghalaya	209	150	138	125	115	123
Mizoram	54	48	44	43	39	45
Nagaland	71	55	54	50	45	50
Tripura	225	211	224	222	190	217
NER	**1370**	**1163**	**1171**	**1130**	**997**	**1121**

In 121st OCC meeting, NERLDC stated that quantum of power against Bangladesh drawal should be reflected in the table either in Tripura drawal figure or separately. Members agreed to that.

As per suggestion by Member Secretary, NERPC it was decided that a comparison of actual vs figures projected in LGBR 2016-17 is to be prepared from now on.

The Sub-committee noted as above.

C.5 Monthly MW requirement & availability of each state of NER:

The following figures were taken from LGBR 2016-17 of NERPC. These figures are to be reviewed.

A. Peak Demand in MW

Name of State	Apr16	May16	Jun16	Jul16	Aug16	Sep16
Ar. Pradesh	142	142	137	137	142	147
Assam	1451	1472	1498	1508	1560	1539
Manipur	168	168	168	163	168	163
Meghalaya	320	320	320	320	320	320
Mizoram	90	90	95	90	90	90
Nagaland	125	125	125	140	140	140
Tripura	270	291	296	296	301	291
NER	**2651**	**2693**	**2724**	**2739**	**2801**	**2775**

Name of State	Oct16	Nov16	Dec16	Jan17	Feb17	Mar17
Ar. Pradesh	143	132	132	137	137	147
Assam	1513	1508	1518	1456	1352	1466
Manipur	163	179	184	179	179	173
Meghalaya	370	380	390	390	370	340
Mizoram	95	95	101	101	90	95
Nagaland	140	135	135	135	125	125
Tripura	321	275	260	250	250	281
NER	**2790**	**2749**	**2760**	**2688**	**2558**	**2707**

B. Peak Availability in MW

Name of State	Apr16	May16	Jun16	Jul16	Aug16	Sep16
Ar. Pradesh	127	144	195	165	140	138
Assam	1012	1134	1305	1249	1170	1222
Manipur	131	173	184	196	179	181
Meghalaya	257	304	373	433	455	482
Mizoram	83	100	123	117	108	111
Nagaland	109	129	145	142	134	137
Tripura	324	355	369	365	350	357
NER	**2043**	**2340**	**2695**	**2675**	**2534**	**2627**

Name of State	Oct16	Nov16	Dec16	Jan17	Feb17	Mar17
Ar. Pradesh	154	140	129	128	127	179
Assam	1251	1202	1169	1152	1108	1278
Manipur	188	175	147	151	142	188
Meghalaya	442	360	340	312	346	386
Mizoram	117	109	99	98	101	120
Nagaland	142	129	124	122	120	141
Tripura	386	369	373	370	355	392
NER	**2681**	**2484**	**2381**	**2331**	**2298**	**2682**

C. Off Peak Demand in MW (08:00 Hrs)

Name of State	Apr16	May16	Jun16	Jul16	Aug16	Sep16
Ar. Pradesh	78	78	75	75	78	81
Assam	943	898	944	950	952	939
Manipur	109	109	109	106	109	106
Meghalaya	223	230	230	230	230	230
Mizoram	59	59	62	59	59	59
Nagaland	75	75	75	84	84	84
Tripura	184	198	201	201	205	198
NER	**1670**	**1639**	**1689**	**1698**	**1706**	**1689**

Name of State	Oct16	Nov16	Dec16	Jan17	Feb17	Mar17
Ar. Pradesh	79	73	73	75	75	81
Assam	983	935	956	932	852	909
Manipur	106	116	120	116	116	112
Meghalaya	230	235	240	240	230	230
Mizoram	62	62	66	66	59	62
Nagaland	84	81	81	81	75	75
Tripura	218	187	177	170	170	191
NER	**1760**	**1687**	**1708**	**1677**	**1581**	**1661**

D. Off Peak Availability in MW (08:00 Hrs)

Name of State	Apr16	May16	Jun16	Jul16	Aug16	Sep16
Ar. Pradesh	40	50	99	122	102	100
Assam	734	824	1014	1126	1048	1068
Manipur	65	87	119	168	152	148
Meghalaya	198	230	305	416	428	445
Mizoram	50	61	88	102	93	93
Nagaland	72	84	105	123	115	116
Tripura	362	303	326	345	331	335
NER	**1420**	**1640**	**2054**	**2402**	**2269**	**2304**

Name of State	Oct16	Nov16	Dec16	Jan17	Feb17	Mar17
Ar. Pradesh	81	56	59	57	72	69
Assam	982	927	956	935	927	985
Manipur	132	115	92	84	94	102
Meghalaya	377	295	290	261	303	318
Mizoram	86	75	72	69	78	82
Nagaland	103	89	92	89	93	95
Tripura	343	317	335	329	322	339
NER	**2104**	**1875**	**1896**	**1824**	**1888**	**1989**

In 121st OCC meeting, AGM, SLDC, AEGCL opined that 100 MW power supply to Bangladesh should be included in the LGBR of 2016-17. Bangladesh should be treated as internal customer of Tripura for this purpose. The forum agreed.

In 122nd OCC meeting, S.E.(O) informed that CEA has been requested to incorporate 100 MW Bangladesh drawal in LGBR 2016-17.

It was also noted by the sub-committee that one additional column may be added to above tables to monitor monthly actual versus forecast to bring in accuracy in the forecast.

The Sub-Committee noted as above.

C.6 Furnishing Reactive Power Absorption Data for last one year:

As per Para no. 9.9.1 of Recommendations of Enquiry Committee on Grid Disturbance, the regulatory provisions regarding absorption of reactive power by generating units needs to be implemented.

It is requested that you may please furnish instances when Reactive Power support was provided by Generators for last one year.

The latest Capability Curve of each generator in Soft Copy may also be provided.

In 122nd OCCM, NERLDC informed the following status of furnishing of reactive power absorption data:

AGBPP, AGTPP, Kopili, Khandong	Furnished on Daily basis
BgTPP	Furnished on Monthly basis
Palatana	Last furnished in Apr'16
Ranganadi	Not furnished/Intermittent
Doyang	Not furnished
Loktak	Not furnished

DGM (SO-I), NERLDC requested all generating utilities to send the requisite information to nerldc@yahoo.co.in.

NEEPCO informed that data for Khandong HEP, Kopili HEP, AGBPP are being generated daily; however they would be resent again. NTPC agreed to submit the data within the stipulated time periodically.

Deliberation of the sub-Committee:

The status of submission as reported in 123rd OCC is as follows:

AGBPP, AGTPP, Kopili, Khandong	Furnished on Daily basis
BgTPP	Furnished on Monthly basis
Palatana	Provided
Ranganadi	Not furnished/intermittent
Doyang	Not furnished/intermittent
Loktak	Not furnished

NEEPCO representative assured that site personnel will be informed about submitting the necessary data.

NERLDC requested NEEPCO to furnish data from Ranganadi and Doyang HEPs. Also, since AGTCCPP was sending the data to personal email IDs, it is difficult for NERLDC to keep track of data. NEEPCO was requested to use nerldc@yahoo.co.in for sending all reactive power absorption data of generators.

The Sub-Committee noted as above.

Action: NEEPCO & NHPC.

C.7 Implementation of Automatic Demand Management Scheme (ADMS)

Hon'ble CERC directed vide order in Petition No. 113/MP/2014 on 31.12.15 to submit PERT charts & action plans for Implementation of Automatic Demand Management Scheme (ADMS) by SLDCs of NER and to implement ADMS by 30.06.16. Hon'ble CERC directed RLDCs to submit the report of status of implementation of Automatic Demand Management Scheme (ADMS) by SLDCs of NER by 31.08.16.

SLDCs of NER are requested to furnish monthly report of status of implementation of Automatic Demand Management Scheme (ADMS) by SLDCs of NER.

In 121st OCC meeting, S.E.(O), NERPC informed that the minutes of the ADMS workshop was issued on 07.04.2016. He suggested that the following works are to be carried out by constituents at the earliest as decided in the ADMS workshop.

1. Identifying minimum two substations from each state to enabled ADMS functionalities on pilot basis.
2. Surveying those substations which are identified for ADMS function to understand the actual status of those stations.
3. Preparing the Bill of materials (BOM) and get the cost estimation from suppliers.

Further, he suggested that software development regarding integration of ADMS with existing SCADA system at SLDC level may be included in SLDC Upgradation Project of

POWERGRID. Members agreed to the proposal and confirmed the minutes of the workshop.

In 122nd OCCM, it was decided that SLDCs would inform the status as soon as possible after due consultation with DISCOMs and vendors. It was also decided that NERPC would write to CMDs of all the utilities in the states i.e. TRANSCO and DISCOMs for conducting internal meetings in this regard periodically.

MS, NERPC stated that as per discussions with CERC in matter of implementation of ADMS in NER, CERC representative urged that ADMS be installed in at least one substation of each state. The forum agreed to implement ADMS in one substation of each state, preferably in state capitals. It was also agreed, that implementation on pilot basis may be taken up in Assam/Meghalaya system to begin with. The funding may be obtained from PSDF.

Deliberation of the sub-Committee:

SE, SLDC, MeECL informed that representative of M/s SCOPE have done an initial survey for implementation of ADMS. However detailed report has not been provided yet by M/s SCOPE. He requested SE(O),NERPC to ensure submission of survey report by M/s SCOPE so that future course of action may be determined. DoP Mizoram intimated that status for Mizoram is same as Meghalaya. DoP Ar. Pradesh and DoP Nagaland representative informed that vendors are yet to visit for survey work. AGM, SLDC, AEGCL informed that ADMS implementation involves APDCL also, so administrative issues have cropped up. So he requested NERPC to write to MD, AEGCL/APDCL for fruitful resolution.

Manager, NERLDC informed the forum that ADMS implementation status has to be informed to CERC within 15.08.2016. If no information received by NERLDC, then status will be indicated as “Not furnished”. So he requested all to provide the status before that.

The Sub-Committee noted as above.

Action: All state utilities, SLDCs, NERTS, NERLDC/NERPC.

C.8 Rectification of phase notations in NER grid:

It has been found that PMUs are showing different phasors w.r.t different nodes of same grid. It is suspected that there are change in phase notations in NER grid & connectivity.

During 1st NETeST meeting, the forum advised that mixing of Phases (change in phase reference w.r.t. one utility is sometimes different from another) as reflected by PMU data in regional grid is to be corrected. Forum requested that the same may be taken up OCC forum of NERPC.

In 120th OCCM, DGM(AM), POWERGRID informed that work at Surjamaninagar has been completed. The forum requested AEGCL to kindly expedite the work at Azara.

During 121st OCCM, AGM, AEGCL suggested that physical connections may have to be changed at Azara. DGM (AM), POWERGRID suggested that a joint visit by POWERGRID/AEGCL to Azara would be fruitful. The forum agreed.

In 122nd OCCM, DGM, AEGCL informed that the work would be completed within one week.

Deliberation of the sub-Committee:

Sr. Engineer, NERLDC informed that phase rectification has not been completed and it was further verified when GD-IV occurred on 09.07.2016. The tripping of 400kV Silchar-Azara was reflected as RY fault at Silchar while it was RB at Azara end. The forum requested AEGCL and NERTS to immediately rectifies the issue. NERTS requested AEGCL to co-ordinate and NERTS representative would be available at site on short notice from AEGCL.

NERTS informed AEGCL representative the contact details of their personnel who will go for joint visit to rectify the problem at Azara. AEGCL was requested to fix a date of inspection at the earliest.

The Sub-Committee noted as above.

Action: AEGCL/NERTS.

C.9 Transformer Tap optimization

System study was conducted by NERLDC considering load, generation and network pattern of May, 2016 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 are attached at **Annexure – C.9.**

In 119th OCCM, SE, SLDC, MeECL informed that voltage profile at 400kV Byrnihat S/S would be supplied by MeECL periodically.

In 120th OCCM, DGM(SO-I), NERLDC informed that MeECL is sending the voltage profile regularly and requested to continue. The bus voltage profile of 400kV, 220kV & 132kV buses w.r.t. tap positions as recommended with the help of offline system study are required for assessment of effectiveness of tap change and its impact in voltage profile improvement. SE, SLDC, MeECL stated that to change tap positions regularly approval from competent authority is required and agreed to revert back to the forum.

In 121st OCC meeting, NERLDC was requested to write to MeECL regarding changing of tap positions as per voltage profile.

In 122nd OCCM, SE, SLDC, Meghalaya informed the forum that request has been received and he would revert back to the forum after due discussion with MePTCL.

DGM(AM), NERTS informed that since tap changing would be done offline, there should be no danger in the operation, and necessary checks like ratio test and continuity checks may be done after tap changing to check healthiness before putting into service. NERLDC informed that similar tap changing has been done in Northern region and the NR grid had been benefitted. Hence, similar exercise should be done for NER to aid in mitigating high voltage conditions. It was agreed that in case SLDC, Meghalaya does not manage to convince MePTCL to perform tap changing at Byrnihat, NERPC may write to MePTCL on behalf of the forum.

Deliberation of the sub-Committee:

After detailed deliberation it was decided that NERPC would conduct a joint meeting with NERPC, NERLDC, NERTS & MePTCL regarding importance of tap optimisation at Byrnihat.

The Sub-Committee noted as above.

Action: MeECL, NERPC/NERLDC/NERTS.

C.10 Issues related to mismatched figures of installed capacity of NER.

The figures of installed capacity of NER by CEA (As on 31.01.16) is not matching with figures of installed capacity of NER prepared by NERLDC based on data provided by SLDCs of NER. Ministry of Power (MOP) had requested NERLDC to resolve this issue.

The installed capacity of NER prepared by CEA and by NERLDC is attached in **Annexure – C.10.**

During 121st OCCM, Member Secretary, NERPC requested utilities to write to CEA for derating/decommissioning of units at their generating stations. TSECL informed that three units of Baramura GBPP were de-commissioned. DGM(MO), NERLDC informed that NERLDC is raising NERLDC Fees & Charges for AGTPP-Extn based on name-plate rating of 51 MW, however IC is 46 for all purposes. The forum requested NEEPCO to kindly clarify the same.

In 122nd OCCM, NEEPCO representative informed that PG test of STG units of AGTCCPP would be carried out on 15th June 2016 and IC/MCR would be confirmed after that.

Deliberation of the sub-Committee:

Sr. Manager, NEEPCO informed the forum that though PG test has been successfully completed, detailed calculation has not yet been done. The IC/MCR would be intimated after report is finalized. Regarding the mismatch in case of State sector generating stations it was decided that all SLDCs should refer to CEA report (follow below link) and inform the discrepancies accordingly before next OCCM.

http://cea.nic.in/reports/monthly/generation/2016/May/actual/opm_16.pdf

It was decided that NERPC would take up with CEA to give the station wise breakup of installed capacity, as indicated on CEA website.

NERLDC requested all states / ISGS to ensure that in case their units are decommissioned / Derated, the respective utility may take up with CEA so that installed capacity on CEA website is reflected correctly.

Action: NEEPCO, SLDCs.

C.11 Furnishing of Ramp-Up, Ramp-Down, Technical Minimum of Units :

A meeting of the Sub-Committee on 'Review of 12th Plan and Generation Planning' headed by Member (Planning), CEA was held on 7th March, 2016. During the meeting, CEA projected maximum ramping requirement of 30000-36000 MW/hour for about 60 hours (out of 8760 hours) during 2021-22 in view of increase in solar generation.

It is requested to furnish the unit-wise Ramp-Up, Ramp-Down, Technical minimum of Generating Units.etc based on data provided by manufacturer as per the attached format.

Format for submission of these data mailed to all ISGS of NER & SLDCs of NER on 9th March, 2016. OTPC has already submitted the details.

The format is attached as **Annexure-C.11.**

In 121st OCCM, During the discussion, on the query of DGM (Commercial) OTPC, NERLDC confirmed that the scheduling has been done on the basis of requisition made by the beneficiaries until the technical minimum.

DGM (SO-I), NERLDC informed that the above information is required for modelling of all India base case for study of effect of RE integration in the system as per projected quantum of power RE sources. The forum once again requested that the above data may please be submitted for all the generating stations of NER, for both Central Sector as well as State Sector.

In 122nd OCCM, DGM(SO-I) once again reiterated that the details for hydel stations of ISGSs' and all the state generating stations are not readily available. S.E.(O) requested all the stations to submit the details as early as possible.

NERLDC indicated the following status of furnishing of Ramping details by generators of NER:

Generator	Status
AGBPP, AGTPP	Furnished (as part of Ancillary services)
OTPC	Furnished
Kopili, Khandong	Furnished
BgTPP	Furnished (as part of Ancillary services)
Ranganadi	Not furnished
Doyang	Not furnished
Loktak	Not furnished

Deliberation of the sub-Committee:

The status as informed in 123rd OCC is as follows:

Generator	**Status**
AGBPP, AGTPP	Furnished (as part of Ancillary services)
OTPC	Furnished
Kopili, Khandong	Furnished
BgTPP	Furnished (as part of Ancillary services)
Ranganadi	NEEPCO unable to provide as manufacturer data not available
Doyang	NEEPCO unable to provide as manufacturer data not available
Loktak	Not furnished

NERLDC requested NEEPCO to collect the data for Ranganadi and Doyang HEPs from manufacturers, and send to NERLDC.

Action: NHPC & NEEPCO.

C.12 High Voltage in Palatana :

During the month of January'16 -50 % of the time, February'16 -96% of the time & March'16 -61 % of the time the voltage of Palatana 400 kV bus was more than 420 kV. The Palatana Bus reactor was charged for the first time at 14:49 Hrs on 14.03.16. The bus reactor tripped at 16:11 hrs on 15.03.16. Bus Reactor at Palatana is under outage since 16:11 hrs of 15.03.16.

OTPC is requested to inform the status of Bus Reactor at Palatana.

In 121st OCCM, OTPC informed that repeated communication to M/s BHEL has been written by them but till date there was no response from BHEL. However, exact status would be informed after detailed analysis by M/s BHEL. The expected date of revival is 15.06.2016.

In 122nd OCCM, DGM, OTPC informed that the matter would be pursued with M/s BHEL if there is no response by 15.06.2016.

DGM (SO-I), NERLDC intimated the forum that the voltage at Palatana remains very high (even beyond IEGC band at some times of the day) during most of the day. The reactor at Palatana has been under outage since long time. The reactor was again charged for 1st time on 14:49 hrs on 14/03/16 for a brief interval, and has been under outage since. Delay in bring the reactor is causing unnecessary deterioration of voltage profile at Palatana and nearby areas. The reactor needs to be brought into service at the earliest.

Deliberation of the sub-Committee:

After detailed deliberation it was decided that NERPC would apprise MD, OTPC about the situation so that reactor is brought into service at the earliest.

The Sub-Committee noted as above.

Action: OTPC.

C.13 Pre monsoon activity of transmission elements:

It was observed that number of tripping of transmission elements in NER increased during monsoon period of last year. For minimization of tripping transmission elements in NER, it is requested to complete all activities (like trimming of trees, vegetation issues etc) of transmission elements before monsoon.

In 121st OCCM, S.E.(O) requested all utilities to expedite vegetation clearance activities. Members agreed.

During 122nd OCCM, S.E.(O) once again highlighted the importance of vegetation clearance. He informed that there has been an alarming rise in number of transient trippings during this pre-monsoon period. All the utilities agreed to undertake activities in this regard and submit report to the forum.

Deliberation of the sub-Committee:

After detailed deliberation all the utilities agreed to submit report to NERPC at the earliest.

The Sub-Committee noted as above.

Action: All utilities.

C.14 Procurement of ERS for NER from PSDF funding:

PSDF Secretariat (NLDC, New Delhi) vide. NLDC-PSDF/NPC-CEA/2016-17/60 dtd. 21st April 2016 has intimated that submission and approval of the schemes is governed in accordance with the guidelines for disbursement of funds from PSDF approved by MoP on 18.9.2014. Guidelines are available on http://psdfindia.in/. The schemes have to be submitted as per formats prescribed in guidelines.

