North Eastern Regional Power Committee

MINUTES OF THE 133rd OPERATION COORDINATION SUB-COMMITTEE MEETING OF NERPC

Date : 08/06/2017 (Thursday)

Time : 10:00 hrs

Venue : "Hotel Nandan", Guwahati.

The List of Participants in the 133rd OCC Meeting is attached at **Annexure – I**

Shri P.K. Mishra, Member Secretary, NERPC welcomed all the participants to the 133rd OCC meeting. He noted the presence of participants from all the utilities except Arunachal Pradesh and Nagaland. However, he expressed satisfaction about the maximum participants from all the utilities and requested to continue the same in future so that matters can be resolved during the meeting. He informed that NERPC has finalized the list for Foreign Study Tour based on active participantion by the officials from different utilities. He also lauded the members for submission of relevant data for merit order portal and also praised officers from MeECL for correcting/solving the Time Drift issues.

Thereafter, Member Secretary requested Shri B. Lyngkhoi, Director/SE(C&O) to take up the agenda items for discussion. Shri Lyngkhoi welcomed Shri S. Chattopadhyay, VP, OTPC, Shri T.N. Deb Choudhury, CGM (Com), APDCL and all the new officers participating from NEEPCO, NHPC, Manipur and requested them to attend the meetings regularly for the benefit of the organization and the region. He also informed that NERLDC, OTPC & M/s Climate Connect Ltd., will give the presentations on different topics for the benefit of the forum and also to discuss and resolved the issues. He requested all the members to actively participate in the discussion.

A. CONFIRMATION OF MINUTES

CONFIRMATION OF MINUTES OF 132nd MEETING OF OPERATION SUB-COMMITTEE OF NERPC.

The minutes of 132nd meeting of Operation Sub-committee held on 12th May, 2017 at Guwahati were circulated vide letter No. NERPC/SE (O)/OCC/2016/4556-4591 dated 20th May, 2017.

MeECL vide mail dated. 21.05.17 has sought modification on the minutes of Agenda Item B.1.(2) :

Recorded:

Name of the Element	Name of Utility	Status
63MVAR Reactor at Byrnihat	MePTCL	EE, MePTCL informed that budgetary offer is yet to be received. Once received DPR would be prepared in one week and sent to NLDC/NPC. SE(C&O) mentioned that the rates can be taken from POWERGRID and DPR should be sent immediately. MePTCL agreed.

To be Recorded:

Name of the Element	Name of Utility	Status
63MVAR Reactor at Byrnihat to be replaced with 80MVAR Reactor	MePTCL	EE, MePTCL informed that budgetary offer is yet to be received. Once received DPR would be prepared in one week and sent to NLDC/NPC. SE(C&O) mentioned that the rates can be taken from POWERGRID and DPR should be sent immediately. MePTCL agreed.

The Sub-committee confirmed the minutes of 133rd OCCM of NERPC with the above modifications as no further comments/observations were received from the constituents.

I T E M S F O R D I S C U S S I O N

B.1. ACTION TAKEN:

1. IMPLEMENTATION OF PROJECTS FUNDED FROM PSDF:

The status as informed in 133rd OCC:

State	Protection System	ADMS	CAPACITOR INSTALLATION
Arunachal Pradesh	-	-	-

Nagaland	-	Under process of approval.	Under process of approval. To submit undertaking and other required documents.
Mizoram	By June'17 all LOAs would be issued.	Under process of approval.	Under process of approval. To submit clarification.
Manipur	By June'17 all LOAs would be issued.	Under process of approval. To submit clarification.	To submit pilot scheme DPR
Tripura	All LOAs issued. Target for work completion March'2018.	DPR will be submitted by July'17 to CEA & NLDC	Under Study stage**
Assam	By June'17 all LOAs would be issued.	DPR submitted. Under process of approval.	-
Meghalaya	MePTCL – All LOAs will be completed by June, 2017. MePGCl – by June, 2017 all LOAs	DPR will be submitted by July'17 to CEA & NLDC	DPR to be prepared.

Deliberation of the sub-Committee:

NERLDC informed that as per CERC order against NERLDC petition 133/MP/2014 on 27th November 2017; all states have to complete the implementation of the recommendations of third party Protection Audit within 12 months from the date of placement of award for purchase of equipment. However, LOAs of R & M works on Protection System by many of the states are not yet completed. Also, due to deficiency in protection system, many disturbances are occurring in the NER grid.

