

# North Eastern Regional Power Committee

## Agenda

### For

### 11<sup>th</sup> NETeST Sub-Committee Meeting

Time of meeting : 10:00 Hrs.

Date of meeting : 13<sup>th</sup> November, 2018 (Tuesday)

Venue : "Hotel Nandan", Guwahati.

#### A. CONFIRMATION OF MINUTES

##### CONFIRMATION OF MINUTES OF 10<sup>th</sup> NETeSTS Meeting held on 16.07.2018.

The minutes of 10<sup>th</sup> NETeST Meeting held on 16<sup>th</sup> July, 2018 at Guwahati were circulated by NERPC vide letter No. NERPC/SE(O)/TeST/2018/ dated 14<sup>th</sup> August, 2018.

*The Sub-committee may confirm the minutes of 10<sup>th</sup> NETeST meeting of NERPC as no comments/observations were received from the constituents.*

#### ITEMS FOR DISCUSSION

##### A.1 Status of SLDCs in NER:

SN	Utility	Status as informed in 09 <sup>th</sup> NETeST	Status as informed in 10 <sup>th</sup> NETeST	Target Completion
UPGRADATION OF SLDCs				
1	Assam	DG set commissioning pending due to ACDB input connection feasibility is not there.	Completed.	DG set-Target July-18. ASEB is to procure input ACDB. Alternatively, a 3way switch may be procured by AEGCL/SLDC for DG connection to main bus
2	Tripura	DG set completed. SAT of remaining 2 RTUs by July'18.	4 RTUs tested. 3 RTU ready for testing. DG set-Installed. Foundation & earthing readiness confirmed by TSECL on 09.12.17. Alstom had some contract issue. Team will be deputed by 15days.	Pending RTU - integration by Aug'18 as RTU links are to be provided by TSECL for GPRS-RTU-SLDC connectivity. By August'18 all SIM & links will be provided.

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3	Meghalaya	DG set installed.	Completed.	Completed.
4	NERLDC	DG set commissioning pending.	Completed.	SAT Completed.
5	Manipur	DG set commissioning pending.	Completed.	Completed. DG set-Target Aug-18
6	Nagaland	DG set installation & commissioning planned in Sept18.	Out of 12, 10 RTUs are installed and six tested. DG set space yet not ready.	Completed. DG set-Target Sep-18.
7	Mizoram	DG set installation & commissioning planned in August'18. Sihmui RTU SAT by July'18	Completed. AMC is still not signed. DG set space yet not ready.	Completed. DG set-Target Aug-18. RTU SAT July'18
8	Ar. Pradesh	DG set completed. To be formally inaugurated in July'18.	8 RTU installed and tested locally without communication links.	Completed.
9	Backup NERLDC	Completed	Completed.	Completed.

***Members may kindly intimate the status.***

**A.2 Status of FO works under different projects:**

Latest status as per 149<sup>th</sup> OCCM:

<b>Name of project</b>	<b>Latest status</b>
MW Vacation OPGW project	<p>KEC</p> <ol style="list-style-type: none"> <li>1. All 17 links already commissioned.</li> <li>2. 3 nos. of links down due to failure of AEGCL 132kV Srikona-Panchgram tower. AEGCL intimated that there is no place for erection of ERS and 2-3 pile foundation needs to be done. Forum requested AEGCL to communicate road map for restoration of 132kV Srikona-Panchgram at the</li> </ol>

	<p>earliest.</p> <p>3. 4 nos. Link requires detail assessment for rectification and job is in progress. Expected completion of rectification by Dec'18.</p> <p>TENDOT</p> <p>4. WIP in all 14 links</p> <p>5. Progress affected due to ROW.</p> <p>6. Expected completion March'19.</p> <p>NOTE</p> <p>1. Arunachal Pradesh may please provide new tower route schedule &amp; readiness for LILO part (Lekhi connectivity from existing Nirjuli-Ranganadi line). The schedule completion 2 months from receipt of new tower route schedule.</p> <p>Railway diversion of POWERGRID also suffering due to ROW in 3 locations to be resolved by Arunachal Pradesh.</p>
<p>NER FO Expansion/Add req of OPGW</p>	<p>TRIPURA</p> <ul style="list-style-type: none"> <li>• 263 of 328 Km Completed</li> <li>• 65 km front not available due to construction of 2 lines by TSECL</li> <li>• Completion: Mar 19</li> </ul> <p>MIZORAM &amp; MANIPUR</p> <ul style="list-style-type: none"> <li>• 80% Material supplied.</li> <li>• Target Completion June 19</li> </ul> <p>NOTE</p> <p>Silchar-Pallatana OPGW work under halt due to objection of NETC &amp; OTPC for transient lightning related fault in rainy season.</p> <p>P&amp;ED Mizoram informed that for 132kV Aizawl-Zemabawk line fibre is being laid by NERTS, with terminal equipment supplied by NERTS. Compatibility to be confirmed by NERTS.</p>
<p>Upgradation of ULDC FO node</p>	<p>15 Location Completed</p> <p>Except Umtru. MeECL informed that there is space constraint in PLCC room. Separate room may be constructed and included in scope.</p>