In 121st OCCM, POWERGRID agreed to submit the formats/DPR on behalf of NER constituents as soon as possible.

In 122nd OCCM, DGM(AM), NERTS requested NERPC to write to ED,NERTS in this regard, so that DPR may be prepared in earnest. SE(O) informed that letter has already been sent to ED, NERTS for necessary action.

Deliberation of the sub-Committee:

DGM(AM), NERTS informed that proposal for management approval for procurement of ERS has been sent to POWERGRID Corporate BDD Group.

Action: POWERGRID.

C.15 Submission of data regarding large scale integration of Renewable Energy:

MoP vide. 23/2/2005-R&R(Vol-XI) dated 22.03.2016 has forwarded communication of MNRE letter No. 11/7/2013-EFM dated 02.03.2016 wherein it was mentioned regarding compilation of data to meet renewable energy targets of 175 GW by 2020.

The following data are required for the said purpose:

a) Data on the technical capacities of power plants such as minimum load, rate of change of generation, start-up time and down time, minimum standstill time, State-wise and region-wise.

b) Thermal balancing potential of RE rich states today and upto 2020(region-wise also).

c) Theoretical hydro balancing potential of states today and upto 2020(region-wise also).

d) Pumped hydro projects capabilities today and upto 2020(region-wise also).

e) Forecasting and scheduling regulations by States.

In 121st OCCM, all the utilities agreed to submit the above.

In 122nd OCCM, all the utilities were requested to kindly submit relevant data listed in (c) & (e) at the earliest.

Deliberation of the sub-Committee:

After detailed deliberation forum decided that NERPC should write to the concerned officials of the different utilities for submission of data and the agenda item be dropped in meantime.

The Sub-Committee noted as above.

Action: 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	1		24.67	719.65
Kopili-II	1			
Kopili	4		197.92	609.67
Ranganadi	3		Subject to inflow	
Doyang	3		27.2	321
Loktak	3		250	769.02
AGBPP	-	-	-	-
AGTPP	-	-	-	-

Hydro planning

The outage of other generating stations may be approved considering the outage required for completion of balance restoration activities at KHEP.

The Committee discussed and approved the proposed shutdown by Generating Stations and the same is given in Annexure – D.2 (along with trans-element).

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.

Deliberation in the meeting

NERLDC informed that the proposed list of planned shutdown was being forwarded by Transmission Licensees at the last moment, thus making it difficult to conduct system studies for these outages. The forum decided that henceforth, Planned shutdown proposals may be furnished by Transmission Licensees for the next month at the end of the month. Any shutdown proposal sent after D-5 (viz. 5 days prior to the OCC meetings) would not be entertained.

The sub-Committee discussed and approved the proposals received from the constituents regarding transmission elements for July, 2016 - August, 2016 and the same has already been uploaded in website of NERPC.

D.3 Estimated Transmission Availability Certificate (TAC) for the month of April & May, 2016:

NETC and POWERGRID have submitted the outage data for the month of April & May, 2016. So the attributability of outage of the said elements may please be finalized.

Deliberation in the meeting

The attributability of April/May 2016 could not be finalized due to non-submission of outage data within stipulated time. The forum once again advised NETC&POWERGRID to submit data in a time bound manner as decided previously.

Action: NETC/NERTS.

D.4 Furnishing of Technical and Commercial data for computation of PoC Charges and Losses for Q3 of 2016-17 (October 2016 – December 2016):

As per provisions of the CERC (Sharing of Inter State Transmission Charges and Losses) Regulations, 2010 as amended from time to time, the following data are required for Computation of PoC Charges & Losses for 3rd Quarter of 2016-17 (October 2016 – December 2016):

Yearly Transmission Charges (YTC) – As per Format I

Technical details of new transmission elements & generating units which are expected to commence commercial operation during July 2016 - September 2016 (As per Format-II)

Details of Long term and Medium term contracts (As per Format IIIA)

Node-wise Forecast maximum withdrawal and injection data (As per Format IIIB)

Maximum Injection and Withdrawal data for corresponding quarter of last 3 years (As per Format IIIC)

Letter in this regard from NLDC, POSOCO and Approved Formats for furnishing the relevant data (Format I, Format II, Format III) have been emailed to all DICs of NER on 05th April 2016. Formats for data submission are also available on website of NLDC at the following link: http://posoco.in/transmission_pricing/formats.

The requisite data/information may please be forwarded to NLDC at implementingagency@posoco.in with a copy to NERLDC at nerldc@yahoo.co.in latest by **31st July 2016**.

AEGCL, MePTCL and TSECL are requested to indicate the YTC data for October 2016 – December 2016 period of their transmission lines approved by CERC for inclusion in PoC Computations. The YTC data must be submitted as per Format-I only (Approved Format).

Deliberation in the meeting

Sr. Engineer, NERLDC informed that YTC data for 132kV Dharmanagar-Dullavcherra (for Q-2) is still pending and requested TSECL to take action in this regard forthwith. TSECL agreed.

NERLDC requested all DICs to furnish the forecast data latest by 25th July for sending to NLDC (Implementing Agency). It was decided by the forum that the data furnished by DICs would be ratified in next OCCM.

NERLDC informed that although constituents are furnishing commercial data for calculation of quarterly POC, the technical data are not being furnished for a long time. It was decided that NERLDC would circulate the technical data of PoC Cases to all DICs for checking at their end. In case of any discrepancy, DICs to point out the same to NERLDC by 15th August'16. NERLDC also requested DICs to submit the details of Transmission / Generation elements commissioned since October 2010 as per Format by 15th August, 2016.

The Sub-committee noted as above.

Action: TSECL/AEGCL.

D.5 Assessment of Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) by SLDC on respective Inter-State Transmission Corridor

The study results for assessment of Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) for state control areas have only been received from MePTCL.

Updated Base Cases have been mailed to all the SLDCs on 01.07.16. All SLDCs are requested to assess the Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) using these cases, and furnish the study cases to NERLDC for the month of November'16 by 15th July, 2016. NERLDC assessed study results is attached in Annexure-I.

SLDCs are requested to check the TTC of their control areas as computed by NERLDC and furnish their comments, if any by 15th July'16. If no comments are forthcoming from the States, TTC, ATC & TRM figures of State control area and group of control areas as assessed by NERLDC may be considered as final and uploaded in NLDC website, if required.

It is pertinent to mention here that 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

S.E(O), NERPC once again requested all the constituents (except Manipur, Nagaland) to submit the laptops with dongles as early as possible. It was emphasized that TTC/ATC calculation cannot be done by the SLDCs unless these laptops are returned to the designated officials. It was decided that by next OCC meeting, Laptop with PSSE Dongle to be returned by all constituents to NERPC for re-allocation to

appropriate personnel. NERPC may also write a reminder letter to all constituents to return Laptop with PSSE dongle by next OCCM.

NERLDC had done TTC calculations of State control areas, State subsystems, and Group of Control areas of NER, on behalf of SLDCs of NER for the month of July'2016. The forum advised the SLDCs to submit any comment to NERLDC by 20th July 2016, and to host the TTC/ATC figures in their respective websites after that.

Action: Assam, Meghalaya, Ar. Pradesh, Mizoram, & Tripura.

The Sub-Committee noted as above.

D.6 Detailed operating procedure for Reserve Shut Down(RSD) and Backing down upto technical minimum:

The 4th Amendment of IEGC notified on 6th April, 2016 requires NLDC to formulate a procedure for taking units under Reserve Shut Down (RSD) and identifying units to be Backed down upto technical minimum schedule. Accordingly NLDC has prepared a draft procedure and sent to all RPCs for discussion. All constituents are requested to please go through the procedure and comment, if any, may be sent NLDC so that same can be considered and final procedure can be sent to CERC.

Deliberation in the meeting

Since there were no comments from any of the constituents forum decided to confirm the Operating Procedure and drop the agenda item.

The Sub-Committee noted as above.

D.7 Grid Disturbance (GD-V) in NER on 16.04.16 at 1203 Hrs:

A major disturbance of category GD-V occurred in NER Grid on 16.04.16 at 1203 Hrs. In this connection it was decided in 121st OCC Meeting of NERPC that a Committee is to be formed to analyze the disturbance thoroughly, identify the root causes and suggest corrective measures. It was also proposed in 42nd PCC Meeting of NERPC to constitute an Enquiry Committee for analysis of the above disturbance with independent members.

In 122nd OCCM, after detailed deliberation it was decided that all members of the Enquiry Committee should abide by the decisions of the 42nd PCC forum.

DGM (SO-II), NERLDC had informed SE (NERPC) that the Enquiry Committee for looking into the causes of Grid Disturbance should be formed of independent

members. For purpose of the Enquiry committee to start its investigation, NERPC may issue letter to all concerned, stating Terms of Reference, etc.

Deliberation in the meeting

In view of reservations raised by DGM(SO-II),NERLDC it was decided that the Committee to analyze GD-V on 16.04.2016 would be headed by S.E.(O),NERPC and all other members would be co-opted by him as per requirement.

The forum agreed that for cases of GD-IV and GD-V in NER, the events are to be analyzed without any delay to prevent loss of valuable information that may prevent identification of root cause. It was decided that the committee to be headed by SE(O), NERPC would be formed at the earliest with Terms of Reference, so that cases of GD-V in NER on 16.04.16, and GD-IV in NER on 09.07.2016, be brought to conclusion by 31st July 2016.

The Sub-committee noted as above.

Action: NERPC

D.8 Updated Operating Procedures of NER July 2016:

Draft Operating Procedures of NER, updated to July 2016 has been sent to regional entities of NER, the same is also available in NERLDC website. Power utilities of NER are requested to furnish their comments and suggestions for this document by 30th June'16 as the same has to be finalized by 10th July'16.The document is password protected; password is available with SOII department of NERLDC.

In 122nd OCCM, DGM(SO-I), NERLDC shared the password of Main document and Annexures to Operating Procedure of NER, and requested all entities of NER Grid to give comments for finalization by 10th July, 2016.

Deliberation in the meeting

NERLDC asked all constituents to forward any comments, latest by 18th July, so that Operating Procedure can be finalized by 20th July 2016.

The Sub-committee noted as above.

D.9 Information of Events of Load crash on account of inclement weather conditions:

As per directives of DPE & MoP, Govt. of India, NERLDC have to prepare reports indicating events in the Grid that occurred on account of inclement weather

conditions, particularly events involving load crash. For preparation of these reports, the following inputs are required from affected states:

a. Date and Time-frame of such incidence ii. Affected areas
b. Reason for load crash iv. Tripping of LT feeders (33 kV / 11 kV level). SLDCs may indicate affected areas if detailed information is not available.
c. Quantum of load crash and generation loss v. Details of Restoration
d. Any corrective measures (presently taken / suggested for future)

A sample format which is being used by NERLDC for event reporting is attached in **Annexure-D.9**.

As and when such events occur, SLDCs are requested to inform about the event to NERLDC immediately after the incident and prepare a report as per the above format and send the same to NERLDC at rtsdnerldc@gmail.com and nerldc@yahoo.co.in. It is pertinent to mention here that AEGCL, MePTCL & TSECL are sending the Load crash reports to NERLDC on regular basis.

In 122nd OCCM, all the utilities agreed to submit the necessary data.

Deliberation in the meeting

AEGCL informed that RHEP generation suddenly comes and it is altering the schedule to a great extent. This is resulting in underdrawal at high frequency resulting in penalty for states. The forum suggested that these instances of sudden generation due to inclement weather should also be included in NERLDC report.

NERLDC informed that load crash report for May, 2016 has been submitted by Assam, Manipur, Mizoram, Meghalaya and Tripura. The forum requested other states to kindly submit the report to NERLDC as and when events of load crash were observed by them.

NERLDC also requested all SLDCs to include the restoration time of these events, so as to enable NERLDC to compute the amount of energy un-served on account of these incidences.

The Sub-committee noted as above.

Action: All utilities, NERLDC.

D.10 Installation of spare Transformers in NER:

Recently 132/33 kV 10 MVA and 16 MVA Transformers at Nirjuli (PG) have been replaced by 2 nos. 50 MVA Transformers. After replacement of the above mentioned

transformers, the 10 MVA & 16 MVA Transformers are now Spare Transformers and can be used at other substations. Further in future 220/132 kV 2x50 MVA Transformers at Balipara (PG) will also be replaced by 2x160 MVA Transformers. Members may please deliberate about optimal utilization of these spare Transformers in NER.

In 122nd OCCM, DGM(AM) suggested that in view of the fact that above stated assets have been replaced, they may now either be de-capitalised or kept as regional spare. Representatives of DoP Ar. Pradesh, AEGCL, DoP Mizoram, TSECL viewed that they should be kept as regional spare. After detailed deliberation it was proposed that the 132/33 kV 10MVA transformer is to be stored at Nirjuli(PG) S/Sn for the time being. The 132/33 kV 16 MVA transformer is to be shifted to 132kV Haflong(PG) S/Sn for use by AEGCL for a period not exceeding 18 months. In case of 2x50 MVA transformers at Balipara, it was decided that they would be returned to the owners i.e. NEEPCO & AEGCL. Also the 132kV bay equipments of NEEPCO would be returned and 132 kV bay equipments of AEGCL would be given to DoP Ar.Pradesh (as regional spare) for use at RHEP S/Sn.

Sr. Manager, NEEPCO informed that the concurrence for returning of Balipara ICT and bay equipments would be intimated later.

Deliberation in the meeting

Sr. Manager NEEPCO informed that NEEPCO is facing capitalization issues for Balipara equipments and decision regarding the handover would be intimated in due course. Sr. Manager, TSECL requested for the 132/33 kV 10MVA transformer that has been de-commissioned at Nirjuli. Similarly SE, DoP Mizoram requested for the 16MVA transformer. DGM(AM),NERTS clarified that first SCM would have to agree for declaring said assets as regional spare to enable POWERGRID to put up to CERC. Members agreed that SCM needs to be conducted urgently and requested NERPC to take necessary action at the earliest.

The Sub-committee noted as above.

Action: NERTS/NERPC /NEEPCO.

D.11 Reasons For Demand - Supply Gap And Its Variation:

It was deliberated in the 4th NPC meeting that monthly power supply position prepared & published by CEA based on the data furnished by the states reflected shortages in almost all the states. However, a number of those states intimated

adequate availability of power. This meant that the deficit/shortage in such states was actually not the deficit in true sense but demand-supply gap due to reasons other than shortage of power. The other reasons for the demand-supply gap could be inadequate availability of power, transmission constraint, distribution constraint, financial constraint, etc. The reason for demand-supply gap needed to be clearly mentioned to reflect true picture of power supply position in different states and also to invite attention of various agencies including policy makers to the specific problem areas in the power sector for suitable solution.

After deliberation it was decided in the meeting that all the RPCs would advise the states in their respective regions to intimate broad break-up of demand-supply gap due to various reasons, or at least, the main reason(s) for demand-supply gap in each month.

In 122nd OCCM, DGM(SO-I), NERLDC was of the view that constituents may indicate the load-shedding quantum in their systems under different heads appropriately like inadequate availability of power, transmission constraint, distribution constraint, financial constraint, etc. The forum agreed.

Deliberation in the meeting

Pls refer to discussion in **Item No. B**.

The Sub-committee noted as above.

D.12 Reactive Power Planning:

In the 4th meeting of NPC, it had been agreed that states should adopt a proactive approach in the matter of reactive power planning, and that the provisions regarding reactive power planning similar to those mandated in the IEGC for the CTU should be included in the respective State Grid codes.

It was informed in the meeting that Sub-Committee of PSDF had forwarded few schemes of capacitor installation by states to respective RPC for approval of RPCs. It was of the view that RPC might be able to justify the requirement of capacitor installation of state.

After detailed deliberation, it was agreed that the proposal of capacitor installation planning by states/entities would be referred to RPCs and to PSDF Sub-Committee routed through RPCs and the proposal would be vetted by the respective RPC.

In 122nd OCCM, after detailed deliberation it was decided that the SLDCs with due consultation of DISCOMs would revert back to the forum with the requirements.

Deliberation in the meeting

EE, Mizoram informed that DPR is being prepared and proposal would be sent after finalization. S.E.(O),NERPC requested other states to kindly estimate requirement and communicate the same.

NERTS also asked states to plan their capacitor requirement taking into account future EHV lines, so that the installation of capacitors does not go waste.

The Sub-committee noted as above.

Action: All utilities, SLDCs.

D.13 Scheme for Storage and Management of Protection System Data Base:

Ramakrishan Task Force Report on Power System Analysis under Contingencies had recommended for creation of data base for relay settings

Quote:

There is also a need for creating and maintaining data base of relay settings. Data regarding settings of relays in their network should be compiled by the CTU and STUs and furnished to the RLDC and SLDC respectively and a copy should also be submitted to RPC for maintaining the data base.

Unquote

RPC had prepared scheme for above purpose for funding from PSDF. The scheme had been approved by MoP. SRPC submitted the scheme for similar purpose. Other RPCs were also requested to initiate the preparation of above scheme to implement the recommendations of the Ramakrishna Task Force. It was informed that the Ramakrishna task Force report had been accepted by MoP.

NPC advised RPCs to take necessary action for creating and maintaining database of relay setting. RPCs agreed to initiate preparation of the scheme for implementation recommendation of Ramakrishna Task Force.

In 122nd OCCM, the forum requested NERPC to undertake exercise in this regard on the same lines of ERPC.

Deliberation in the meeting

S.E.(O),NERPC informed that exercise has already been initiated in this regard and the item may be reviewed periodically in PCC meeting of NERPC. NERPC informed that they will take up the matter with ERPC, and will intimate by next OCC & PCC.

The Sub-committee noted as above.

Action: NERPC.

D.14 Review of CEA(Technical Standards for Construction of Electrical Plants and Lines) Regulations, 2010:

The stated regulation is to be reviewed every five years. Members may please discuss for modification in Chapter IV, Part-A and Chapter-V, Part-A.

In 122nd OCCM, the members agreed to revert back with their views and any amendments if required.

Deliberation in the meeting

Since no comments were received the forum decided to drop the agenda item.

The Sub-committee noted as above.

D.15 Status of RE generation in NER:

NLDC is compiling details of renewable power plants in India. NERLDC has mailed all the power utilities regarding furnishing of details of RE Generation in NER. All the power utilities are requested to furnish the details of RE Generators currently under operation and also provide information regarding RE Generators expected to be commissioned in future.

The formats are attached in **Annexure-D.15**.

Deliberation in the meeting

The format was circulated by NERLDC for submission of information by SLDCs of NER by 31st July 2016.

The Sub-committee noted as above.

D.16 Verification of Transmission Availability against outage of ISTS Elements:

Monthly Outage verification of ISTS elements is being done by NERLDC. To verify the reasons of outage as claimed by Transmission Licensee, relevant supporting documents namely Disturbance Recorder outputs (in COMTRADE format), Substation Event Logger, Relay indications, Photographs of affected parts of line, Patrolling report, FIR to local district administration, weather report etc. are required. Earlier, NERTS & NETC were also requested to indicate the particular clause of CERC regulations, in case of outages not attributable to respective ISTS Transmission Licensees. In absence of the supporting documents there could be ambiguity in the outage verification process. Accordingly, from next month onwards, NERTS & NETC may furnish the monthly outages for verification, incorporating relevant clause of CERC regulations, in Excel format, with all supporting documents.

It is also requested to submit the details within 10th of every month for the previous month.

Deliberation in the meeting

The forum advised NETC & NERTS to submit the above stated details within the stipulated time frame.

It was decided that from next OCCM, the Outage details would be placed in the meeting for comments from all constituents.

The Sub-committee noted as above.

Action: NERTS, NETC.

D.17 Furnishing of UFR Report and status of Implementation:

As per recommendation of enquiry Committee, the status of installation of UFR in NER is attached in Annexure-III. It is gathered that, 18.5 MW quantum is yet to be implemented in Arunachal Pradesh & Manipur.