S.E. (C&O), NERPC informed that those schemes whose DPR has been submitted, would be taken up in the Appraisal Committee meeting after Technical Evaluation.

Sr. Manager, TSECL informed that based upon preliminary studies of Tripura Power System it has been found that all the bus voltages are within the IEGC band. However, sporadically the voltage at Palatana reduces due to sudden high MVAR drawal by Bangladesh when Palatana machines are not in service. Forum requested TSECL to submit the study results to NERPC/NERLDC. Sr. Manager, NEEPCO informed that AGTCCPP are facing similar situation(s) with frequent voltage dips usually at the time of switching operations of 132kV AGTCCPP-Agartala. Sr.

Manager, TSECL informed that the problem of voltage dip at AGTCCPP end when charging from Agartala end is a rare occurrence.

DGM(AM), NERTS suggested using a DMM to measure voltage locally. Members strongly viewed the decline in NER grid voltage stability due to high MVAR drawal by Bangladesh. The forum advised TSECL to explore options for restricting supply by increasing under-voltage settings and also inform the forum about any penalty clauses agreed upon with Bangladesh for high MVAR drawal.

The Sub-Committee noted as above.

Action: All state utilities/NERPC.

2. <u>Outage of Important Grid Elements:</u>

Name of the Element	Name of Utility	Status
63MVAR Reactor at Byrnihat	MePTCL	EE, MePTCL informed that budgetary offer has been received and is under evaluation. **
400KV 80MVAR Bus Reactor At Palatana	OTPC	04 Nos bushing to be replaced. Work would be completed by OTPC itself. Tentative completion 31.10.2017.
63 Mvar Line Reactor of 400 kV Balipara - Bongaigaon III line at Bongaigaon	NERTS	Within15.06.17
2x12.5 Mvar Bus Reactor at Samaguri	AEGCL	The forum decided to drop the item.
220 kV, 1x31.5 Mvar Bus Reactor at Mokokchung (PG).	NERTS	December'17
400 kV, 2x63 MVAR Bus Reactor at Biswanath Chariali	NERTS	Added in **C.1.**

** The forum decided that detailed study needs to be done regarding requirement of the reactor at Byrnihat and overall study for reactor requirement in NER.

The Sub-Committee noted as above.

Action: MePTCL, OTPC, NERTS, NERLDC/NERPC.

3. Furnishing of various data for reliable grid operation:

Data regarding	Utilities non-submission/compliance
	As of 133rd OCC
UFR Operation Report	All SLDCs except Meghalaya & Nagaland upto May'17
Reporting of Commissioned Elements for Tarang App	All SLDCs except Manipur & Nagaland
DAS output for FRC calculation	OTPC, NTPC, NEEPCO, NHPC**
Questionnaire of Working Group on Hydro(FOLD)	P&ED Mizoram
Report on VDI/FDI	All SLDCs except Assam, Meghalaya.
DG healthiness report***	NERTS, NTPC, OTPC, Ar. Pradesh, AEGCL, MSPCL, MePTCL, Mizoram, Nagaland, TSECL. Revised format to be circulated by NERLDC.
Auxiliary Supply details	NERTS, NTPC, OTPC, Ar. Pradesh, AEGCL, MSPCL, Mizoram, Nagaland, TSECL. Revised format to be circulated by NERLDC.
Technical & Commercial data for PoC (Q3 2017-18)	Due date for submission of Q3 data is 21.06.2017.

***Format to be circulated by NERLDC

Date & Time of event	Brief description	Name of ISGS	Whether data submitted
On 21.02.17 at 15:59Hrs	900 MW generation loss due to tripping of Klaisindh units-1,2	Palatana,BgTPP, AGTCCPP Extn,Ranganadi	NO
On 05.02.17 at 12:24Hrs	765kV Mainpuri-Bara tripped alongwith both running units of Bara TPS. Generation loss=1100MW	Palatana,BgTPP, AGTCCPP Extn,Ranganadi	NO
On 28.04.17 at 19:10 Hrs	GD-IV load loss = 689MW generation loss= 845MW	Palatana,BgTPP, AGTCCPP Extn,Ranganadi	NO
AGTCCPP, AGBPP, Khandong, Kopili, Doyang and Loktak may please intimate their DAS implementation schedule.			