. Critical Issues against project implementation may be discussed

Name of the Project	Critical Issue
Upgradation of ULDC FO node	
MW Vacation	
NER FO Expansion/Add req of OPGW	

***NERTS may please intimate the status.***

**B. NEW ITEMS**

**B.1 Strengthening of PLCC System by NER States:**

As per discussion in previous meetings:

- Assam, Meghalaya and Manipur have submitted relevant data pertaining to their communication system.
- Mizoram, DoP Ar.Pradesh, Nagaland and Tripura yet to submit.
- A communication map is to be prepared by NERLDC based on the above data and also existing network of NERTS.
- NERPSIP communication schemes are to be included for holistic map. NERPC to invite POWERGRID-NERPSIP to next NETeST for apprising the same.

***NERLDC may please inform the status.***

**B.2 Termination of OPGW at RHEP:**

In 10<sup>th</sup> NETeST meeting, NERTS informed that the work is carried under MW Vacation project executed by M/s Ten Dot. The new tower route schedule & readiness for LILO part (Lekhi connectivity from existing Nirjuli-Ranganadi line) is yet to be provided by DOP Ar. Pradesh. Rain/landslide/water accumulation is also delaying the project. Target completion is Nov/Dec18.

In 149<sup>th</sup> OCC meeting DGM(AM) NERTS requested that Arunachal Pradesh may please provide new tower route schedule & readiness for LILO part (Lekhi connectivity from existing Nirjuli-Ranganadi line). The schedule completion 2 months from receipt of new tower route schedule. He further informed that Railway diversion of POWERGRID also suffering due to ROW in 4 locations to be resolved by Arunachal

Pradesh. The forum requested DoP Ar. Pradesh to expedite. NEEPCO also requested that alternate path for OPGW may be laid using 400kV lines from RHEP.

NEEPCO has informed that termination of OPGW link in the Ranganadi HE Plant is required at the earliest and Ranganadi station be declared as Wide area network point. The equipment for OPGW is laying in the Power House site since several months awaiting for Termination of OPGW for reliable communication for both Voice and data. In this regard NEEPCO is already entered into the agreement with PLCC for Lease Line. At present ULDC Phone in RHEP is not working since two to three years due to failure in PLCC media and also our plant is operating in web based scheduling system which require uninterrupted internet facility. This can also be achieved by commissioning of OPGW.

***DoP Ar.Pradesh may please inform the status of tower route schedule.***

***NEEPCO & NERTS may please inform the status.***

### **B.3 Implementation of Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017:**

As per discussion in the previous meetings the following were decided:

- Presently NERTS should submit the availability data in the format to NERLDC for verification and further certification by NERPC.
- Since the regulation came into effect from 15.05.2017, the data from May'17 to Mar'18 may be submitted forthwith and consequently monthly data may be submitted.
- Availability for communication links associated with ISTS wideband only may be dealt with at the moment.
- Links diagram data from Assam, Meghalaya states have been received; detailed channel routing is yet to be submitted by the all states.
- A consolidated list of communication links has been made from the details submitted by POWERGRID. The detail list is attached in Annexure-B.3. The details of commissioning dates and owner has to be updated and submitted by NERTS, POWERGRID.
- The forum may approve the draft format for availability calculation already circulated by NERLDC.

***NERLDC/NERTS may please inform the status.***

### **B.4 MW and MVAR data validation:**

In 10th NETeST meeting DGM(SL) NERLDC asked Assam to submit the data validated stations report as many RTUs of Assam not reporting to NERLDC through ICCP. MeECL representative informed that validation work has started for Meghalaya SLDC and is slated for completion by July'18.