DoP, Arunachal Pradesh & MSPCL is requested to provide current status of implementation of UFR in their respective states.

Further NERLDC has already mailed all the states, regarding submission of details of UFR operation on monthly basis as per format- Annexure-IV and the response is summarized as below:

Sl. No.	Name of Utility	Current Status	Remarks
1	DoP, Arunachal Pradesh	Submitted for May'16	
2	AEGCL	Submitted for June'16	Regularly submitting
3	MSPCL	Not submitted	
4	MePTCL	Not submitted	
5	P&E, Mizoram	Submitted for April'16	
6	DoP, Nagaland	Submitted for June'16	Regularly submitting
7	TSECL	Submitted for May'16	

All the states are requested to provide feeder-wise details of UFR operation during Grid Disturbance on 16th April'16 as per the attached format in **Annexure-D.17**.

Deliberation in the meeting

The forum decided that monthly report is not being furnished. As per clauses of relevant regulations, and Order of Hon'ble CERC in matter of Petition no. 113/MP/2014, NERLDC and NERPC are mandated to submit status of UFR operation and non-operation to CERC. SLDCs were thus requested to submit UFR operation

details (feeder-wise quantum of load relief to be indicated) on monthly basis, and even if no UFR operated in particular month, it should indicated as NIL.

The Sub-committee noted as above.

Action: All utilities.

D.18 Outage of multiple reactors at Bongaigaon:

420 kV, 80 MVAR Bus Reactor IV at Bongaigaon is under outage since 8th June'16 due to very high hydrogen content on Y-Phase Bushing ; further 420 kV, 80 MVAR Bus Reactor III at Bongaigaon also blasted due to failure of B-Phase bushing on 25.06.16[as reported by NERTS].

After the above blasting incident 420 kV 50 MVAR Bus Reactor II at Bongaigaon, 420 kV 63 MVAR Line Reactor on 400 kV Bongaigaon - New Siliguri line I at Bongaigaon and 400 kV 63 MVAR Line reactor on 400 kV Bongaigaon - Balipara line I at Bongaigaon were taken under emergency shutdown by NERTS, reportedly due to low bushing oil level.

400 kV nodes in NER Grid are experiencing over voltage after commissioning of HVDC Biswanath Chariali. NER Grid is experiencing high voltage at 400 kV Buses due to outage of multiple Bus Reactors. To maintain voltage profile at 400 kV Buses, several 400 kV lines of NER were kept open. Total Loss of reactive power compensation is 323 MVAR due to these outages.

Such multiple outages of reactors are inimical for grid security/operation.

Deliberation in the meeting

DGM (AM), NERTS informed that Polymer/RIP Bushings are more reliable & less prone to failure compared to conventional OIP bushings. As a preventive measure, all the bushings of 50MVAR Bus Reactor-II, 80MVAR Bus Reactor-III & 80MVAR Bus Reactor-IV are under replacement with RIP bushings for reliable operation of the reactors in coming days. However, to arrange the RIP bushings & subsequent replacement of all the OIP bushings for the said reactors (including healthy ones) in the ongoing inclement weather conditions, it took certain time to restore the reactors. However, this preventive & one-time exercise for improvement of reliability of the Reactors was essential to avoid breakdown and subsequent aggravation of over-voltage issue of NER Grid.

NERLDC informed that such multiple outages of Grid elements to be prevented in future.

The Sub-committee noted as above.

Action: NERTS.

D.19 Updation of SPS Document of NER Grid:

NERLDC is preparing SPS Document of NER Grid. The draft SPS Document is attached as per **Annexure-D.19**.

All the concerned utilities are requested to give comments on the document and provide the updated Logic Diagram of SPS by 31st July'16.

Deliberation in the meeting

OTPC representative informed that on 09.07.2016(GD-IV) SPS-3 did not mal-operate rather it was due improper scheme design. He requested that the matter be discussed in System-Study sub-group. Sr. Engineer, NERLDC did not agree with view of OTPC and informed that as per design of SPS-3, generation at Palatana units to be reduced to 200 MW immediately (within seconds), and requested constituents to review the whole "System Protection & islanding" schemes designed for NER system due to subsequent addition of new Tr. Lines & generation in NER Grid. The matter of redesigning of SPS would be reviewed in next System Study meeting of NER.

The Sub-committee noted as above.

Action: All utilities.

D.20 Furnishing of Black Start Time for Power Plants:

All the power utilities having black start facilities are requested to furnish the time required for Black Start of their Power Plants. These data are required by operators for restoration of Grid after disturbance, scheduling of Power plants etc.

The Power Utilities are also requested to provide the time required to start their generators after Grid power is extended upto their bus.

Deliberation in the meeting

The forum requested NERLDC to kindly consult already available data in the form of Ancillary Service etc. and revert back. It was decided that Hydro and Gas stations to give their black start timings, and time required to start their generators after Grid power is extended upto their bus to NERLDC.

AGBPP, AGTPP and BgTPP are furnishing Warm start & Cold start timings as part of Ancillary services data.

The Sub-committee noted as above.

Action: NERLDC.

D.21 Under requisition, Over drawal & DSM outstanding:

It has been observed that some of the constituents are over drawing from the grid on persistent manner whereas at the same time they are surrendering their shares. For instance both Assam and Tripura have overdrawn considerably in last week of June-16[please refer daily reports]. Further no effort is seen to toggle the drawal as per DSM regulation. Report pertaining to over drawal and non-payment to DSM pool is being reported to CERC as per directive. At any time CERC may take suo-motu action in these regard.

For better management of the Grid, it is desired that proper load forecasting is carried out by all the States and requirements met through firm schedule instead of leaning on DSM.

Deliberation in the meeting

Please refer to discussion in **Item No.B.** DGM(MO) further stressed that planned overdrawal from grid by surrendering allocation from ISGS should be discouraged.

The Sub-committee noted as above.

Action: All utilities.

D.22 Load Forecast Error:

At present day-ahead hourly load forecast data on daily basis is being prepared by NERLDC based on the data sent by SLDCs. It has been observed that there is a huge difference between the forecasted load and the actual demand met.

A comparison between the forecasted load and the actual demand met of all the states of NER is attached in **Annexure-D.22**.

Deliberation in the meeting

Sr. Engineer, NERLDC appraised the communication regarding proper load forecasting received from ED, NLDC. It was informed that states have to give 15 min block-wise data by 11:00 Hrs for next day, which would be used by RLDC to develop the 1st line of forecast. The methodology being followed by states for load forecasting was to be discussed and made uniform, so as to prevent wide variations between forecast and actual figures.

Manager, NERLDC informed that states have to give 15 min blockwise data by 23:00 Hrs for next day. At present Mizoram & Meghalaya are furnishing 15 min forecasting data. He also intimated that the new SCADA has a package for load forecasting which may be explored.

The Sub-committee noted as above.

Action: All SLDCs

D.23 Primary Response of generating units:

Primary Response through governor action is expected to be provided by generating units as per section 5.2 (f) to 5.2 (i) of the Indian Electricity Grid Code (IEGC).

NLDC/RLDCs have been evaluating frequency response of all the regional entities due to large contingency in the system leading to load or generation loss. The Median value of FRC of North Eastern Region was of the order of 50 MW/Hz. From the response observed on 9th June'16 for load throw off of 4000 MW, it is apparent that there are scopes for improving of primary response through governor action.

The communication from ED, NLDC is attached at Annexure-D.23. The letter was already forwarded to all the concerned utilities by GM, NERLDC.

All the concerned generating utilities are requested to inform the status of implementation of Primary Response at each Generating Units.

As per, CERC approved Procedure for Assessment of Frequency Response Characteristic (FRC) of Control Areas in Indian Power System, all RLDCs are to submit FRC calculation to CERC if loss of load/generation greater than 1000 MW and frequency change of 0.05 Hz occurs in the Grid. Sometimes it has been observed that whatever correction in frequency is required, the same is done within 10secs. Since SCADA data is available after 10secs, these type of incidents are not captured properly. In other words, accurate value of FRC could not be derived from SCADA data due to its inherent design.

Accordingly, all the generating stations are requested to furnish data from DAS (Data Acquisition system) whenever such type of event occurs. If generating stations have not implemented DAS, it is requested to do so at the earliest.

Deliberation in the meeting

The letter issued by ED-NLDC dated was discussed.

It was stated that out of the many instances mentioned in the letter, all generators should intimate the response by their units in the case of 4000 MW load throw-off on 9th June, 2016 at 14:27 Hrs.

The Sub-committee noted as above.

Action: NERLDC.

D.24 Dynamic Data of generating units:

As deliberated in 11th System Study Meeting of NERPC, all the generating Units were requested to furnish dynamic data as per the formats circulated in previous meetings. Some of dynamic simulation data from IGSS are available with NERLDC as of now.

NLDC has prepared the Dynamic Model of All India Grid using legacy data. In order to tune the case for North-Eastern Region for performing Stability studies, it is necessary that all generating utilities to furnish the modelling information available with them. If these data are not readily available with them, generating utilities of NER are requested to collect these data from manufacture and send these data to NERLDC.

Deliberation in the meeting

NERLDC informed the forum that NLDC had prepared Dynamic cases for study, based on legacy data, which may be insufficient for accurate representation of NER Grid generators. The forum advised the generating stations to submit the data whichever is available, and to contact manufacturer regarding data that is not available with them.

The Sub-committee noted as above.

Action: All generating stations.

D.25 Outage Coordination:

In line with the provisions of the IEGC for outage coordination, a procedure was formulated by NLDC in Feb 2013 for stream lining the shutdown coordination activity.

As per the procedure, the outage indenting agency shall confirm its readiness to avail the outage to NERLDC by 10:00 hrs on D-3 basis i.e. 3 days ahead of the OCC approved date for availing the outage. All the power utilities are requested to inform about the readiness of availing the shutdown through mail to nerldcoutage@gmail.com. Some of the indenting agencies are not informing about the same, making outage co-ordination together with revision in Transfer Capability etc. difficult.

Outage coordinators of all utilities are requested to comply with the procedure.

Deliberation in the meeting

The forum advised NERTS to comply and requested all the SLDCs to disseminate the procedure to respective state utilities for compliance. It was also noted that in many cases, Transmission utilities were not availing shutdown even though the same was approved in OCC meetings, and no confirmation regarding non-availing of shutdown was given to NERLDC, which prevents upward revision of Transfer capability.

The Sub-committee noted as above.

Action: All utilities, NERTS.

D.26 Impact on Transfer Capability of NER Grid after commissioning of Unit # 1 of BgTPP and 400/220 kV, 315 MVA ICT-II at Balipara:

The Transfer Capability (Import / Export) of NER to ER Grid is impacted by the generation at BgTPP (NTPC). The generation at BgTPP has caused reduction in Import Capability of NER from ER Grid, and increase in Export Capability of NER to ER Grid. This situation of reduction in Import Transfer Capability of NER Grid from ER is expected to further aggravate with commissioning of Unit # 2 and 3 of BgTPP.

After commissioning of 400/220 kV, 315 MVA ICT-II at Balipara (PG), the constraint for import capability of NER from Eastern Region has shifted to 220 kV Balipara – Sonabil – Samaguri link (earlier it was High loading of 400/220 kV, 315 MVA Misa ICT, under N-1 contingency of other ICT at Misa).

After commissioning of 220/132 kV, 2x100 MVA ICTs at Sonabil (AEGCL), the loading on 220 kV Balipara – Sonabil line is expected to increase further due to feeding of downstream loads from 220/132 kV Sonabil (AEGCL) substation. It is thus necessary to expedite commissioning of 2nd circuit of 220 kV Balipara – Sonabil – Samaguri link of AEGCL & kV and award of 400/220 2x500 MVA ICTs at Misa in order to address the constraint in Transfer Capability of NER from ER.

Deliberation in the meeting

The forum decided to review commissioning of 220 kV Balipara – Sonabil – Samaguri Ckt #2 and 400/220 2x500 MVA ICTs at Misa in item No.C.1 of OCC. It was decided that to expedite 220 kV Balipara – Sonabil – Samaguri line, it may be placed in next SCM of NER.

NERLDC informed that NTPC was not submitting the forecast generation figures to NERLDC, and requested that NTPC should submit accurate forecast generation since their generation directly impacts the Transfer capability of NER Grid.

The Sub-committee noted as above.

Action: AEGCL,NERTS.

D.27 Real-Time Energy Assessment System for effective Grid Management-Software by CDAC

CDAC has submitted a proposal for Real-Time Energy Assessment System for effective Grid Management. The Proposed system has majorly three components namely, real-time data acquisition system, real-time energy assessment system and short term load forecasting. This would be very useful for the SLDCs for forecasting the load and to plan the scheduling accordingly. This would also be useful for the users to have online information of the schedule and UI charges, this would help them to schedule and

reduce their penalty and thereby contributing to the Grid stability. The project would approximately cost around 2 crores which would also require user contribution. The detailed proposal is given at **Annexure- D.27.**

Deliberation in the meeting

Members agreed to study the proposal in detail and revert back.

The Sub-committee noted as above.

Action: All SLDCs.

D.28 Delay in Scheduling of power from NTPC ER stations.

It has been notice that in many instances, there is delay in scheduling of Partial or URS requisition of power from NTPC, ER.

Deliberation in the meeting

Manager, NERLDC informed that at times there are issues of delay in inter-regional cases, however, the problem would be solved after WBES software is commissioned.

The Sub-committee noted as above.

Action: NERLDC.

D.29 Data mismatch in NERLDC website.

At many instances huge Data mismatch has been found in the Realtime Data "State Schedule vs Actual" of Assam displayed in the NERLDC website.

Deliberation in the meeting

It was clarified that the website data should not be relied upon and is not to be used for system operation especially in state like Assam where SLDC is fully functional.

The Sub-committee noted as above.

Action: NERLDC.

D.30 Certification of Meghalaya state T/L as ISTS line:

Based on initial studies by MeECL the following lines have been found to cater loads of other states in addition to Meghalaya, so they may be declared as ISTS line:

1. 220kV D/C Misa - Killing
2. 132 kV S/C Agia - Nagalbibra
3. LILO of 400kV D/C Pallatana - Bongaigoan at 400/220kV Killing S/S

The matter was discussed in one of the sub-group meetings and it was suggested that NLDC/NERLDC may conduct studies by WebNet software and inform the members of load flow patterns in 123rd OCC.

Deliberation in the meeting

Sr. Engineer, NERLDC informed that the study results would be communicated to MeECL/NERPC within 15 day.

The Sub-committee noted as above.

Action: NERLDC.

Any other item:

1. Disturbance in NER Grid on 09th July 2016 at 13:19 Hrs

A major disturbance of category GD-IV occurred in NER Grid on 09.07.16 at 1319 Hrs. At 13:19 Hrs, 400 kV Silchar – Byrnihat and 400 kV Silchar – Azara lines tripped, leading to loss of major corridors between Northern and Southern part of Grid. After this, other 132 kV lines between Northern and Southern part tripped due to overloading, and finally isolation of Southern part of NER Grid comprising of South Assam, Manipur, Mizoram, & Tripura including Bangladesh.

Tripura system with Bangladesh, AGTPP and Palatana blacked-out, while the South Assam load tripped on operation of SPS-1. Mizoram and Manipur systems survived with Loktak generation.

This isolated part was later synchronized to rest of NER Grid, and the interrupted portion of NER Grid restored progressively by 1414 Hrs.

Deliberation in the meeting

Sr. Engineer, NERLDC gave a presentation highlighting presumptive reasons and highlights of the grid failure. Forum decided that the disturbance be investigated by the same committee constituted to analyze GD_V on 16.04.2016 under the chairmanship of S.E.(O),NERPC.

The Sub-committee noted as above.

Action: NERPC.

Date & Venue of next OCC meeting

It is proposed to hold the 124th OCC meeting of NERPC on second week of August, 2016. However, the exact date and venue will be intimated in due course.

The meeting ended with thanks to the Chair.

*****

Annexure-I

List of Participants in the 123rd OCC Meetings held on 12.07.2016

SN	Name & Designation	Organization	Contact No.
1.	Sh. N. Perme, EE, SLDC	Ar. Pradesh	09436288643
2.	Sh. K. Goswami, DGM (Com)	Assam	09864020019
3.	Sh. Navajit Patir, Dy. Manager, SLDC	Assam	09707380294
4.	Sh. B.C. Borah, AGM,SLDC	Assam	09435119248
5.	Sh. Satyendra Kumar, Asst. Manager	Assam	09859164470
6.	Sh. G.K. Bhuyan,AGM (Com)	Assam	09854015601
7.	Sh. G. TapanKumar Sharma, Manager	Manipur	08974138850
8.	Sh. Themchan Woleng, Manager	Manipur	08731000143
9.	Sh. F.E Kharshiing, SE (SLDC)	Meghalaya	09863066960
10.	Sh. R. Majaw, SE (E/M)	Meghalaya	09436110871
11.	Sh. T. Gidon, EE, SLDC	Meghalaya	09774479956
12.	Sh. B. Narry, AEE	Meghalaya	09089000911
13.	Sh. A.G. Tham, AEE	Meghalaya	09774664034
14.	Sh. R.Khongmalai, AE	Meghalaya	08014137268
15.	Sh. David Ramnunsanga	Mizoram	09436155836
16.	Sh. Rokobeito Iralu, SDO (Trans.)	Nagaland	09436832020
17.	Sh. U. Debbarma, DGM, SLDC	Tripura	09436462842
18.	Sh. Debabrata Pal, Sr. Manager (Comml.)	Tripura	09436500244
19.	Sh. P. Kanungo, DGM (AM)	PGCIL	09436302823
20.	Sh. H. Talukdar, Chief Manager, AM	PGCIL	09436335237
21.	Sh. Bishwajit Medhi, Manager (SO-I)	NERLDC	09436335376
22.	Sh. R. Sutradhar, DGM (MO)	NERLDC	09436302714
23.	Sh. Rahul Chakraborti, Sr. Engr. (SO-II)	NERLDC	09402507543
24.	Sh. Joypal Roy. Sr. Mgr. (C/M)	NEEPCO	09435577726
25.	Sh. Prasenjit Phookan, DGM (E/M)	NEEPCO	09435380415
26.	Sh. B.K. Chakraborty, DGM (E/M)	NEEPCO	09436309730
27.	Sh. E. Ngullie, DGM (O)	NTPC	09435139531
28.	Sh. R.V. Patnaik, AGM (OS)	NTPC	09438233243

	No Representative	**NHPC**	-
29.	Sh. Alokesh Hazarika, Executive (O&M)	OTPC	07085060480
30.	Sh. P.K. Mishra, MS	NERPC	-
31.	Sh. B. Lyngkhoi, Director/S.E (O)	NERPC	09436163419
32.	Sh. S. Mukherjee, AEE	NERPC	08794277306