NERLDC has informed that P&ED Mizoram are yet to submit the questionnaire. NERLDC has also requested that Water level, inflow details, discharge quantity & Number of Gate opening (in case of spillage) of Hydro Plants be recorded on a 12 hour basis (2 entries in a day) and to be submitted to NERPC & NERLDC on a monthly basis for proper operational planning.

Deliberation of the sub-Committee:

Upon request from members, NERLDC circulated afresh their e-mail ids as follows:

Sl. No.	Name of Department/Activities	Email Ids
1	Control Room	nerldccr@posoco.in
2	Open Access	nerldcoa@posoco.in
3	System Operation- II	nerldcso2@posoco.in
4	NERLDC RTSD	rtsdnerldc@posoco.in
5	Outage Related activities	nerldcoutage@posoco.in
6	Protection Related activities	nerldcprotection@posoco.in
7	Market Operation	nerldcmo@posoco.in
8	SEM data	monerldc@posoco.in

The Sub-committee noted as above.

Action: All utilities as above.

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

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

NER PERFORMANCE DURING MAY, 2017

	Energy Met (MU)		w.r.t. Apr,17 % inc (+) /dec (-)	Energy Reqr. (MU)		w.r.t. Apr,17 % inc (+) /dec (-)	% inc (+) /dec (-) of energy reqr vs met. In May,17
States	**May-17**	**Apr-17**		**May-17**	**Apr-17**		
Ar. Pradesh	61.01	58.636	4.05	62.19	59.486	4.55	-1.90
Assam	723.12	619.101	16.80	765.00	659.554	15.99	-5.47
Manipur	72.13	67.792	6.40	73.29	69.185	5.93	-1.58
Meghalaya	136.77	120.821	13.20	136.77	120.821	13.20	0.00
Mizoram	42.30	41.775	1.26	43.16	42.510	1.53	-1.99
Nagaland	63.70	53.431	19.22	64.75	54.334	19.17	-1.62
Tripura	120.73	96.587	25.00	124.52	101.994	22.09	-3.04
Region	**1219.76**	**1058.143**	**15.27**	**1269.69**	**1107.884**	**14.60**	**-3.93**

States	Demand Met (MW)		w.r.t. Apr,17 % inc (+) /dec (-)	Demand in (MW)		w.r.t. Apr,17 % inc (+) /dec (-)	% inc (+) /dec (-) of Demand vs met. In May,17
	May-17	**Apr-17**		**May-17**	**Apr-17**		
Ar. Pradesh	145	129	12.40	145	133	9.02	0.00
Assam	1580	1399	12.94	1649	1414	16.62	-4.18
Manipur	161	154	4.55	163	155	5.16	-1.23
Meghalaya	304	292	4.11	304	293	3.75	0.00
Mizoram	85	85	0.00	86	86	0.00	-1.16
Nagaland	131	120	9.17	132	121	9.09	-0.76
Tripura	276	252	9.52	280	252	11.11	-1.43
Region	**2391**	**2209**	**8.24**	**2472**	**2258**	**9.48**	**-3.28**

REGIONAL GENERATION & INTER-REGIONAL EXCHANGE IN MU

Month---->	**May-17**	**Apr-17**
Total Generation in NER (Gross)	1111.858	1048.652
Total Central Sector Generation (Gross)	873.920	754.168
Total State Sector Generation (Gross)	295.716	294.484
Inter-Regional Energy Exchange		
(a) NER-ER	**42.45**	**124.49**
(b) ER-NER	**242.07**	**120.44**
(c)NER-NR	**102.02**	**114.88**
(d)NR-NER	92.30	195.72
© Net Import	189.90	76.79

AVERAGE FREQUENCY (Hz)

Month---->	**May-17**	**Apr-17**
	% of Time	% of Time
Below 49.9 Hz	9.20	9.02
Between 49.9 to 50.05 Hz	71.60	74.20
Above 50.05 Hz	18.91	16.78
Average	49.99	49.99
Maximum	50.32	50.26
Minimum	49.64	49.66

The Sub-committee noted as above.