***AEGCL/MeECL/NERLDC may please intimate the status.***

### **B.5 Shut Down Procedure for Optical Links:**

In 10<sup>th</sup> NETeST meeting the necessity of availability of critical Optical communication links / nodes without hampering monitoring of the power system was discussed. NERLDC informed that the clear list of OPGW/PLCC links ( by collecting from all utilities of NER) is being compiled in a Communication map and the detailed end-to-end channel(port to port) list is being prepared and the same would be circulated shortly. The draft Communication map alike POWER map may be prepared & submitted soon by NERLDC so that if any changes are there same may be commented by utilities. NERTS already provided list of links( MW,ULDC,FO expansion) and already prepared a FO Map as circulated in 18<sup>th</sup> NERPC and same may be taken as reference. After detailed deliberation the forum referred the matter to the next OCC meeting for shut down procedure finalization. Only Meghalaya submitted the communication drawing, Assam submit but not detailed. NERTS referred 18<sup>th</sup> RPC minutes. DGM(SL) NERLDC opined that the communication drawing submitted in 18<sup>th</sup> RPC is only links not channel details.

Director NERPC mentioned that that preparation/finalization Network is long pending and at first, communication Link network diagram (OPGW/PLCC/Others) just alike power map connecting critical stations of CS/ISGS/States & LDCs of NER may be prepared by RLDC. Onward, if required, incorporation of channels & other requirements may be done in next stage by RLDC by collecting from respective utility. Issues/requirements from state utility/central utility may be taken up bilaterally and if same is not sorted out, can be discussed in meeting

***Members may please discuss.***

### **B.6 Discontinuity in links for MW vacation project.**

In 10<sup>th</sup> NETeST meeting Manager, NERTS informed that there is a break up of Link via Jiribam-Pailapool-Srikona-Panchgram-Badarpur due to failure of Tower in between Panchgram-Srikona-Pailapul. On rectification of Tower (5-6months as intimated by Assam), OPGW to be restored separately by AEGCL.

Further, for other locations, the joint box splicing rectification work is delayed due to unfavorable climatic conditions. Although, all fibre related issues will be sorted out by Nov 18.

***AEGCL/NERTS may please intimate the status.***

### **B.7 Finalization of agreement/formalities as to be adopted by operators while operating central sector assets ( like VOIP, URTDSM , etc.).**

Necessary formalities i.r.o operation may be finalized by NERTS, NERLDC & SLDC for proper operation of assets supplied under VOIP, FO EXPANSION, URTDSM etc where Equipment is installed in a control room but assets are not owned by owner of control room/LDC. Further for state sectors, wherever state links are established(e.g. NER FO Expansion proj or similar) by & then AMC payment will be done by POWERGRID, for same billing will be done during AMC period against expenditure & as applicable.

In 10<sup>th</sup> NETeST meeting it was decided that the modalities would be presented in the next NETeST meeting for further ratification.

***NERTS/NERLDC may please present the modalities.***

**B.8. Inter country Communication- Bangladesh & India( via SM Nagar -Comilla):**

In 10<sup>th</sup> NETeST meeting it was discussed that preferably, ICCP may be integrated between NLDC India & NLDC Bangladesh by taking up for inter-country administrative permission from respective authority with cyber security measures been taken care. The same is also opined by NERTS & discussed with POWERGRID's LD&C as well ( designated for communication planning) keeping in view discussion in last meeting (7<sup>th</sup> Op cord meeting 04.06.18). The regulations of CEA/CERC hold good within/up to boundary of State/Country. Keeping in view country's security aspect( cyber & other regulations of DOT) & compliance thereof, same may be taken up by NLDC India with NLDC Bangladesh. However End to end(substation to substation) PLCC/Protection/FO Voice communication may be maintained between two border stations with intimation to concern authority as applicable. Channels as required up to border area may be provided by utility as per jurisdiction and same channels are proposed to be used by respective NLDCs.

NERTS informed that the views of POWERGRID communicated in the course of 7<sup>th</sup> Operational Coordination Committee meeting were not recorded in the MoM. The request for revision of MoM has been given to NLDC, POSOCO in this regard.

Forum opined that all cyber security concerns to be taken care for country-to country integration. This is also for intimation to next RPC level & further needful to be discussed in the next NETeST meeting as well.