Transformer Tap Optimisation Study

Senario : May 2016

29-Apr-16

Sl. No.	Substation	Voltage Ratio (kV)	Transformer No.	Capacity in MVA	Controlled Bus	Tap Step (%)	Total Tap Positions	Nominal Tap	Present Tap	Voltage Profile				Optimised Tap Changer Position
										Off-Peak			Peak	
										Nominal Taps	Present Tap setting	After Optimisaton	After Optimisaton	
1	**Balipara**	400/220	1	315	400kV	1.25	17	9	9	416	412	407	404	NO+1 (10)
		220/132	2	50	132kV	1.25	17	9	9	138	138	134	128	NO+2 (11)
		220/132	3	50	132kV	1.25	17	9	9					NO+2 (11)
2	**Bongaigaon**	400/220	1	315	400kV	1.25	17	9	12	415	414	412	409	NO+3 (12)
3	**Salakati**	220/132	1	50	132 kV	1.25	17	13	13	139	135	135	135	NO (13)
		220/132	2	50	132 kV	1.25	17	13	16					NO+3 (16)
4	**Misa**	400/220	1	315	400kV	1.25	17	9	5	416	409	404	400	NO-4 (5)
		400/220	2	315	400kV	1.25	17	9	5					NO-4 (5)
5	**RHEP**	400/132	1	360	400 kV	2.5	17	9	9	416	411	407	404	NO+2 (11)
		400/132	2	360	400 kV	2.5	17	9	9					NO+2 (11)
6	**Azara**	400/220	1	315	400kV	1.25	17	9	8	415	413	411	410	NO-1 (8)
		400/220	2	315	400kV	1.25	17	9	8					NO-1 (8)
7	**Biswanath Chariali (PG)**	400/132	1	200	400 kV	1.25	17	9	8	416	411	408	404	NO-1 (8)
		400/132	2	200	400 kV	1.25	17	9	8					NO-1 (8)
8	**Silchar**	400/132	1	200	400 kV	1.25	17	9	9	411	`411	410	409	NO (9)
		400/132	2	200	400 kV	1.25	17	9	9					NO (9)
9	**Byrnihat**	400/220	1	315	400 kV	1.25	17	9	9	419	421	420	417	NO+2 (11)
		400/220	2	315	400 kV	1.25	17	9	9					NO+2 (11)
		220/132	5083/1	160	132 kV	1.25	17	9	9	138	139	137	135	NO-1 (8)
		220/133	5083/1	160	132 kV	1.25	17	9	9					NO-1 (8)
10	**Palatana**	400/132	1	125	132 kV	1.25	17	9	9	136	136	134	133	NO+2 (11)

Note : a) NO indicates Nominal Tap position, b) NO-1 when HV bus is controlled bus, indicates transferring MVAR from HV bus to LV bus to reduce voltage of the HV bus and increase voltage of LV bus

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN NORTH-EASTERN REGION
INCLUDING ALLOCATED SHARES IN JOINT & CENTRAL SECTOR UTILITIES
(As on 31.01.2016)

State	Ownership/ Sector	Modewise breakup							Grand Total
		Thermal				Nuclear	Hydro (Renewable)	RES (MNRE)	
		Coal	Gas	Diesel	Total				
Assam	State	60.00	276.20	0.00	336.20	0.00	100.00	30.01	466.21
	Private	0.00	24.50	0.00	24.50	0.00	0.00	4.10	28.60
	Central	127.00	417.92	0.00	544.92	**0.00**	329.72	0.00	874.64
	Sub-Total	**187.00**	**718.62**	**0.00**	**905.62**	**0.00**	**429.72**	**34.11**	**1369.45**
Arunachal Pradesh	State	0.00	0.00	0.00	0.00	0.00	0.00	104.61	104.61
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.27	0.27
	Central	12.35	43.06	0.00	55.41	0.00	97.57	0.00	152.98
	Sub-Total	**12.35**	**43.06**	**0.00**	**55.41**	**0.00**	**97.57**	**104.88**	**257.86**
Meghalaya	State	0.00	0.00	0.00	0.00	0.00	282.00	31.03	313.03
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	17.70	105.14	0.00	122.84	0.00	74.58	0.00	197.42
	Sub-Total	**17.70**	**105.14**	**0.00**	**122.84**	**0.00**	**356.58**	**31.03**	**510.45**
Tripura	State	0.00	169.50	0.00	169.50	0.00	0.00	16.01	185.51
	Private	0.00	0.00	0.00	0.00	0.00	0.00	5.00	5.00
	Central	18.70	404.92	0.00	423.62	0.00	62.37	0.00	485.99
	Sub-Total	**18.70**	**574.42**	**0.00**	**593.12**	**0.00**	**62.37**	**21.01**	**676.50**
Manipur	State	0.00	0.00	36.00	36.00	0.00	0.00	5.45	41.45
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	15.70	67.98	0.00	83.68	0.00	80.98	0.00	164.66
	Sub-Total	**15.70**	**67.98**	**36.00**	**119.68**	**0.00**	**80.98**	**5.45**	**206.11**
Nagaland	State	0.00	0.00	0.00	0.00	0.00	0.00	29.67	29.67
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	10.70	46.35	0.00	57.05	0.00	53.32	0.00	110.37
	Sub-Total	**10.70**	**46.35**	**0.00**	**57.05**	**0.00**	**53.32**	**29.67**	**140.04**
Mizoram	State	0.00	0.00	0.00	0.00	0.00	0.00	36.47	36.47
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	10.35	38.29	0.00	48.64	0.00	34.31	0.00	82.95
	Sub-Total	**10.35**	**38.29**	**0.00**	**48.64**	**0.00**	**34.31**	**36.47**	**119.42**
Central - Unallocated		37.50	104.44	0.00	141.94	0.00	127.15	0.00	269.09
Total (North-Eastern Region)	State	60.00	445.70	36.00	541.70	0.00	382.00	253.25	1176.95
	Private	0.00	24.50	0.00	24.50	0.00	0.00	9.37	33.87
	Central	250.00	1228.10	0.00	1478.10	0.00	860.00	0.00	2338.10
	Grand Total	**310.00**	**1698.30**	**36.00**	**2044.30**	**0.00**	**1242.00**	**262.62**	**3548.92**

INSTALLED CAPACITY (IN MW) OF POWER UTILITIES IN THE STATES/UTS LOCATED IN NORTH-EASTERN REGION
(As available with NERLDC)
Central Sector added as per Geographic Location

State	Ownership/ Sector	Modewise breakup							Grand Total
		Thermal				Nuclear	Hydro (Renewable)	RES (MNRE)	
		Coal	Gas	Diesel/Oil	Total				
Assam	State	0.00	276.20	60.00	336.20	0.00	100.00	4.00	440.20
	Private	0.00	24.50	0.00	24.50	0.00	0.00	0.00	24.50
	Central	0.00	291.00	0.00	291.00	**0.00**	275.00	0.00	566.00
	Sub-Total	**0.00**	**591.70**	**60.00**	**651.70**	**0.00**	**375.00**	**4.00**	**1030.70**
Arunachal Pradesh	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	0.00	0.00	0.00	0.00	405.00	0.00	405.00
	Sub-Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**405.00**	**0.00**	**405.00**
Meghalaya	State	0.00	0.00	0.00	0.00	0.00	282.00	32.70	314.70
	Private	106.95	0.00	0.00	106.95	0.00	0.00	0.00	106.95
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total	**106.95**	**0.00**	**0.00**	**106.95**	**0.00**	**282.00**	**32.70**	**421.65**
Tripura	State	0.00	170.00	0.00	170.00	0.00	0.00	15.00	185.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	922.10	0.00	922.10	0.00	0.00	5.45	927.55
	Sub-Total	**0.00**	**1092.10**	**0.00**	**1092.10**	**0.00**	**0.00**	**20.45**	**1112.55**
Manipur	State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	0.00	0.00	0.00	0.00	105.00	0.00	105.00
	Sub-Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**105.00**	**0.00**	**105.00**
Nagaland	State	0.00	0.00	0.00	0.00	0.00	0.00	25.50	25.50
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	0.00	0.00	0.00	0.00	75.00	0.00	75.00
	Sub-Total	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**75.00**	**25.50**	**100.50**
Mizoram	State	0.00	0.00	22.92	22.92	0.00	0.00	29.85	52.77
	Private	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Central	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Sub-Total	**0.00**	**0.00**	**22.92**	**22.92**	**0.00**	**0.00**	**29.85**	**52.77**
Total (North-Eastern Region)	State	0.00	446.20	82.92	529.12	0.00	382.00	107.05	1018.17
	Private	106.95	24.50	0.00	131.45	0.00	0.00	0.00	131.45
	Central	0.00	1213.10	0.00	1213.10	0.00	860.00	5.45	2078.55
	Grand Total	**106.95**	**1683.80**	**82.92**	**1873.67**	**0.00**	**1242.00**	**112.50**	**3228.17**

Installed Capacity in NER (As on 29.02.16)

Isolated Capacity		Grid Capacity									
Utility / Mode	Total Capacity in MW	Utility / Station	Type	No. of Units	Size (MW)	Total (MW)	Utility / Station	Type	No. of Units	Size (MW)	Total (MW)
State Sector		**Central Sector**									
Arunachal Pradesh		Khandong	H	3	25	75	**Tripura**				
Micro Hydel	63	Kopili	H	4	50	200	Gumti	H	3	5	15
Diesel	16	Doyang	H	3	25	75	Rokhia	G	6	8	48
		AGBPP	G	4	34	134		G	3	21	63
Total Arunachal Pradesh	**79**		G	2	34	67	**Total Tripura**				**185**
Assam			S	3	30	90	**Assam**				
Micro Hydel	0	AGTPP	G	4	21	84	Champabati	H	2	2	4
Diesel	0	AGTPP(Extn)	G	2	23	46	Chandrapur	O	2	30	60
		Ranganadi	H	3	135	405					
		Monarchok	G	1	66	66					
							Namrup	G	20+21+21+11+24+22		119
Total Assam	**0**	Momnarchak Solar PV	SO	9	5	5	Lakwa	G	4x15+3x20+1x37.2		157
		Total NEEPCO				**1247**					
Manipur		**Loktak**	**H**	**3**	**35**	**105**	Adamtila (IPP-DLF)	G	3	3	9
Micro Hydel	1	**Total NHPC**				**105**	Baskandi (IPP-DLF)	G	1x5+3x3.5		16
Diesel/Heavy Fuel	42	**Palatana**	**G**	**2**	**232**	**464.6**	Langpi HEP	H	2	50	100
Total Manipur	**43**		**S**	**2**	**131**	**262.0**	**Total Assam**				**465**
		Total OTPC				**726.6**	**Nagaland**				
Mizoram		**Total (Central Sector)**				**2079**	Likimro	H	3	8	24
Solar	0	**State Sector**					Others	H	1	2	2
Diesel	1	**Meghalaya**					**Total Nagaland**				**26**
Total Mizoram	**1**	Umiam Stage I	H	4	9	36	**Mizoram**				
		Umiam Stage II	H	2	10	20	Bairabi	O	4	6	23
Nagaland		Umiam Stage III	H	2	30	60	**Serlui B**	H	3	4	12
Micro Hydel	0	Umiam Stage IV	H	2	30	60	Micro Hydel	H	2x1.5+3x0.35+2x1.5+3x1+2x1+2x1.5+3x0.1+2x0.25+2x0.25+1x0.5+2x0.25+2x0.25		18
Diesel	0	Umtru	H	4	3	11	**Total Mizoram**				**53**
Total Nagaland	**0**	Myntdu Leshka	H	3	42	126	**Total (State Sector)**				**1150**
Tripura		Sonapani	H	1	2	2	**Regional Total**				
Diesel	1	MPL	C	1x8+1x45.15		53	Isolated				124
Total Tripura	**1**	Adhunik	C	1	25	25	Grid (Hydro)				1349
		Shyam Century	C	1	14	14	Grid (Gas)				1684
		Maithan Alloys Ltd	C	1	15	15	Grid (Coal)				107
		Total Meghalaya				**422**	Grid (Oil)				83
							Grid (SO)				5
Total Isolated	**124**	**Tripura**					**Total Central Sector**				**2079**
		Baramura	G	2	5	10	**Total Grid**				**3228**
			G	1	7	7	**Total NER Capacity**				**3352**
			G	2	21	42	H=Hydro, G=Gas, C=Coal, O=Oil, S=Steam				

Total Hydro - 1413 MW | **Total Thermal - 1933 MW** | **Total Solar : 6 MW**

Source: Data collected from Power Utilities of NER

List of Units belonging to NEEPCO

Sl No	Station	*Unit No*	Source	Installed Capacity in MW	Ramp Up Rate/ Min		Ramp Down Rate/ Min		Technical Minimum		Dead-Band/ Forbidden Zone if any	Remarks
					Unit-wise	Station-wise	Unit-wise	Station-wise	Unit-wise	Station-wise		
1	Ranganadi	1	Hydro	135								
2	Ranganadi	2	Hydro	135								
3	Ranganadi	3	Hydro	135								
4	Kopili	1	Hydro	50								
5	Kopili	2	Hydro	50								
6	Kopili	3	Hydro	50								
7	Kopili	4	Hydro	50								
8	Khandong	1	Hydro	25								
9	Khandong	2	Hydro	25								
10	Kopili St II	1	Hydro	25								
11	Doyang	1	Hydro	25								
12	Doyang	2	Hydro	25								
13	Doyang	3	Hydro	25								
14	AGBPP	1	Gas	33.5								
15	AGBPP	2	Gas	33.5								
16	AGBPP	3	Gas	33.5								
17	AGBPP	4	Gas	33.5								
18	AGBPP	5	Gas	33.5								
19	AGBPP	6	Gas	33.5								
20	AGBPP	7	Steam	30								
21	AGBPP	8	Steam	30								
22	AGBPP	9	Steam	30								
23	AGTPP	1	Gas	21								
24	AGTPP	2	Gas	21								
25	AGTPP	3	Gas	21								
26	AGTPP	4	Gas	21								
27	AGTPP	5	Steam	25.5								
28	AGTPP	6	Steam	25.5								
29	Monarchak	1	Gas	65.42								
30	Monarchak	2	Steam	35.58								

List of Units belonging to NHPC

Sl No	Station	*Unit No*	Source	Installed Capacity in MW	Ramp Up Rate/ Min		Ramp Down Rate/ Min		Technical Minimum		Dead-Band/ Forbidden Zone if any	Remarks
					Unit-wise	Station-wise	Unit-wise	Station-wise	Unit-wise	Station-wise		
1	Loktak	1	Hydro	35								
2	Loktak	2	Hydro	35								
3	Loktak	3	Hydro	35								

List of Units belonging to OTPC

Sl No	Station	*Unit No*	Source	Installed Capacity in MW	Ramp Up Rate/ Min		Ramp Down Rate/ Min		Technical Minimum		Dead-Band/ Forbidden Zone if any	Remarks
					Unit-wise	Station-wise	Unit-wise	Station-wise	Unit-wise	Station-wise		
1	Palatana	GT-I	Gas	232.39								
2	Palatana	ST-I	Steam	130.91								
3	Palatana	GT-II	Gas	232.39								
4	Palatana	ST-II	Steam	130.91								

List of Units belonging to NTPC

Sl No	Station	*Unit No*	Source	Installed Capacity in MW	Ramp Up Rate/ Min		Ramp Down Rate/ Min		Technical Minimum				Dead-Band/ Forbidden Zone if any	Remarks
									Unit-wise		Station-wise			
					Unit-wise	Station-wise	Unit-wise	Station-wise	With Oil Firing	Without Oil Firing	With Oil Firing	Without Oil Firing		
1	BgTPP	1	Coal	250										
2	BgTPP	2	Coal	250										
4	BgTPP	3	Coal	250										

List of Units belonging to APGCL

Sl No	Station	*Unit No*	Source	Installed Capacity in MW	Ramp Up Rate/ Min		Ramp Down Rate/ Min		Technical Minimum		Dead-Band/ Forbidden Zone if any	Remarks
					Unit-wise	Station-wise	Unit-wise	Station-wise	Unit-wise	Station-wise		
1	Langpi	1	Hydro	50								
2	Langpi	2	Hydro	50								
3	LTPS	1	Gas	15								
4	LTPS	2	Gas	15								
5	LTPS	3	Gas	15								
6	LTPS	4	Gas	15								
7	LTPS	5	Gas	30								
8	LTPS	6	Gas	30								
9	LTPS	7	Gas	30								
10	LTPS	8	Steam	37.2								
11	NTPS	1	Gas	23								
12	NTPS	2	Gas	23								
13	NTPS	3	Gas	23								
14	NTPS	4	Gas	12.5								
15	NTPS	5	Gas	30								
16	NTPS	6	Gas	22								

List of Units belonging to MePGCL

Sl No	Station	*Unit No*	Source	Installed Capacity in MW	Ramp Up Rate/ Min		Ramp Down Rate/ Min		Technical Minimum		Dead-Band/ Forbidden Zone if any	Remarks
					Unit-wise	Station-wise	Unit-wise	Station-wise	Unit-wise	Station-wise		
1	Umiam St I	1	Hydro	9								
2	Umiam St I	2	Hydro	9								
3	Umiam St I	3	Hydro	9								
4	Umiam St I	4	Hydro	9								
5	Umiam St II	1	Hydro	10								
6	Umiam St II	2	Hydro	10								
7	Umiam St III	1	Hydro	30								
8	Umiam St III	2	Hydro	30								
9	Umiam St IV	1	Hydro	30								
10	Umiam St IV	2	Hydro	30								
11	Umtru	1	Hydro	2.8								
12	Umtru	2	Hydro	2.8								
13	Umtru	3	Hydro	2.8								
14	Umtru	4	Hydro	2.8								
15	Myndtu Leshka	1	Hydro	42								
16	Myndtu Leshka	2	Hydro	42								
17	Myndtu Leshka	3	Hydro	42								
18	Sonapani	1	Hydro	1.5								
19	MPL	1	Coal	8								
20	MPL	2	Coal	43								
21	Adhunik	1	Coal	25								
22	Shyam Century	1	Coal	13.8								
23	Maithan Alloys Ltd	1	Coal	15								

List of Units belonging to TSECL

Sl No	Station	*Unit No*	Source	Installed Capacity in MW	Ramp Up Rate/ Min		Ramp Down Rate/ Min		Technical Minimum		Dead-Band/ Forbidden Zone if any	Remarks
					Unit-wise	Station-wise	Unit-wise	Station-wise	Unit-wise	Station-wise		
1	Gumti	1	Hydro	5								
2	Gumti	2	Hydro	5								
3	Gumti	3	Hydro	5								
4	Baramura	1	Gas	5								
5	Baramura	2	Gas	5								
6	Baramura	3	Gas	6.5								
7	Baramura	4	Gas	21								
8	Baramura	5	Gas	21								
9	Rokhia	1	Gas	8								
10	Rokhia	2	Gas	8								
11	Rokhia	3	Gas	8								
12	Rokhia	4	Gas	8								
13	Rokhia	5	Gas	8								
14	Rokhia	6	Gas	8								
15	Rokhia	7	Gas	21								
16	Rokhia	8	Gas	21								
17	Rokhia	9	Gas	21								

List of Units belonging to Electricity Department, Nagaland

Sl No	Station	*Unit No*	Source	Installed Capacity in MW	Ramp Up Rate/ Min		Ramp Down Rate/ Min		Technical Minimum		Dead-Band/ Forbidden Zone if any	Remarks
					Unit-wise	Station-wise	Unit-wise	Station-wise	Unit-wise	Station-wise		
1	Likimro	1	Hydro	8								
2	Likimro	2	Hydro	8								
3	Likimro	3	Hydro	8								

List of Units belonging to Power & Electricity Department, Mizoram

Sl No	Station	*Unit No*	Source	Installed Capacity in MW	Ramp Up Rate/ Min		Ramp Down Rate/ Min		Technical Minimum		Dead-Band/ Forbidden Zone if any	Remarks
					Unit-wise	Station-wise	Unit-wise	Station-wise	Unit-wise	Station-wise		
1	Serlui B	1	Hydro	4								
2	Serlui B	2	Hydro	4								
3	Serlui B	3	Hydro	4								
4	Bairabi	1	HSD	5.7								
5	Bairabi	2	HSD	5.7								
6	Bairabi	3	HSD	5.7								
7	Bairabi	4	HSD	5.7								

Approved SHUTDOWN OF ELEMENTS FOR 123rd OCCM- BAR CHART

SN	Name of Element	Jul-16																									Aug-16							Time	
		6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8		
1.TRANSMISSION LINES																																					
	132kV Transmission lines																																				
1	132 kV S/C Kopili - Khandong # 2 TL																																			08:00 to 16:00	Annual Maintenance in Bay equipemnt at Khandong HEP
2	132KV, S/C,Khliehriat - Khandong # 2 TL.																																			08:00 to 16:00	Repalcement of Trip coil 2 , CT tandelta & capacitance at Khandong HEP
3	132Kv Kumarghat - RC Nagar Line																																			08:00 to 16:00	For shortening and tightening of jumpers at Loc. No.163 and 217 respectively
4	132KV, D/C, Silchar-Hailakandi TL # 2																																			08:00 to 15:00	AMP of Bay equipment .
5	132 KV R. C. Nagar - Agartala # 1 TL																																			08:00 to 16:00	conductor replacement work Loc. No 29 - 30 in 'B' ph (33kV , 11kV & LT lines below the said location shall also require Shutdown from State)
6	132kV Palatana - Surjamaninagar TL																			Subject to Tripura's Consent																08:00 to 16:00	For repairing of conductor in between location no 92 to 93
7	132KV, S/C, Badarpur-Kolasib TL																							132 kV Aizawl-Kolasib to be in service												08:00 to 16:00	Tree cutting & Conductor re- tensioning at loc no 343 to 344
8	132KV, S/C, Badarpur- Kumarghat TL																																			08:00 to 16:00	Infrigement clearing in ROW area. (loc no 144 to 172) & Disc changing at loc .144 & 145 R Phase Badarpur side
9	132 KV, D/C, Silchar - P. K. Bari # 1 TL																																			08:00 to 16:00	Jumpher at different Locations to be tightened
10	132 KV, D/C, Silchar - P. K. Bari # 2 TL																																			08:00 to 16:00	Jumpher at different Locations to be tightened
11	132kV Mokokchung - Mokokchung # 1 TL																																			09:00 to 16:00	Annual Maintenance in Bay equipemnt at Nagaland State S/S.
12	132kV Mokokchung - Mokokchung # 2 TL																																			09:00 to 16:00	Annual Maintenance in Bay equipemnt at Nagaland State S/S.
	220kV Tansmission Lines																																				
9	220 kV SKT-BTPS # 1 Line																							Subject to Assam's Consent												08:00 to 16:00	Fitting of Corona Ring
10	220 kV SKT-BTPS # 2 Line																																			08:00 to 16:00	Fitting of Corona Ring
11	220kV Misa -Samaguri # 1 TL																																			08:00 to 16:00	Replacement of Tandelta Violated CT at Samaguri Substation
12	220kV Mokochung - Mariani # 2 TL																																			09:00 to 16:00	Annual Maintenance in Bay equipemnt
	400 kV Tansmission Lines																																				
13	400KV Silchar - Byrnihat TL																																			10:00 to 12:00	To replace line side isolator jumper at Silchar Substation.
14	400KV, D/C Palatana - Silchar # 1 TL																																			08:00 to 16:00	Jumpher to be tightened at tower no , 549,577,578,579,580,581, 582,584,585,588,590,592,598
15	400KV, D/C Palatana - Silchar # 2 TL																																			08:00 to 16:00	Jumpher to be tightened at tower no , 549,577,578,579,580,581, 582,584,585,588,590,592,598
16	400KV Silchar - Azara TL																																			08:00 to 16:00	Jumper Tightening planned at various locations.
800 kV BNC HVDC																																					
1	400kV , 80 MVAR Bus Reactor-1					Subject to restoration of all reactors at Bongaigaon																															08:00 to 16:00	Replacement of 400 KV OIP Bushings with RIP Bushing (rescheduled S/D)
132 kV Dimapur S/S																																					
2	220/132kV 100 MVA ICT-I																																			08:00 to 15:00	Tan Delta and Capacitance for R Phase unit bushing and fixing of WTI & OTI
400kV BALIPARA SS																																					
3	400kV Ranganadi-II Main Bay																																			08:00 to 16:00	CT tandelta , Annual Maintenance
4	400 kV Misa # I - MAIN BAY																																			08:00 to 16:00	CT tandelta , Timing ,Annual Maintenance
5	400kV Ranganadi-I Main Bay																																			08:00 to 16:00	CT tandelta , Timing , Annual Maintenance
6	400 kV Bongaigaon -1 & B/Chariali-3 TIE BAY																																			08:00 to 16:00	CT tandelta , DCRM , Timing , Annual Maintenance
7	400 kV Bongaigaon -2 & B/Chariali-4 TIE BAY																																			08:00 to 16:00	CT tandelta , DCRM , Annual Maintenance
8	400 kV Bongaigaon # 4 - Line Reactor																					Subject to availability of all other reactors														08:00 to 16:00	Bushinag Tandelta , Annual Maintenance
9	400 kV Bus Reactor -1 - MAIN BAY																																			08:00 to 16:00	Timing of CB, DCRM , Annual Maintenance
10	400kV Ranganadi-II & Misa -II Tie Bay																																			08:00 to 16:00	Timing of CB, DCRM , Annual Maintenance
11	400kV Bongaigaon-I Main Bay																																			08:00 to 16:00	Timing of CB, Annual Maintenance
400KV BONGAIGAON S/S																																					
12	400 kV BNG-Azara Main Bay																																			08:00 to16:00	Bay Equipments AMP
13	400 kV Balipara # 1 Main Bay																																			08:00 to 16:00	Bay Equipments AMP
14	400 kV Byrnihat- BTPS # 1 Tie Bay																																			08:00 to16:00	Bay Equipments AMP
15	400/220 kV 315 MVA ICT																																			10:00 to 10:45	Changeover of Units
400KV Misa Substation																																					
16	220kV Transfer Bus Coupler Bay																																			08:00 to 16:00	Bay Equipments AMP
17	50 MVAR Bus reactor & BR Bay (404 R)																																			08:00 to 16:00	Annual maintenance activities
18	400kV Balipara #1 MAIN l Bay (Bay- 404)																																			08:00 to 16:00	Annual maintenance activities
132kV Jiribam Substation																																					
19	132/33KV, 6.3 MVA ICT bay																																			08:00 to 16:00	AMP of Bay equipment (ICT Shutdown also required.)
132kV Imphal Substation																																					
20	132/33KV 50MVA ICT # I																																			08:00 to 16:00	Annual maintenance activities
21	132/33KV 50MVA ICT # II																																			08:00 to 16:00	Annual maintenance activities
132kV Ziro Substation																																					
22	132/33 kV 3x5MVA ICT																																			08:00 to 16:00	Annual maintenance activities
	AEGCL																																				
1	220KV BTPS-Agia-Boko line-I																																			08:00 to 17:00	Checking & tightening of jumper cone of tension points, clearing trees, bamboos
2	220KV BTPS-Agia-Mirza Line-II																																			08:00 to 17:00	Checking & tightening of jumper cone of tension points, clearing trees, bamboos
3	220KV Samaguri-Sonabil																																			08:00 to 16:00	Scheduled maintenance
4	220KV Samaguri-Mariani-II																																			08:00 to 16:00	Corridor cleaning, jumper checking
5	220KV Tinsukia-Kathalguri-1,2																																			08:00 to 16:00	Scheduled maintenance
	Manipur																																				
1	132 kV Loktak - Ninthoukhang																																			07:00 to11:00	Repairing of main bus isolator
2	132 kV Karong - Kohima																																			09:00 to16:00	Jungle Cutting
	Meghalaya																																				
1	132 kV Lumsnong - Panchgram																																			11:00 to16:00	Replacement of damaged disc insulators

Annexure – D.9

Load Crash Report

Incident No.:

1) **Date and Time of the Incident:** DD.MM.YYYY w.e.f HHMM Hrs

2) **Antecedent Conditions:**

   i) Frequency : Pre incident : _____ Hz

   ii) Demand Met / Generation

S.No	State/Area/Corridor	Demand Met (MW)
1		
2		

3) **Incident Summary:**

(Brief description of the event indicating area affected and reasons for load crash)

i) Lines Outage and Restoration Details (132 kV & above)

Sl. No	Element	Tripping type	Date and Time of Tripping		Date and Time of Restoration	
1						
2						

ii) Details of tripping of LT feeders

iii) Approximate Load Loss in MW:

iv) Approximate Generation Loss in MW:

v) Area affected:

vi) Reason for Load Crash: Storm/ Heavy rainfall / Earthquake etc.

vii) Restoration Details :

4) **Corrective action:**

5) **Current Status:**

ANNEXURE-D.15

Details of Solar plants

Sl. No	Solar Plant/Region	Owner	Geographical Location	Total Number of Modules	Each Module Capacity	Total Installed Capacity	Voltage level at which connected	Whether implemented through NVVNL under JNNSM ? (Yes/No)	Connectivity at injecting end (CTU/STU)	Long Term Access, MW scheduled	Long Term Access Start date	Nodal agency for day-to-day scheduling with the concerned RLDC	Beneficiaries / Region	Trader
Inter-State Solar														
Intra-State Solar														
1	Monarchak Solar PV	NEEPCO	Tripura					No	STU	5.5	04.02.2015	SLDC	Tripura	

Details of RE Generators

Sl. No	Name of Plant	Owner	Geographical Location	Fuel type	Each Module Capacity	Total Installed Capacity	Voltage level at which connected	Connectivity at injecting end (CTU/STU)	Long Term Access, MW scheduled	Long Term Access Start date	Nodal agency for day-to-day scheduling with the concerned RLDC	Beneficiaries / Region	Trader	If Future project expected date of completion
Inter-State														
Intra-State														

ANNEXURE-D.17

Details of operation of UFR (Under Frequency Realy)

Name of Utility :

Month :

Sl No	Date of UFR Operation	Time of UFR Operation	UFR Location	UFR Stage Settings			Loading (in MW) before UFR operation	Frequency at the time of UFR operation	Load relief provided in UFR operation	Frequency post UFR operation	Any action taken
				Stage	Frequency (in Hz)	Load Relief (in MW)					

Note : Data of previous month to be submitted within 7 days of current month

ANNEXURE-D.19

1. Summary of System Protection Schemes(SPS)

Normally all the System protection schemes are proposed, discussed and getting approved in RPC meetings such as OCC, PCC, TCC and RPC Board meetings.

The Summary of System Protection Schemes (SPS) both inter/Intra regional which are in service, and no of schemes Approved, no of schemes under discussion stage are detailed below

Sl. No.	Region	No. of Schemes In service	No. of Schemes approved (yet to be operationalized)	No. of schemes under discussion	Remarks
1	North Eastern Region	9			

The System protection schemes for Inter / intra-regional corridor (Region wise) divided in to three categories as stated below.

i) SPS related to tripping of critical line / corridor

ii) SPS related to safe evacuation of Generation

iii) SPS related to overloading of Transformers

iv) SPS related to maintaining transfer capability

The summary of SPS both inter/intra regional which are in service, and number of schemes yet to be operationalized based on the categories above are detailed below:

Region	Tripping of critical line(s) / corridor			Safe evacuation of generation			Overloading of Transformers / Critical line(s)			TOTAL
	In Service	Approved	Under Discussion	In Service	Approved	Under Discussion	In Service	Approved	Under Discussion	
NER	4	0		2			3			9

Also the system protection schemes for inter/intra-regional corridors (region-wise) can be categorized as stated below:

i) SPS related to Generation rejection

ii) SPS related to Load rejection

iii) SPS related to Generation/Load rejection

iv) SPS related to HVDC controls

v) SPS related to others

2. SPS in North Eastern Region

RefNo.	Nameof theScheme	Implementing Agency	Status
SPS/NER/LINE/01	SPSassociatedwithtripping of400kVPalatana–Silchar D/Clines	CTU, OTPC AEGCL, MePTCL andTSECL	InServicew.e.f. 23.02.2015
SPS/NER/LINE/02	SPSassociatedwithtripping of400kVSilchar–AzaraS/C and400kVSilchar–ByrnihatS/Clineswhenthereisnogeneration atPalatanaCCGT	CTU, AEGCL, MePTCL and TSECL	InServicew.e.f. 14.09.2013
SPS/NER/LINE/03	SPSassociatedwithoverloadingof 220kVSalakati – BTPSD/Clines(PG)	CTU, AEGCL	In service w.e.f 23.06.2015
SPS/NER/LINE/04	SPSassociatedwithtripping of 132 kV Umiam Stg-I to Umiam St-III D/C lines	MePTCL	In service w.e.f June 2015
SPS/NER/GEN/01	SPSassociatedwithtripping of400kVSilchar–AzaraS/C and400kVSilchar–ByrnihatS/Clinesduring generationof1stModule ofPalatana	CTU, OTPC, AEGCL, MePTCL and TSECL	InService w.e.f 23.02.2015
SPS/NER/GEN/02	SPSassociatedwithgeneratione vacuation from AGTPP	NEEPCO, CTU	In service w.e.f. 21.07.2015
SPS/NER/TRF/01	SPSassociatedwithtripping ofgeneration of 1st ModuleofPalatanaCCGT(363.3	CTU, OTPC,AEGCL, MePTCL	InService w.e.f. 14.09.2013
SPS/NER/TRF/02	SPSassociatedwithtripping of400/132kV,2x200MVAICTsat Silchar (PG)	CTU, AEGCL	In service w.e.f. 29.06.15
SPS/NER/TRF/03	SPSassociatedwithmorethan 60MWloading from LVto HVside ofAzaraICTs	AEGCL	InService w.e.f August 2014

INDEX

RefNo.	Nameof theScheme	ImplementingAgency	Status	
SPSrelatedtotrippingof criticalline / Corridor				
SPS/NER/LINE/01	SPSassociatedwithtripping of400kVPalatana–Silchar D/Clines	CTU, OTPC AEGCL, MePTCL andTSEC	InService	
SPS/NER/LINE/02	SPSassociatedwithtripping of400kVSilchar–AzaraS/C and400kVSilchar–ByrnihatS/Clineswhenthereisnogeneration atPalatanaCCGT	CTU,AEGCL, MePTCL andTSECL	InService	
SPS/NER/LINE/03	SPSassociatedwithoverloadingof 220kVSalakati – BTPSD/Clines(PG)	CTU, AEGCL	InService	
SPS/NER/LINE/04	SPSassociatedwithtripping of 132 kV Umiam Stg-I to Umiam St-III D/C lines	MePTCL	In service	
SPSrelatedtoSafe evacuationof generation				
SPS/NER/GEN/01	SPSassociatedwithtripping of400kVSilchar–AzaraS/C and400kVSilchar–ByrnihatS/Clinesduring generationof1stModule ofPalatana	CTU, OTPC,AEGCL, MePTCL andTSEC	InService	
SPS/NER/GEN/02	SPSassociatedwithgenerationevacuation from AGTPP	NEEPCO, CTU	In Service	
SPSrelatedtooverloadingof Transformers / Critical Line(s)				
SPS/NER/TRF/01	SPSassociatedwithtripping ofgeneration of 1st ModuleofPalatanaCCGT(363.3	CTU, OTPC,AEGCL, MePTCL	InService	
SPS/NER/TRF/02	SPSassociatedwithtripping of400/132kV,2x200MVAICTsat Silchar (PG)	CTU, AEGCL	InService	
SPS/NER/TRF/03	SPSassociatedwithmorethan 60MWloading from LVto HVside ofAzaraICTs	AEGCL	InService	

SPS relatedto tripping ofcritical line /Corridor

RefNo: SPS/NER/LINE/01

SPSforNERGridSecuritywithModules(GT+ST)ofOTPCPalatanagneratingstation(2 x363.3MW)

SPS2- When 400kVPalatana-Silchar(D/C)linestrip

Pre-condition:

Following lines should bekeptin opencondition

- 132kVKhliehriat–LumshnongS/C
- 132kVPailapool –Jiribam line at Jiribamend
- 132kVPKBari –Dharmangar S/Cwill bekept open

Scheme:

i. Whenboththecktsof400kVPalatana–Silcharlinestrip,asignalwillbegeneratedfromtriprelays at Silchar

ii. ThissignalshouldtriptheHV Circuit Breaker of 400/132 kV, 125 MVA Palatana ICT to maintain safe, secure and reliable operation of Tripura system

iii. Also this signal should trip CBof132kVSilchar–SrikonaD/C,132kVSilchar–PanchgramS/C&132 kVSilchar –DullavcherraS/C linesat Silchar.

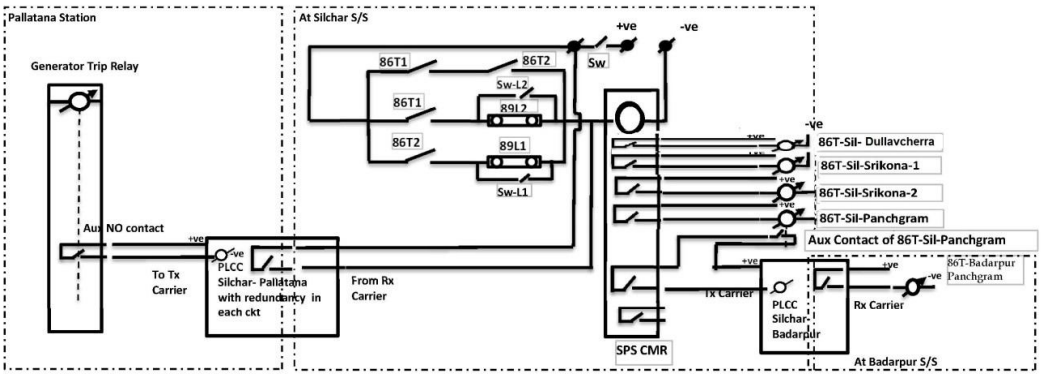
iv. Subsequenttotrippingof132kVSilchar–Panchgramline,asignalwillbegeneratedfromtriprelayof132kVSilchar–Panchgramline.ThissignalshouldtriptheCBof 132kVBadarpur–Panchgramline at Badarpur.

v. After these trippingsainstantloadreliefof109MWatOff-peak&159MWin Peak.

vi. Thesignalfromtrippingof400kVSilchar – PalatanaD/CshouldalsoenablereductionofGenerationofModuleI&IIofPalatana,OTPCtoaround20MWexcluding theauxiliaryconsumption.

vi. Then manualdemand management/ disconnectionshouldbeimposed,ifnecessary.

Special Protection Scheme for Grid Security of NER- Case1 &2



86T1 Trip Relay of Silchar-Pallatana ck1 at Silchar End.

86T2 Trip Relay of Silchar-Pallatana ck2 at Silchar End.

89L1 Line Isolator Aux. Contact Silchar-Pallatana ck1 at Silchar End.

89L2 Line Isolator Aux. Contact Silchar-Pallatana ck2 at Silchar End.

SPS CMR High Speed Contact Multiplier relay to be installed & wired at Silchar substation

Sw In Out Switch for SPS scheme,

Sw-L1, Sw-L2 SPS in out switch for Line L1,L2. To be kept ON(through) whenever respective Line is Out & to be kept Off when Line is in service.

Scheme Requirement:

i. When generator at Palatana trips or both the ckts of 400 kV Palatana – Silchar lines trip, a signal will be generated from trip relays at Silchar

ii. This signal should trip the CB of 132 kV Silchar – Srikona D/C & 132 kV Silchar – Dullavcherra line & 132 kV Silchar – Panchgram lines at Silchar.

iii. Subsequently, tripping of 132 kV Silchar – Panchgram line a signal will be generated from trip relay of 132 kV Silchar –Panchgram line. This signal should trip the CB of 132 kV Badarpur – Panchgram line at Badarpur.