***Members may please discuss.***

**B.9 Improvement of Data Availability of NER**

To observe and monitor the actual quantity of data that are available to NERLDC control room from Central sector as well as State sector stations, a detailed point list (analogue and digital) has been prepared by NERLDC (attached in **Annexure-B.9(I) & B.9(II)**).

***Members may please discuss.***

**B.10 Status of URTDSM**

Latest status as per 149<sup>th</sup> OCC meeting held on 11.10.2018:

1. SAT in 2nos. PDC completed. SAT for NERLDC PDC started.
2. 39 out 51 PMUs reporting. WIP for BNC. Target for completion-Jan2019

NOTE:

3. OPGW installation for Ranaganadi connectivity is on halt due to water log (at loc of shift from 132kV GITL to 400kV Line).

- Further Splicing is delayed due to peddy & ROW

Members from various SLDCs informed that important nodes have been excluded from PMU installation under Phase-I & II. The forum decided that those locations would be included under Phase-III. All SLDCs to prepare list and communicate the same to NERLDC.

***NERTS may please intimate the status of URTDSM works.***

**B.11 GPRS connectivity for Substations and Leased line for SLDC:**

In 10<sup>th</sup> NETeST meeting the following timeline(s) were agreed to by the different utilities:-

Name of utility	Static IP at SLDC	GPRS SIM/Broadband
TSECL	By July'18	By 15.08.2018
MSPCL	-	Remaining By July'18
DoP Nagaland	-	By July'18

It was also intimated to states that instead of 3G SIM, if internet lease link is taken at substations also, then the same is also feasible with the modems provided for states. ED, NERLDC opined that GPRS is a temporary arrangement and should be discouraged. However it may be used as a stopgap arrangement till OPGW is implemented. However PLCC should serve as the backup for all state substations.

***TSECL/MSPCL/DoP Nagaland may please inform the latest status.***

**AGENDA ITEMS FROM NERLDC:**

**B.12 Outage of Telemetry:**

The following RTUs are not reporting for long duration:

- a) Ranaganadi since 07/09/2018,
- b) Kathalguri since 06/10/2018,
- c) Roing S/s Since 19/09/2018,
- d) Tezu S/s since 24/09/2018,

ECl channel of following RTUs is out of service as on date since 31/10/2018:

- a. 400 kV Bongaigaon S/s
- b. 220 kV Salakati S/s
- c. 400 kV BgTPP

***Members may please discuss.***

**B.13 Discussion on visit to KPTCL regarding VSAT:**

Field visit to KPTCL to see VSAT setup was discussed in the last meeting. It is requested to provide nomination for the above programme. The program is being organized tentatively on 1st week of December.

***Members may please discuss.***

**Any other item:**

**Date and Venue of next NETeST**

It is proposed to hold the 12<sup>th</sup> NETeST meeting of NERPC on second week of January, 2019. The date & exact venue will be intimated in due course.

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S. No.	LINK		PROJECT	CURRENT STATUS	COMMISSIONING DATE(Expected Date if not completed)	OWNER	REMARKS (IF ANY)
	FROM	TO					
1	ZIRO	RANGANADI	MW VACATION				
2	RANAGANADI	PARE	MW VACATION				
3	RANAGANADI	NIRJULI	MW VACATION				
4	PARE	CHIMPU	MW VACATION				
5	RANAGANADI	GOHPUR	MW VACATION				
6	GOHPUR	BALIPARA	MW VACATION				
7	TINSUKIA	NAMRUP	MW VACATION				
8	NAMRUP	LAKWA	MW VACATION				
9	LAKWA	MARIANI(AS)	MW VACATION				
10	MARIANI(AS)	MARIANI(PG)	MW VACATION				
11	MARIANI(AS)	SAMAGURI	MW VACATION				
12	SAMAGURI	MISA	MW VACATION				
13	SALAKATI	BONGAIGAON(PG)	MW VACATION				
14	BONGAIGAON(PG)	BgTPP	MW VACATION				
15	BgTPP	BTPS(AS)	MW VACATION				
16	BTPS(AS)	AGIA	MW VACATION				
17	AGIA	SARUSAJAI	MW VACATION				
18	AGIA	BOKO	MW VACATION				
19	AGIA	AZARA	MW VACATION				
20	SIRIKONA	PAILAPOOL	MW VACATION				
21	PAILAPOOL	JIRIBAM(PG)	MW VACATION				
22	SIRIKONA	SILCHAR	MW VACATION				
23	BADARPUR	BADARPUR(AS)	MW VACATION				
24	BADARPUR	SIRIKONA	MW VACATION				
25	SILCHAR	BADARPUR	MW VACATION				
26	BADARPUR	KOLASIB	MW VACATION				
27	KOLASIB	AIZAWL	MW VACATION				
28	DIMAPUR	NAGARJUN	MW VACATION				
29	NAGARJUN	DIMAPUR	MW VACATION				
30	IMPHAL	IMPHAL(MN)	MW VACATION				
31	DIMAPUR	NAGARJUN	MW VACATION				
32	MOKOKCHUNG	MOKOKCHUNG(NA)	MW VACATION				
33	SILCHAR	KILLING	MW VACATION				
34	KILLING	BONGAIGAON(PG)	MW VACATION				

S. No.	LINK		PROJECT	CURRENT STATUS	COMMISSIONING DATE(Expected Date if not completed)	OWNER	REMARKS (IF ANY)
	FROM	TO					
1	KATHALGURI	MARIANI(PG)	NER FO EXPANSION				
2	MARIANI(PG)	MOKOKCHUNG(PG)	NER FO EXPANSION				
3	MOKOKCHUNG(NA)	DOYANG	NER FO EXPANSION				
4	DOYANG	DIMAPUR(PG)	NER FO EXPANSION				
5	DOYANG	WOKHA	NER FO EXPANSION				
6	WOKHA	SANIS	NER FO EXPANSION				
7	WOKHA	KOHIMA	NER FO EXPANSION				
8	BADARPUR(PG)	JIRIBAM(PG)	NER FO EXPANSION				
9	JIRIBAM(PG)	JIRIBAM(MA)	NER FO EXPANSION				
10	JIRIBAM(PG)	LOKTAK	NER FO EXPANSION				
11	LOKTAK	IMPHAL(PG)	NER FO EXPANSION				
12	LOKTAK	RENGPANG	NER FO EXPANSION				
13	LOKTAK	NINGTHOUKHONG	NER FO EXPANSION				
14	NINGTHOUKHONG	CHURACHANDPUR	NER FO EXPANSION				
15	CHURACHANDPUR	KAKCHING	NER FO EXPANSION				
16	KAKCHING	CHANDEL	NER FO EXPANSION				
17	KAKCHING	THOUBAL	NER FO EXPANSION				
18	THOUBAL	KONGBA	NER FO EXPANSION				
19	KONGBA	YAINGANGPOKPI	NER FO EXPANSION				
20	YAINGANGPOKPI	IMPHAL(MN)	NER FO EXPANSION				
21	YAINGANGPOKPI	HUNDUNG	NER FO EXPANSION				
22	IMPHAL(MN)	KARONG	NER FO EXPANSION				
23	AIZAWL	LUANGMUAL	NER FO EXPANSION				
24	AIZAWL	ZUANTUI	NER FO EXPANSION				
25	ZUANTUI	SLDC AIZAWL	NER FO EXPANSION				
26	ZUANTUI	MELRIAT	NER FO EXPANSION				
27	AIZAWL	MELRIAT	NER FO EXPANSION				
28	MELRIAT	CHUIMUI	NER FO EXPANSION				
29	MELRIAT	SILCHAR(PG)	NER FO EXPANSION				
30	SM NAGAR	BJ NAGAR	NER FO EXPANSION				
31	SM NAGAR	MONARCHAK	NER FO EXPANSION				
32	SM NAGAR	BADHARGHAT	NER FO EXPANSION				
33	SM NAGAR	79 TILLA	NER FO EXPANSION				
34	SM NAGAR	ROKHIA	NER FO EXPANSION				
35	ROKHIA	UDAIPUR	NER FO EXPANSION				
36	UDAIPUR	GUMTI	NER FO EXPANSION				
37	GUMTI	AMARPUR	NER FO EXPANSION				
38	UDAIPUR	PALATANA	NER FO EXPANSION				
39	PALATANA	PK BARI	NER FO EXPANSION				
40	SILCHAR(PG)	MELRIAT	NER FO EXPANSION				
41	SATCHAND	SABROOM	NER FO EXPANSION				
42	79 TILLA	DHALABIL	NER FO EXPANSION				
43	79 TILLA	BARAMURA	NER FO EXPANSION				
43	KILLING	AZARA	NER FO EXPANSION				
44	KAHELIPARA	B/U NERLDC	NER FO EXPANSION				
45	NEHU	NEIGRIHMS	NER FO EXPANSION				
46	KHLIERIAT(ME)	LESKHA	NER FO EXPANSION				
47	KHLIERIAT(ME)	KHLIERIAT(PG)	NER FO EXPANSION				
48	KHLIERIAT(ME)	LUMSHONG	NER FO EXPANSION				
49	KHANDONG	HALFLONG	NER FO EXPANSION				