SPSforNERGridSecuritywithModules(GT+ST)ofOTPCPalatanagneratingstation(2x363.3MW)

SPS4- When 400kVSilchar–ByrnihatS/Cand 400kVSilchar–AzaraS/Cline trips (withoutgenerationatPalatana)

Pre-condition:

Following lines should bekeptin opencondition

- 132kVKhliehriat–LumshnongS/C
- 132kVPailapool –Jiribam line at Jiribamend
- 132kVPKBari –Dharmangar S/Cwill bekept open

Scheme:

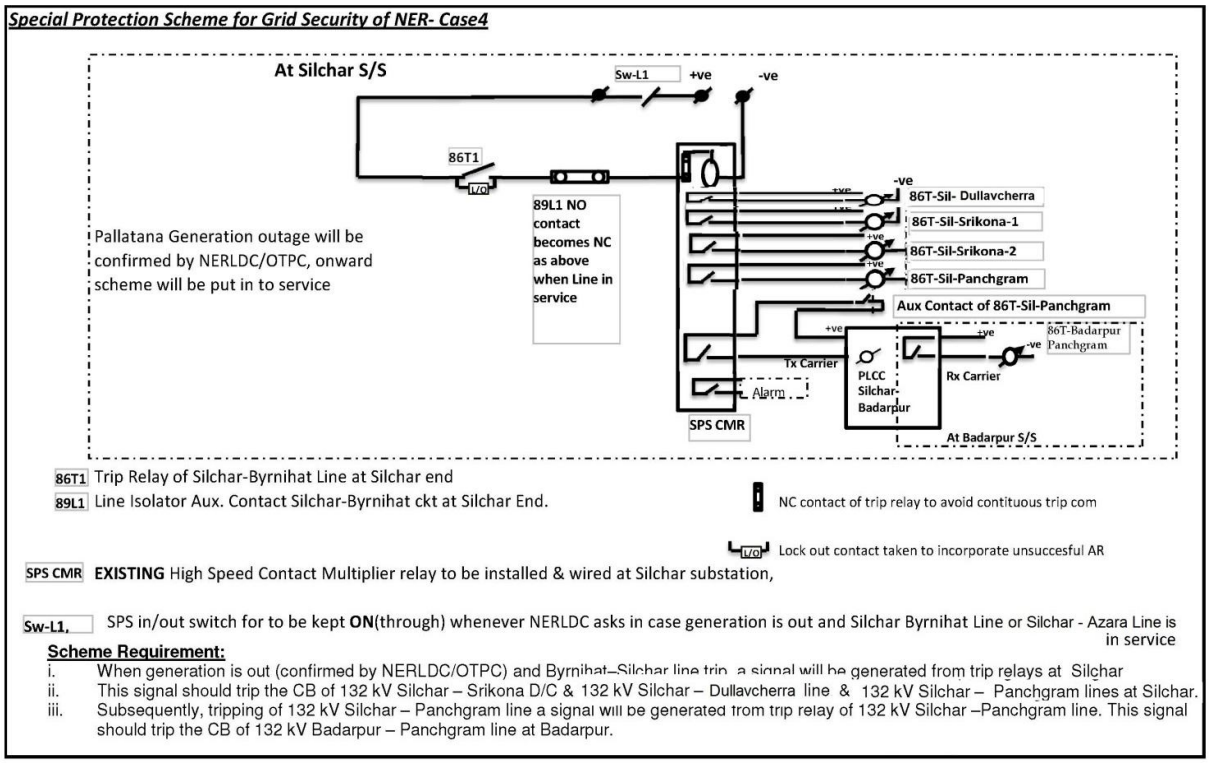
i. When400kVSilchar–Byrnihatlineand400kVSilchar–Azaralinetrips,asignalwillbegeneratedfromtriprelaysatSilchar.Also,incaseofoutageofeither400kVSilchar–Byrnihatlineor400kVSilchar–Azaraline,ifotherlinetrips,signalwillbegenerated fromtriprelays at Silchar.

ii. ThissignalshouldtriptheCBof132kVSilchar–SrikonaD/C,132kVSilchar–PanchgramS/C&132 kVSilchar –DullavcherraS/C linesat Silchar.

iii. Subsequenttotripping of132kVSilchar–Panchgramline, asignalwill begeneratedfromtriprelayof132kVSilchar–Panchgramline.ThissignalshouldtriptheCBof132kVBadarpur–Panchgramline atBadarpur.

iv. Afterthesetrippingsaninstantloadreliefofaround109MWinOff-Peakand159MWinPeakHourswillbe obtained.

v. Then manualdemand management/ disconnectionshouldbeimposed,ifnecessary.



Note :

TheSPSschemes asstatedabovearesubject tochangeswithchanging gridconditions.Theloadsbeing disconnectedwiththeconfiguration as per currentSPSincludeloadsinSouthAssam,partofMeghalayaand partofTripura power systems.

SPSassociatedwithoverloadingof220kVSalakati–BTPSD/Clines

Pre–Condition:

TheDhaligaonarealoadofAssamneedstobekeptinradialmodeandBhutanloadthrough132kVRangia–DeothangS/Cmustnotbeaffectedduetooperationofthis SPS.

Scheme:

i. Topreventtrippingof220kVSalakati–BTPSD/Clines,radialloadsinDhaligaonareaofAssam maybeshedasaprecautionarymeasure.

ii. When220kVSalakati–BTPSD/Clinesgetoverloaded(more than 600 Ampere current per circuit) in Salakati – BTPS direction,asignalwouldbegenerated thatwilltripradialloadsinDhaligaon area ofAssam by tripping of 132 kV BTPS – Dhaligaon I & II lines.

iii. Incaseofoutageofonecircuit of 220kVSalakati –BTPSD/Clines, andoverloadingoftheexistingcircuit(more than 600 Ampere in Salakati – BTPS direction),asignalwouldbegeneratedthatwilltripradialloadsinDhaligaon area ofAssam.

SPSassociatedwithtripping of 132 kV Umiam Stg-I – Umiam Stg-III D/C lines

Pre–Condition:

Meghalaya power system shall be segregated into 3 parts by opening of 132 kV Umiam Stg-I – Umiam line & 132 kV Mawlai – Umiam line and 132 kV Nongstoin – Mawphlang line. One part of Meghalaya power system loads shall be fed from Khliehriat (PG) substation, other part connected through 132 kV Agia – Nangalbibra line and the 3rd part through 220/132 kV Killing (Byrnihat) substation.

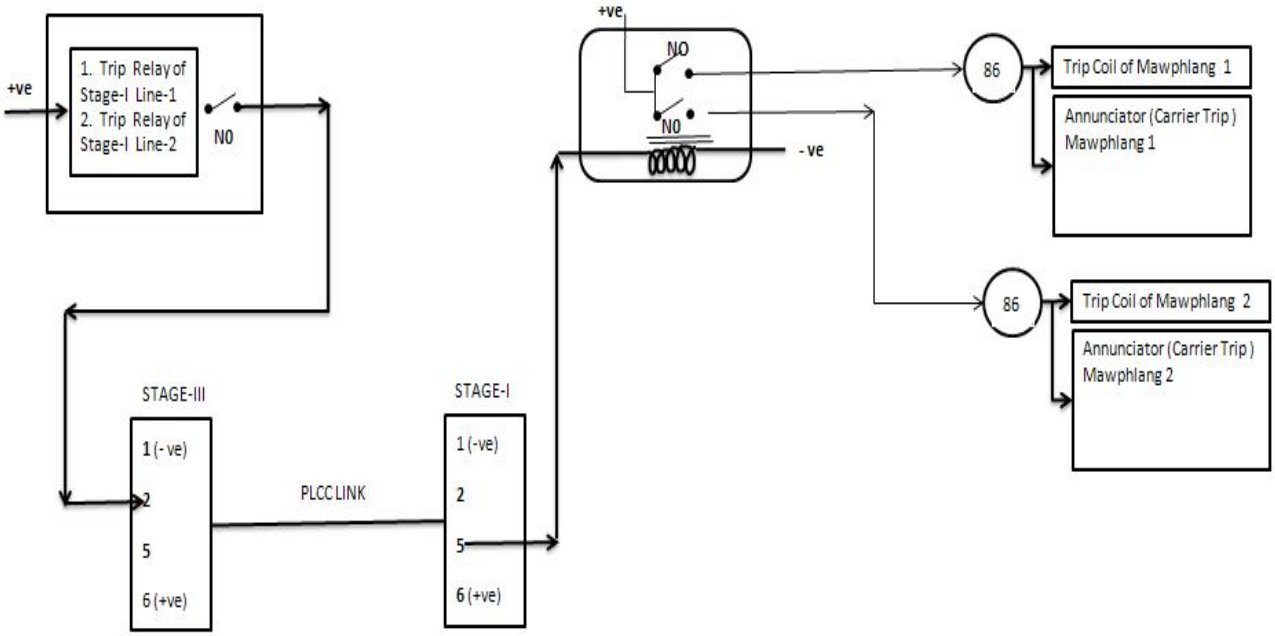
Scheme:

iv. Topreventcollapse of part of Meghalaya system fed from 220/132 kV Killing (Byrnihat) substation, carrier inter-tripping scheme has been implemented to prevent tripping of 132 kV Umiam St-I – Umiam St-III D/C lines.

v. In the event of any fault that results in failure or tripping of 132 kV Umiam St-III – Umiam Stg-I D/C lines, a carrier signal would instantaneously be received at the PLCC Protection equipment. The same signal would be transmitted via PLCC link from Stage III to protection equipment at stage I power station. The command is further extended to the tripping circuit at C&R panel resulting in direct trip of two feeders namely, Mawphlang Feeder 1 and Mawphlang Feeder 2 at Stage I power Station shedding a combined load of 25 MW (max) instantaneously.

vi. If Garo Hills load is provided through 132 kB Nangalbibra –Nongstoin line instead of 132 kV Agia-Nangalibra line, then the load relief on account of operation of this SPS shall 75 MW (maximum).

Inter-tripping scheme between 132 kV Umiam St-I to Umiam St-III D/C lines



SPSrelatedtoSafeevacuationofGeneration

RefNo: SPS/NER/GEN/01

SPSforNERGridSecuritywithModules(GT+ST)ofOTPCPalatanagneratingstation(2x363.3MW)

SPS3- When 400kVSilchar–ByrnihatS/Cand 400kVSilchar–AzaraS/Clinestrip(withgenerationatPalatana)

Pre-condition:

Following lines should bekeptin opencondition

- 132kVKhliehriat–LumshnongS/C
- 132kVPailapool –Jiribam line at Jiribamend
- 132kVPKBari –Dharmangar S/Cwill bekept open

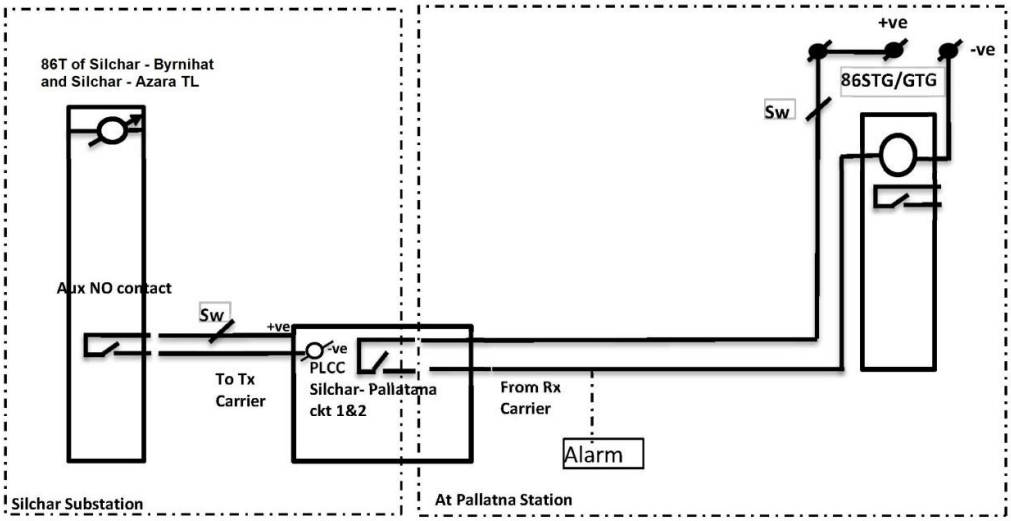
Scheme:

i. When400kVSilchar–ByrnihatS/C and400kVSilchar–AzaraS/C linestrip,signalwillbegeneratedfromtriprelaysatSilchar.Also,incaseofoutageofeither400kVSilchar–Byrnihatlineor400kVSilchar–Azaraline,ifotherlinetrips,signalwillbegenerated fromtriprelays at Silchar.

ii. ThissignalshouldtripCBsofGTG/STGof1st ModuleofPalatanaCCGT(asmayberequired).ButthetrippedunitofPalatanawillberunninginFSNL(FullSpeedNoLoad).TheunitsofPalatanamay betrippedallowingamaximumof200MWinjection from Palatana.

iii. Then manualdemand management/ disconnection ofloadshould beimposed, ifnecessary.

Special Protection Scheme for Grid Security of NER- Case:3



86T Trip Relay of Silchar-Pallatana ck1 at Silchar End.

86GTG 86 Trip relay for GTG at Pallatana

Note: At Present spare channel is not available for Silc-Pallatana PLCC links , can be made availble on procurement.

Sw In Out Switch for SPS scheme

Scheme:

i. When 400 kV Byrnihat – Silchar line & 400 kV Silchar - Azara lines trip, signal will be generated from trip relays at Silchar

ii. This signal should trip CB of GTG/STG of at Palatana. But unit will be running in FSNL

iii. A instant relief in line loading of 230/130 MW which will avert the system from cascade tripping.

v. Then manual demand disconnection should be imposed.

SPSforgenerationfrom6unitsofAGTPP–Extensionproject

When132kVAGTPP– Kumarghat S/Clinetrips(with generationfrom4 nos.GTand2nos. ST-ExtensionofAGTPP)

Scheme:

i. UnderN-1contingencyof132kVAGTPP–KumarghatS/C,withgenerationfrom4nos.GT(Existing)ofAGTPPand2nos.ST(Extension)ofAGTPP,theremaybesudden overloadinginseverallinesoutgoing from AGTPPor in Tripurapower system.

ii. The tripping of 132 kV AGTPP – Kumarghat line should result in generation reduction of 32 MW at AGTPP (from AGTPP – Extension units) in order to maintain safe line loading on outgoing feeders from AGTPP

(The SPS has been put in service w.e.f. 1300 Hrs of 21-July-2015).

RefNo:SPS/NER/TRF/01

SPSforNERGridSecuritywithModules(GT+ST)ofOTPCPalatanagneratingstation(2x363.3MW)

SPS1- WhenPalatanaunittrips

Pre-condition:

Following lines should bekeptin opencondition

- 132kVKhliehriat(MePTCL) –Lumshnong S/C
- 132kVPailapool –Jiribam line at Jiribamend
- 132kVPKBari –Dharmangar S/Cwill bekept open

Scheme:

ii. Whenboth ModuleofPalatanaCCGTtrips,asignalwillbegeneratedfromtriprelay oftheModules.

iii. ThissignalshouldthentriptheCBof132kVSilchar–SrikonaD/C,132kVSilchar–PanchgramS/C&132 kVSilchar –DullavcherraS/C linesat Silchar.

iv. Subsequenttotrippingof132kVSilchar–Panchgramline,asignalwillbegeneratedfromtriprelayof132kVSilchar–Panchgramline.ThissignalshouldtriptheCBof 132kVBadarpur–Panchgramline at Badarpur.

v. Afterthesetrippingsaninstantloadreliefofaround109MWinOff-Peakand159MWinPeak.

vi. Then manualdemand management/ disconnectionshouldbeimposed,ifnecessary.

RefNo:SPS/NER/TRF/02

SPSfortrippingof400/132kV,2x200MVAtransformersatSilchar(PG)

Pre-condition:

Following lines should bekeptin opencondition

- 132kVKhliehriat–LumshnongS/C
- 132kVPailapool –Jiribam line at Jiribamend
- 132kVPKBari –Dharmangar S/Cwill bekept open

Scheme:

i. Tomaintainsafeloadingof400/132kV,2x200MVAtransformerat400/132kVSilchar (PG) substation,radialloadsinSouthernpartofNERGridaretobeshed.

ii. Upon tripping of any ICT among 2 x 200 MVA, 400/132 kV ICTs at Silchar, a signal shall be generated.

iii. This signal should then trip the CB of 132 kV Silchar – Srikona D/C, 132 kV Silchar – Panchgram S/C & 132 kV Silchar –Dullavcherra S/C lines at Silchar.

iv. Subsequent to tripping of 132 kV Silchar – Panchgram line, a signal will be generated from trip relay of 132 kV Silchar –Panchgram line. This signal should trip the CB of 132 kV Badarpur – Panchgram line at Badarpur.

v. After these trippings an instant load relief of around 109 MW in Off-Peak and 159 MW in Peak.

vi. In case one ICT at 400/132 kV Silchar substation is out-of-service, the SPS will still act to disconnect radial loads in Southern part of NER Grid.

SPSassociatedwithmorethan60MWloadingfromLVtoHVsideof400/220kV,2x315MVAAzaraICTs

Scheme:

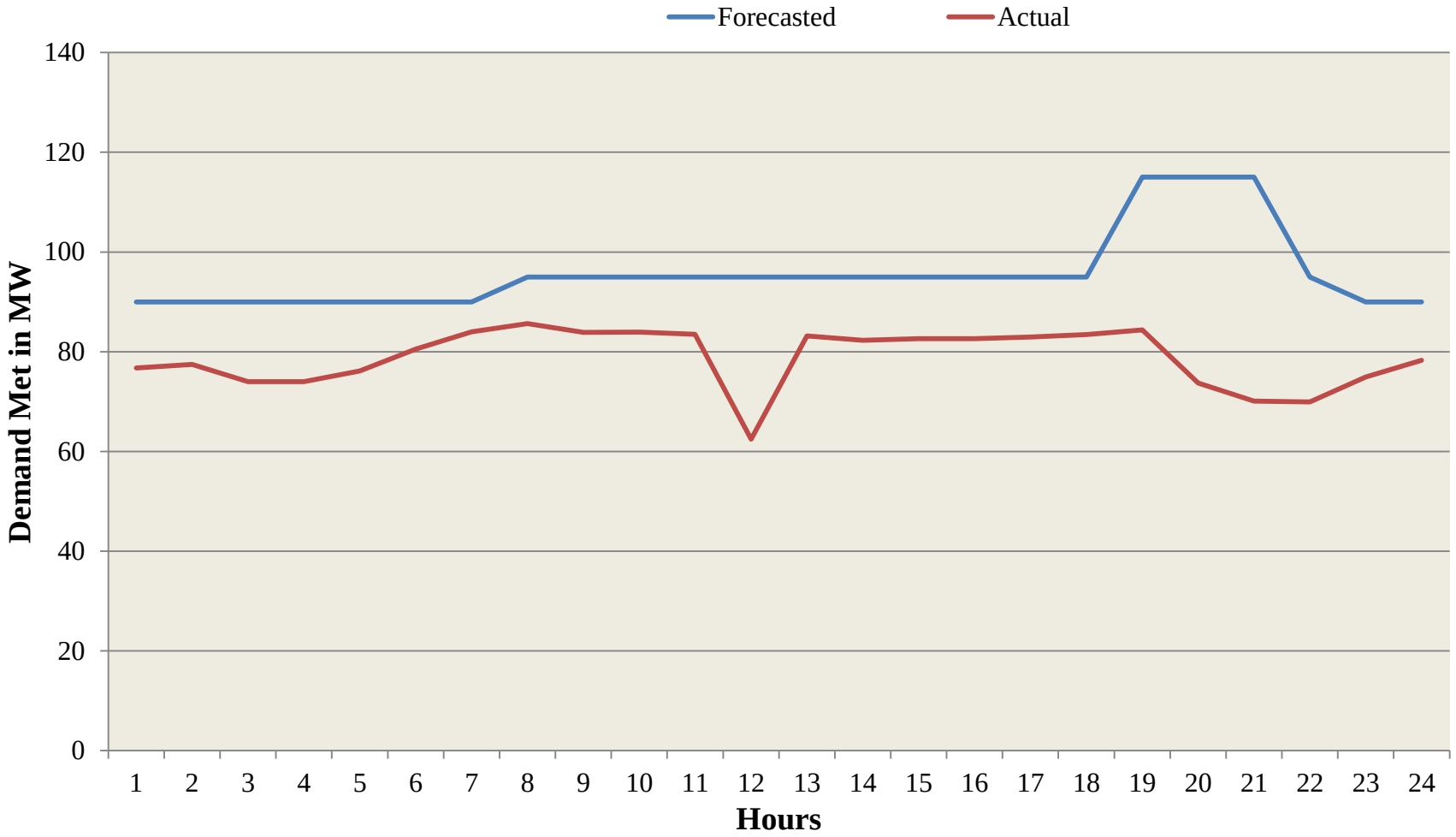
i. Whenpowerflowsin400/220kV,2x315MVAICTsatAzara(AEGCL)substationfrom220kVto400kV,itmayleadtooverloadingof220kVSalakati–BTPSD/Clines.

ii. Whenpowerflowon400/220kV,2x315MVAICTsatAzara(PG)reaches60MWfrom220kVto400kVside,arelaywouldpick-upresultingintrippingof400/220kV,2x315MVAICTsat Azara(AEGCL).