S. No.	LINK		PROJECT	CURRENT STATUS	COMMISSIONING DATE(Expected Date if not completed)	OWNER	REMARKS(IF ANY)
	FROM	TO					
1	SARUSAJAI	KAHELIPARA	ULDC PROJECT				
2	KAHELIPARA	UMIUM III	ULDC PROJECT				
3	UMIUM III	UMIUM I	ULDC PROJECT				
4	UMIUM I	NEHU	ULDC PROJECT				
5	NEHU	NERLDC	ULDC PROJECT				
6	KHLIEHRIAT(ME)	NERLDC	ULDC PROJECT				
7	BALIPARA	MISA	ULDC PROJECT				
8	MISA	KOPILI	ULDC PROJECT				
9	KOPILI	KHANDONG	ULDC PROJECT				
10	KHANDONG	KHLIEHRIAT(PG)	ULDC PROJECT				
11	KHLIEHRIAT(PG)	BADARPUR	ULDC PROJECT				
12	BADARPUR	KUMARGHAT	ULDC PROJECT				
13	KUMARGHAT	RC NAGAR	ULDC PROJECT				
14	RC NAGAR	SLDC AGARTALA	ULDC PROJECT				
15	MISA	DIMAPUR	ULDC PROJECT				
16	DIMAPUR	KOHIMA	ULDC PROJECT				
17	KOHIMA	IMPHAL	ULDC PROJECT				

**Telemetry Availability Status at NERLDC from Constituents (as on 01-10-2018):****Presented in 149<sup>th</sup> OCC Meeting**

Sl. No.	Name of the Constituents	Total Analogue Data points	Total Digital Data points	Total Data Points	Analogue Data points Reporting	Digital Data Points Reporting	Total Reporting	Total Percentage of data Availability
1	Arunachal Pradesh	104	149	253	6	4	10	3.95%
2	Assam	1217	1731	2948	536	547	1083	36.64%
3	Manipur*	180	255	435	97	159	256	56.09%
4	Meghalaya	409	388	797	207	86	293	36.76%
5	Mizoram	71	50	121	9	9	18	14.87%
6	Nagaland	237	270	507	0	0	0	0%
7	Tripura	524	715	1239	149	189	338	27.28%
8	PGCIL	628	1082	1710	421	724	1145	66.95%
9	NEEPCO	202	286	488	143	190	333	68.23%
10	NTPC	31	49	80	23	43	66	90%
11	OTPC	41	85	126	41	85	126	100%
12	NHPC	18	29	47	17	28	44	95.74%
	NER	3662	5089	8751	1563	1911	3473	42.49%

\*Note: Manipur Telemetry Re-Checked at 1200 Hrs. 03/10/2018.

**Telemetry Availability Status at NERLDC from Constituents (as on 31-10-2018):**

Sl. No.	Name of the Constituents	Total Analogue Data points	Total Digital Data points	Total Data Points	Analogue Data points Reporting	Digital Data Points Reporting	Total Reporting	Total Percentage of data Availability
1	Arunachal Pradesh	106	152	258	7	11	18	6.97%
2	Assam	1217	1731	2948	509	523	1038	35.00%
3	Manipur	180	255	435	60	93	125	35.17%
4	Meghalaya	409	388	797	238	57	295	37.01%
5	Mizoram	79	50	129	9	7	16	12.40%
6	Nagaland	237	270	507	13	2	15	2.95%
7	Tripura	524	715	1239	133	133	266	21.46%
8	PGCIL	616	1052	1668	388	688	1076	64.51%
9	NEEPCO	202	286	488	109	136	245	50.20%
10	NTPC	31	49	80	23	49	72	90%
11	OTPC	41	85	126	40	81	121	96.8%
12	NHPC	18	29	47	17	28	45	95.74%
	NER	3671	5092	8763	1555	3557	3357	38.31%