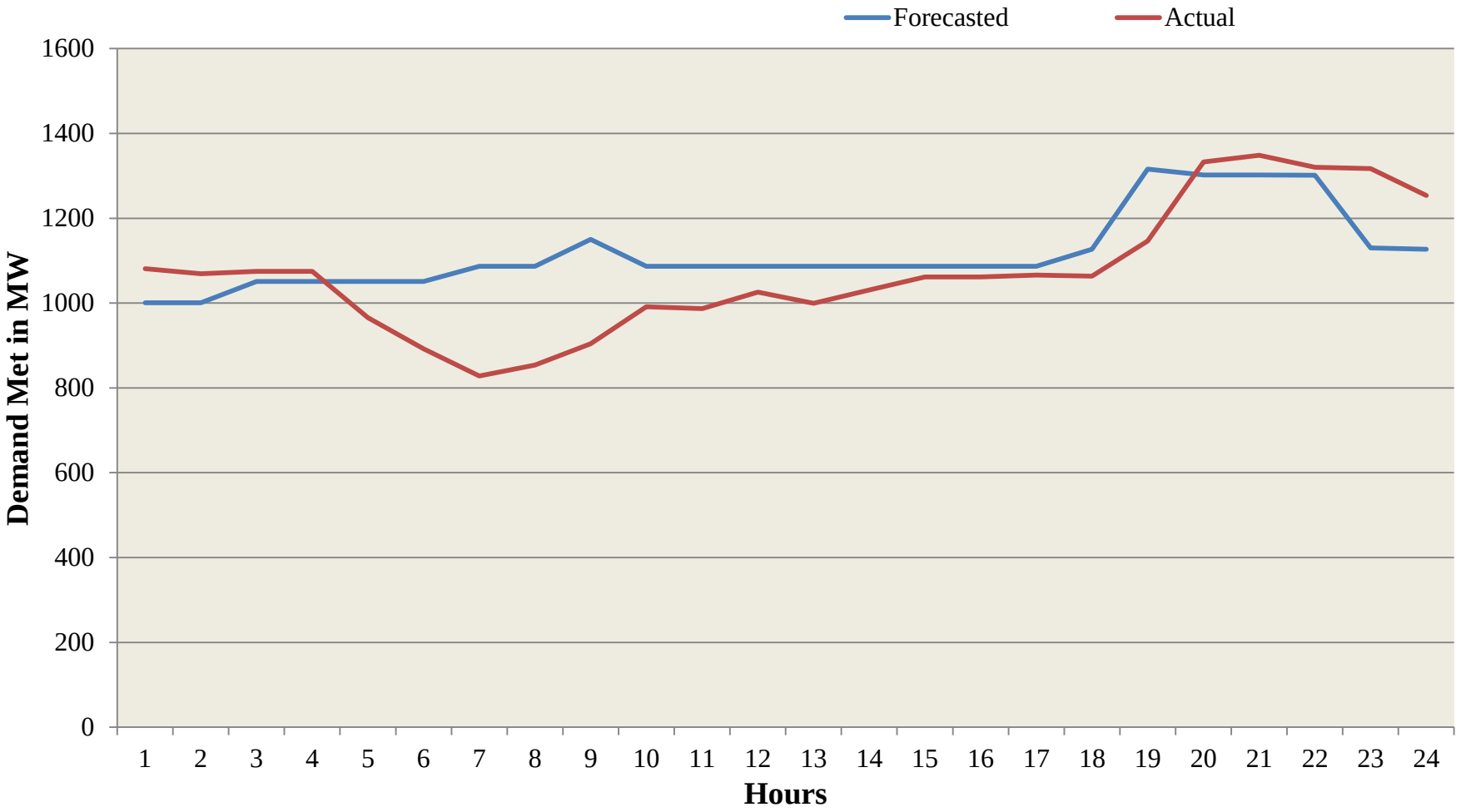
iii. Thiswillpreventflowofpowerfrom220kVSalakati–BTPSD/ClinestoSouthernpartofNERGrid,in absence ofsufficientgenerationinSouthern partofNER grid.

iv. ThismayaffectloadservedinSouthernpartofNERGrid,butwillaverttrippingofcriticalcorridorsinNERGrid.

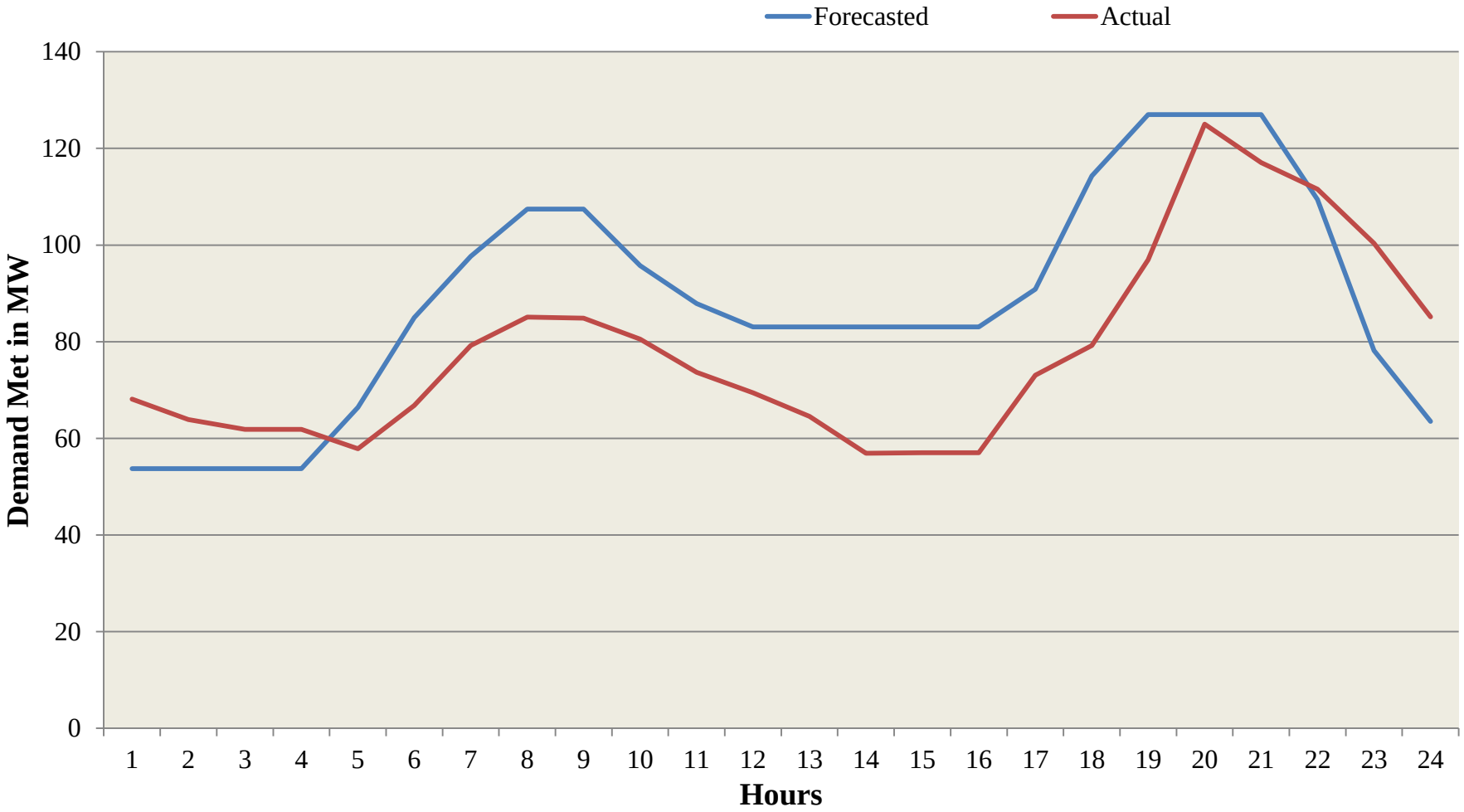
Comparison Between Forecasted & Actaul Demand Met of Arunachal Pradesh for 06-Jul-16



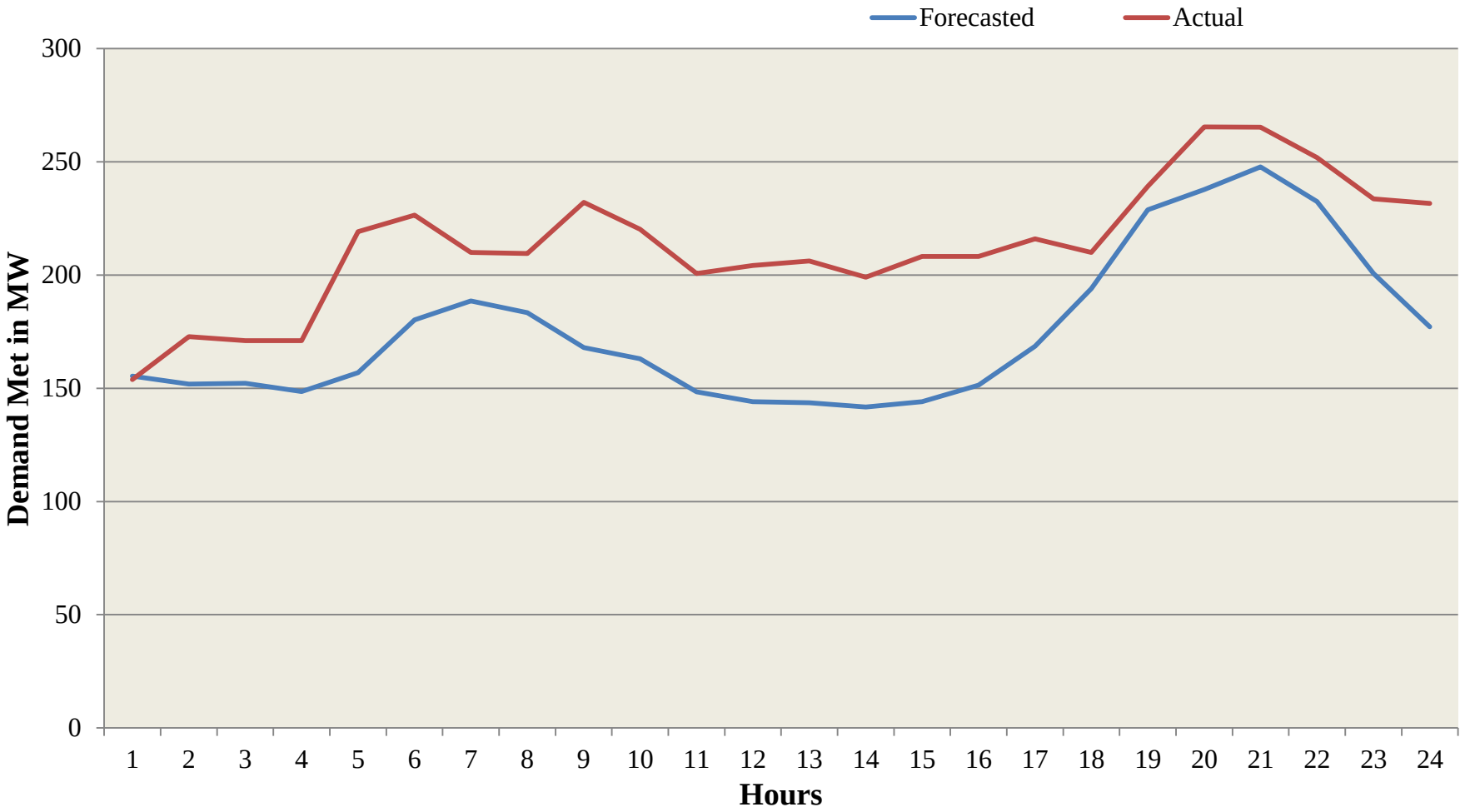
Comparison Between Forecasted & Actaul Demand Met of Assam for 06-Jul-16



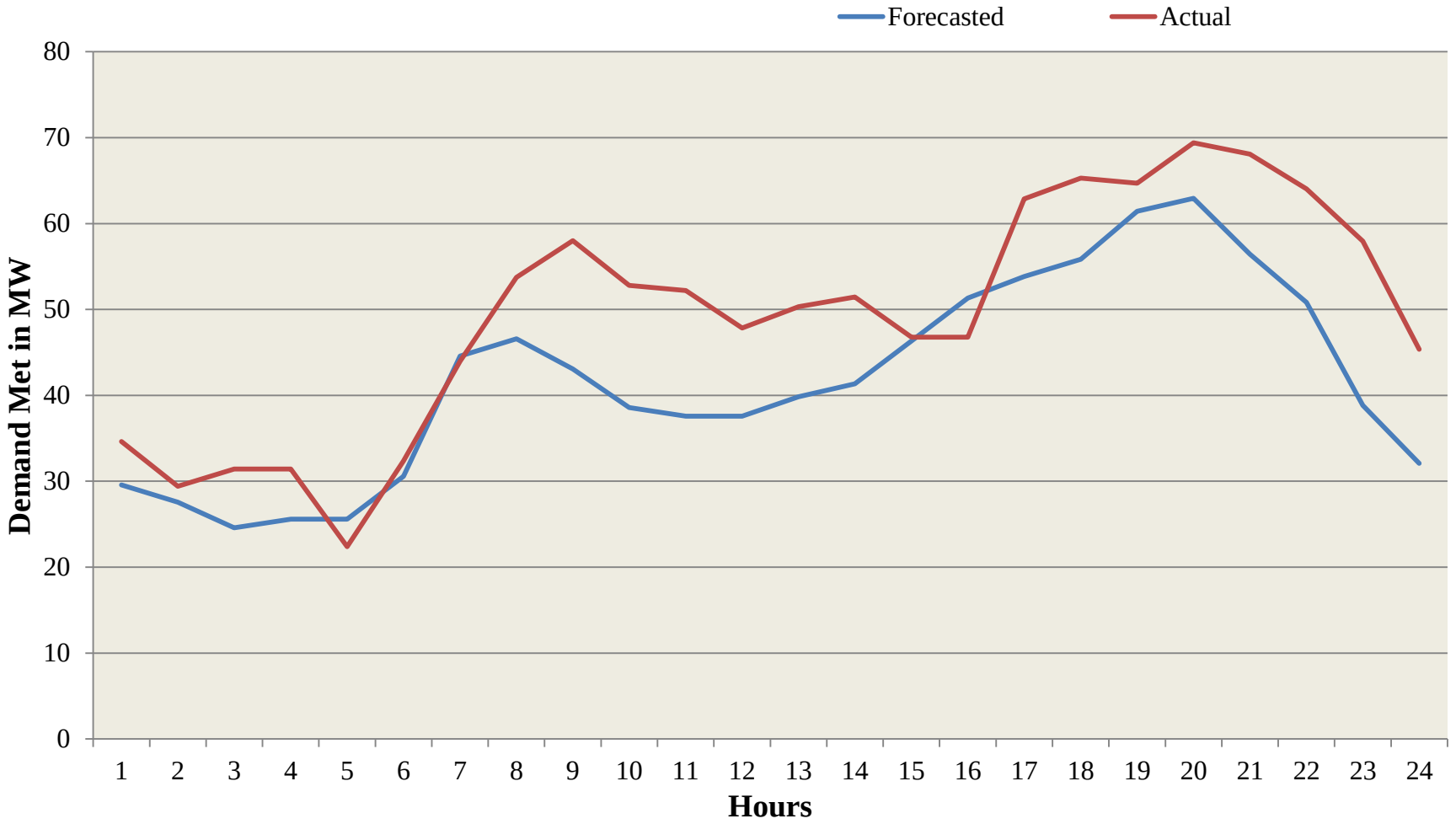
Comparison Between Forecasted & Actaul Demand Met of Manipur for 06-Jul-16



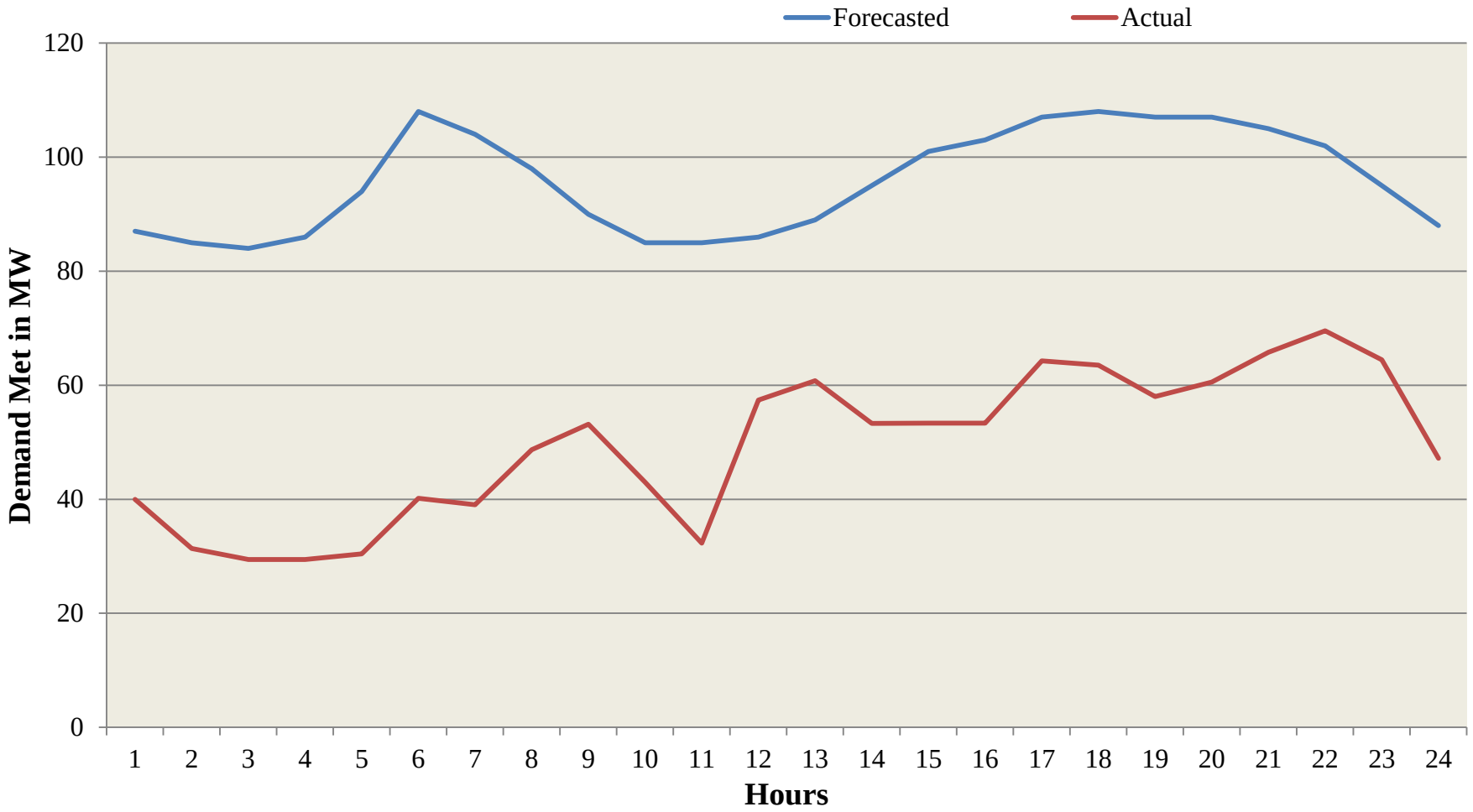
Comparison Between Forecasted & Actaul Demand Met of Meghalaya for 06-Jul-16



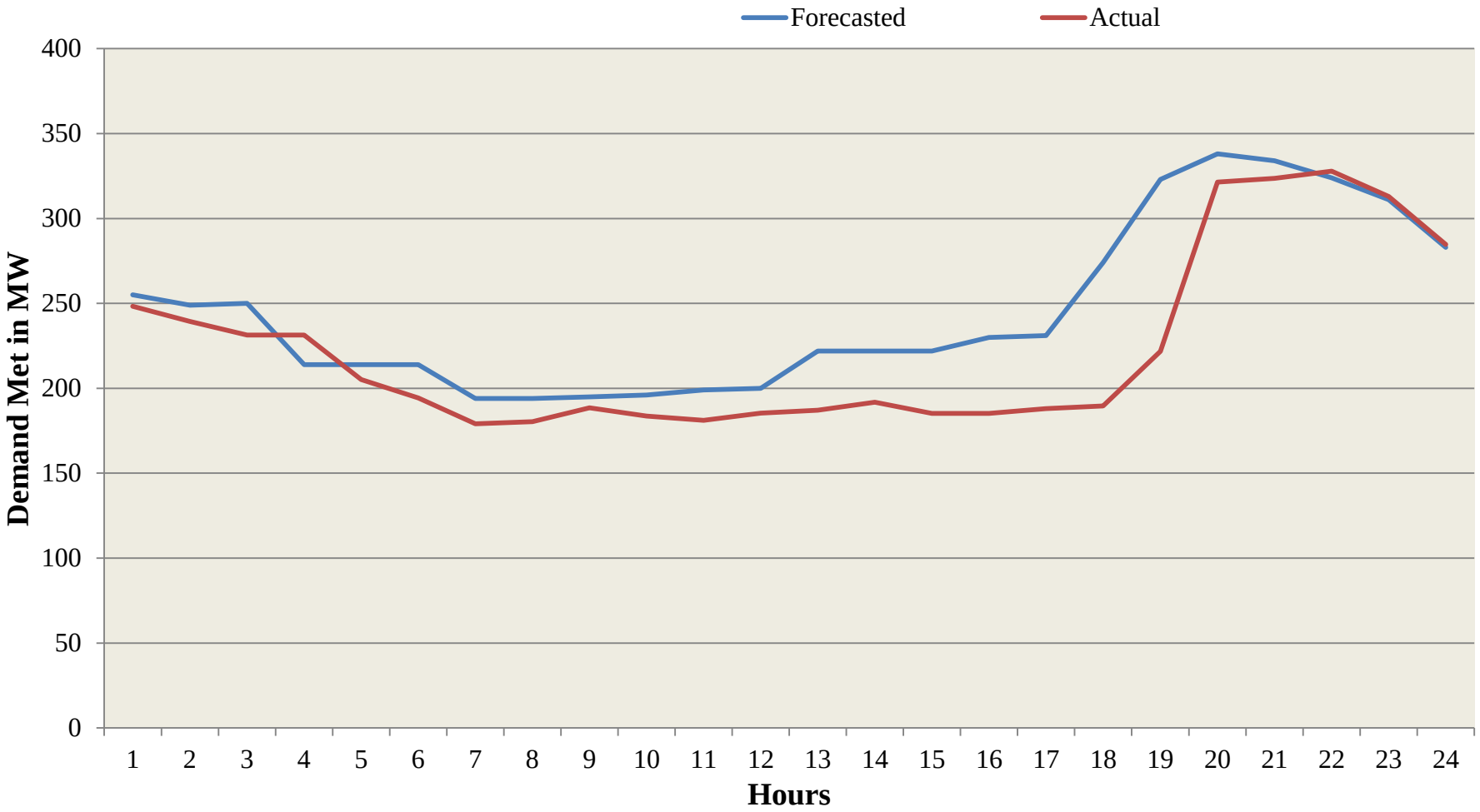
Comparison Between Forecasted & Actaul Demand Met of Mizoram for 06-Jul-16



Comparison Between Forecasted & Actaul Demand Met of Nagaland for 06-Jul-16



Comparison Between Forecasted & Actaul Demand Met of Tripura (with Bangladesh) for 06-Jul-16



Real-Time Energy Assessment System for effective Grid Management

Proposal

Submitted By

Centre for Development of Advanced Computing (C-DAC)
(A Scientific Society of the Department of Electronics & IT, Govt of India)
#1, CDAC Knowledge Park, Old Madras Road
Byappanahalli, Bangalore-560038
Ph No: 080 66116400 / 66166316(Board)
Fax: 080-25246356 / 25247724
Visit us www.cdac.in

Non-Disclosure

The information in this proposal shall not be disclosed outside the intended party and its relevant stakeholders and shall not be duplicated, used, or disclosed in whole or in part for any purpose other than to evaluate the proposal, provided that if a contract is awarded to C-DAC as a result of or in connection with the submission of this proposal, the client shall have the right to duplicate, use, or disclose the information to the extent provided by the contract. This restriction does not limit the right of the client to use information contained in the proposal if it is obtained from another source without restriction.

1. Motivation:

North East India has many industries and it has been a major challenge for these industries to purchase power at lower cost. Introduction to Electricity Act (Open Access) has made possible for these industries to purchase power at lower cost. In India, Indian Energy Exchange (IEX) and Power Exchange India Limited (PXIL) follow the collective type open access. Inter-state and intra-state bilateral transactions of open access are handled by Regional LDC and State LDC respectively as per the guidelines. Since the electricity cannot be preserved, economical equity between generation and consumption must be maintained, this is the major challenge faced by the LDCs. In other side, open access users are paying penalties as proper real-time assessment system not available at their end to monitor and the control their schedules. This in turn troubles the grid stability.

In other side, planning of the state load/DISCOM wise load is very import for better management of power grid discipline. One of the most important works of an electric power utility (SLDCs, DISCOMs) is to correctly predict load requirements. Load forecasting is a method of quantitatively determining future load demand. The primary function of a power utility is to supply electrical energy to the consumers economically. Limitations of energy resources in addition to environmental factors, requires that the electrical energy should be used more efficiently.

Power sector is highly capital intensive and entire planning of generation, transmission and distribution follows an axiomatic approach based on load forecasting. For this purpose, the anticipated load demand should be known. The resources available in the country for electrical power generation (thermal, hydro and nuclear power stations) can then be developed easily considering the electrical power and energy requirements and the locations or regions where demand is expected. Load forecasting has many applications including energy purchasing and generation, load switching, contract evaluation and infrastructure development. Short-term load forecasting is used to supply necessary information for the power system management in day-to-day operations and unit commitment. The forecasting time-period or the prediction time for short-term load forecasting can be hour-by-hour, day-by-day, week-by-week. With the recent trend of deregulation of electricity markets, short-term load forecasting has gained more importance and greater challenges.

2. Advantages of real-time energy assessment system

The Proposed system has majorly three components, real-time data acquisition system from special energy meter, real-time energy assessment system and short term load forecasting. Real-time data acquisition system is base for real-time energy basement system. Load forecasting is based on historical load, date, time, weather info etc. parameters.

Benefits of real-time energy assessment system:

a. Help the better management of power grid and improves the grid stability.
b. Open access user avoids the penalties and helps to get better incentives by timely actions
c. It helps the open access user to adhere with given schedules.

Benefits of short-term load forecasting:

a. Energy purchasing and generation, load switching
b. Optimum supply schedule, Network planning
c. Better power system planning, operation and control.
d. Real-time control and energy management.

3. Background on Open Access and CERC Regulations

A. Open Access

The open access is categorized as intra-state open access and inter-state open access based on Electricity producer and consumer entity location. Inter and intra-state open access is further classified based on duration of contract. Those are long term open access (LTOA), medium term open access (MTOA) and short term open access (STOA). There two different types of open access transactions, one is bilateral and other is collective transaction.

LTOA, MTOA and approved STOA transactions and any other collective transactions will be scheduled by corresponding LDC. Schedules will be made available to open access user on the current day for the next day for all 96 time blocks. Open access user has to adhere the given schedules strictly. Any deviations leads for deviation charges as per CERC regulations based on grid frequency and in turn trouble the grid stability.

Short term like Week-ahead day-head, intra-day forecasting helps for the utilities to purchase any deficit power, planned load-shedding; sell any surplus power, real-time operation and control etc. for better management of power grid. This planned operation helps the grid stability.

B. CERC Regulations for Grid Discipline

The objective of Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) regulations, 2014 is to maintain grid discipline and grid security as envisaged under the Grid Code through the commercial mechanism for Deviation Settlement through drawal and injection of electricity by the users of the grid. These regulations shall be applicable to sellers and buyers involved in the transactions facilitated through short-term open access or medium-term open access or long-term access in inter-State transmission of electricity.

a) The charges for the Deviations for all the time-blocks shall be payable for over drawal by the buyer and under-injection by the seller and receivable for under-drawal by the buyer and over-injection by the seller and shall be worked out on the average frequency of a time-block at the rates specified in this regulation.
b) Charges for deviation for each 0.01 Hz step is equivalent to 35.60 Paise/kWh in the frequency range of 50.05-50.00 Hz, and 20.84 Paise/kWh in frequency range 'below 50 Hz' to 'below 49.70 Hz'. These charges are applicable up to 12% of the schedule deviation. More than 12% of schedules deviation charges as per the CERC Regulations, 2014.

The CERC regulation helps for the better grid stability and management. To adhere with the regulations real-time assessment system helps the open access user when to draw more power for cheaper cost and when to draw less power to get better incentives. Assessment system gives various notifications/alarms for needful timely actions; this in turn helps for grid stability.

4. Real-Time Energy assessment system

Decision support system for load forecasting, is vitally important for the electric utility. Accurate model for electric power load forecasting are essential to the operation and planning of DISCOMS/SLDCS. Load forecasting helps the DISCOMS/SLDCS to make decisions on purchasing electric power, load shedding and other infrastructure development. Short term load forecast includes from same-day, day-ahead and week-ahead.

Real Time energy assessment system helps the open access users to adhere the schedules properly. The assessment system gives real-time proactive alarms/notifications like, when to draw more power with cheaper price and when to under draw to get better incentives. This system allows the user to adhere to the schedules and helps the power grid discipline by giving better incentives to open access consumers.

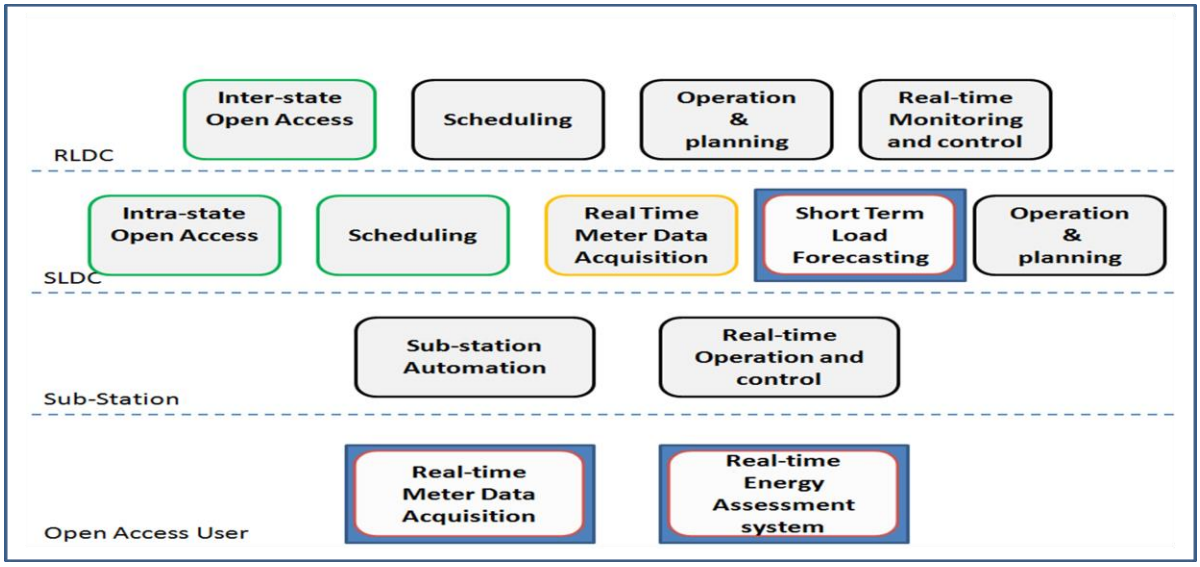


Fig:1-Power System hierarchical Architecture and its responsibilities

The assessment system for grid discipline contains three modules.

a) Real-time data acquisition system(for open access user)
b) Real-time Energy Assessment system(for open access user)
c) Short-term Load forecasting tools(for DISCOMs/SLDC)

3.1 Real-Time Data Acquisition System

Data Acquisition system acquires real-time data like actual power import/export, reactive power, 3-phases voltage & current and frequency from Special Energy meter. The data will be provided in various forms like tabular, gauge, trend and graphical format for better understanding power import/export.

3.2 Real-time Energy Assessment System

Real-Time Energy Assessment System works based on Scheduled import/export, actual import/export, and Grid Frequency and CERC grid discipline regulations. Schedule data will be provided by LDC for all 96 time blocks of the day. Actual import/export, Frequency (f) information collected from Special Energy Meter in real-time basis. CERC Schedule deviations charges will be made available in Database for decision making. Rate of deviation charges (RDC) is as shown below, these charges applicable up to 12% of deviation.

SL.No	RATE FOR DEVIATION CHARGE(RDC)
1	f>=50.05Hz, RDC=0
2	50.05>f>=50.00, RDC increases by 35.6 p/u for each 0.01Hz step
3	50.00>f>=49.7, RDC increases by 20.84 p/u for each 0.01Hz step
4	F<49.7,RDC=824.04p/u

Table.1: Rate for Deviation Charge(RDC) based on frequency

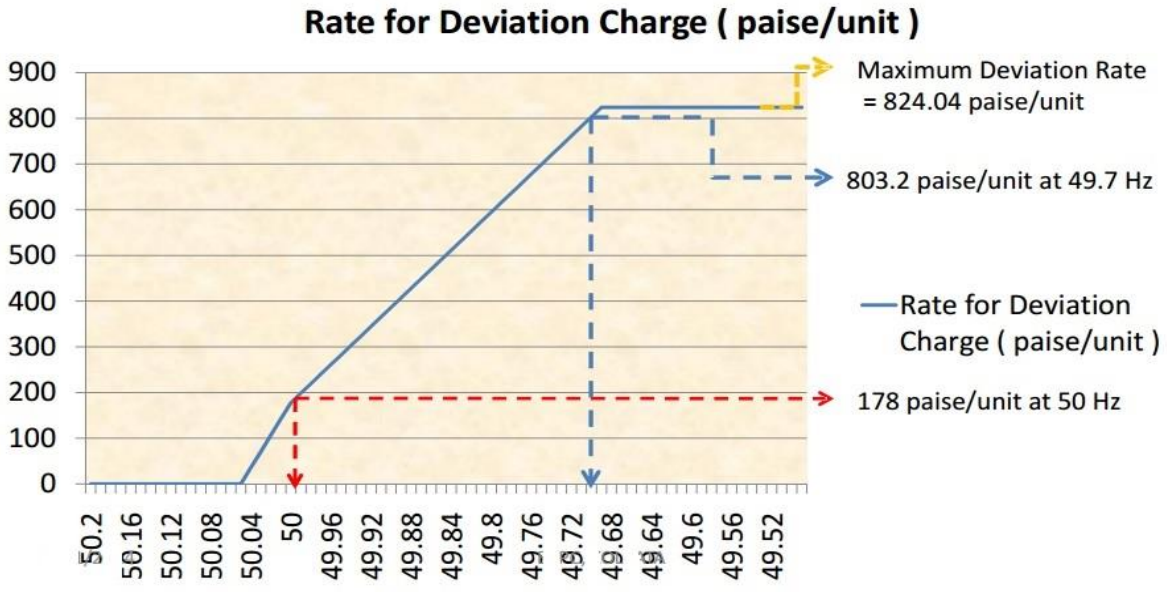


Fig.2: Rate for Deviation Charge(RDC) based on frequency

If grid frequency is more than 50.05Hz, user can overdraw power free of cost and can even ramp down their captive generation. When frequency is 50Hz user can overdraw power at cheaper prices like 178paisa/unit. When a frequency is 49.7 and below open access user has to pay with RDC as 824.04 paisa/unit. If under draws when frequency is 49.7 and below will get better incentive as 824.04 paisa/unit.

Energy assessment system configured with limits based on schedule quantum, drawl quantum, deviation quantum, frequency, rate for deviation charge (RDC). Various alarm/notifications generated by energy assessment system for needful timely actions to avoid penalties and get better incentives. Energy assessment system has provision for customization as per user requirements when they need alarms/notifications. This system helps for grid discipline by avoiding penalties and giving incentives to open access user. This system makes the win-win situation for the both open access users and power grid at every point of time.

3.3 Load Forecasting

Supply and load of electrical demand fluctuates with the changes of weather conditions. An energy price also plays a key factor during peak load conditions. In these situations, load forecasting plays a vital role for power utilities. In general, there are 3 types of forecasting approaches i.e. short term, medium term and long term. Short-term forecasts which are usually from one hour to one week, medium forecasts which are usually from a week to a year, and long-term forecasts which are longer than a year. Short term load forecasting can be used to predict the load and to take decisions to prevent overloading. When these decisions are taken at right time, such decisions can improve network reliability and also reduce the occurrences of equipment failures and blackouts. Various methods for short term load forecasting are similar day approach, regression models, time series, neural networks, statistical learning algorithms, fuzzy logic, and expert systems. End-use and econometric approaches are broadly used for medium forecasting.

Factors considered during medium and short term forecast are historical load, weather data, population of the area, economic and geographic data of that area. One additional factor considered especially considered for short term forecasting is time factor. This time factor include time of the year, day of the week and hour of the day. Time factor is crucial during forecasting due to the differences in load between weekdays and weekends. Load on weekdays also can behave differently. Special days such as holidays, festivals etc is one more critical factor affect the load. Time series for load is a set of data that is based on observed load over a time period. It is the historical record of data taken at equally spaced intervals with consistency. Considering all these factors such as weather conditions of historical data, differentiating type of days such as weekday/weekend, special days for medium or short term forecasting, time series for load is prepared.

Recommended model for short term forecasting Auto Regressive Integrated Moving Average (ARIMA) model based on the Box-Jenkins method. Adopted methodology is a self- projecting time series forecasting method. For forecasting each day, a dynamic set of comparison day selection criteria is created. The criteria takes into consideration day of week, day type including special holidays and several user definable parameters. Comparison days are sorted with very wide search criteria until one

or more days are found. Special days are not used as comparison days except in case of forecasting the load for special day. The special days definitions are editable by the user.

Box-Jenkins modeling involves identifying an appropriate ARIMA process, fitting it to the data, and then using the fitted model for forecasting. One of the attractive features of the Box-Jenkins approach to forecasting is that ARIMA processes are a very rich class of possible models and it is usually possible to find a process which provides an adequate description to the data. Box-Jenkins modeling procedure involved an iterative five-stage process of Data preparation, model selection, parameter estimation, model checking and forecasting. Data preparation involves transformations and differencing. Transformations of the data can help stabilize the variance in a series where the variation changes with the level. Model selection uses various graphs based on the transformed and differenced data to identify ARIMA processes to provide a good fit to the data. Parameter estimation means finding the values of the model coefficients which provide the best fit to the data. Model checking involves testing the assumptions of the model to identify any areas where the model is inadequate. If the model is found to be inadequate, it is necessary to go back to model selection and try to identify a better model. Once the model has been selected, estimated and checked, it is a straightforward task to compute forecasts.

Duration:

2 Years

Budget Outlay:

Rs.2 crore