ITEMS FOR DISCUSSION

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

During 133rd 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 133rd OCC Meeting	Status as given in 132nd OCC Meeting
a. New Projects			
1	Trial operation and CoD of Unit -II of Bongaigoan TPS of NTPC	Light up expected by 26.06.2017.	Exact COD of Unit-II to be informed in next OCC meeting.
2	400/220kV, 2x315 MVA ICT of NTPC at Bongaigaon	ICT-1 - by Sept'17	ICT-1 - Manufacturing stage
3	Kameng HEP of NEEPCO two units (2 x 150 MW) Next two units (2x150 MW)	Delay in dam construction. First unit by early 2018.	Delay in dam construction. First unit by early 2018.
4	Pare HEP of NEEPCO (2 x 55 MW)	Delay in dam construction. First unit by early 2018.	Delay in dam construction. First unit by early 2018.
5	400 kV D/C Silchar - Melriat line of PGCIL	December, 2017.	June, 2017.
6	220kV Rangia - Salakati of AEGCL	December 2017	December 2017 (30 km line idle charge from Salakati end)
7	132kV Monarchak – Surjamaninagar D/C of TSECL	September, 2017	September, 2017
8	132kV Pasighat – Aalong of Ar. Pradesh	Charged on 08.05.2017. To be dropped.	Charging for testing purpose may be taken up with C.E., DoP Ar. Pradesh.
9	132kV Surjamaninagar Bay at OTPC	Forum decided that work to be done by PGCIL. Sought amendment to 5th SCM minutes.	S.E.(C&O),NERPC work to be completed by OTPC. Clarification sought from CEA.
10	400kV D/C Balipara – Kameng of Ar. Pradesh	Sept' 2017.	July 2017.
11	RHEP 80 MVAR Bus Reactor	Tendering stage.	T.S. completed except for GIS bay.
12	SLDCs (Ar. Pradesh, Manipur, Mizoram, Nagaland)	Manipur – Completed, Mizoram- Completed, Nagaland-Building ready and handed over, AP- SAT going on.	Manipur – Completed ToC remaining, Mizoram- Completed, Nagaland-Building ready and handed over, AP- SAT going on
13	400/220 kV 315 MVA ICT-II at Bongaigaon	Manufacturing stage	Manufacturing stage

14	220/132 kV, 2x160 MVA ICTs at Balipara	ICT -I - June'17 ICT-II By 31st August 2017(LOA date).	ICT -I - June'17 ICT-II By 31st August 2017(LOA date).
15	220/132 kV, 1x160 MVA ICT with GIS Bay at Kopili	By 31st August 2017(LOA date).	By 31st August 2017(LOA date).
16	400/132 kV, 1x315 MVA ICT-III at Silchar	December, 2017(LOA date).	December, 2017(LOA date).
17	Replacement of 1x315 MVA ICTs with 2x500 MVA ICTs at Misa (PG)	December, 2017(LOA date).	December, 2017(LOA date).
18	400 kV Silchar – Misa D/C	M/s Sterlite Grid 4 Limited	M/s Sterlite Grid 4 Limited
19	1x125 MVAR Bus Reactor at 400 kV at Balipara	December, 2017(LOA date).	December, 2017(LOA date).
20	1x125 MVAR Bus Reactor at 400 kV Bongaigoan	December, 2017(LOA date).	December, 2017(LOA date).
21	Bays at Hailakandi & 132V Silchar-Hailakandi of PGCIL	Sept' 2017.	June, 2017.
22	Tuirial HEP of NEEPCO	Unit #I - Sept'2017 Unit #II - Oct'2017	Unit #I - Oct'2017 Unit #II - Dec'2017
23	New Umtru HEP of MePGCL (2x20MW)	Unit #I- ToC to be completed. U#II - June'17 trial run.	Unit #I- synchronized on 24.04.17. CoD by last week of May'17 U#II - July'17
24	400 kV, 2x63 MVAR Bus Reactor at Biswanath Chariali	July'2017	-
b. Elements under breakdown/ upgradation			
27	Up-gradation of 132 kV Lumshnong-Panchgram line	DPR submitted for board approval.	DPR submitted for board approval.
28	Switchable line Reactors at 400kV Balipara & Bongaigoan	Bongaigaon-Sept'17	Bongaigaon-May'17
29	PLCC Panels at Loktak end of Loktak – Ningthoukhong 132 kV feeder and Loktak - Rengpang 132 kV feeder	May'2018	May'2018
30	LILO of 132kV Ranganadi – Nirjuli at Pare of NEEPCO by PGCIL	Work given to KEC. Completion by May'2018	Work given to KEC. Completion by May'2018

31	LILO of 132kV Ranganadi – Itanagar (Chimpu) at Pare of Ar. Pradesh	Bay 1 at RHEP for Pare: July'17 Bay 2 at RHEP for Itanagar: Mar'18	Bay 1 at RHEP for Pare: May'17 Bay 2 at RHEP for Itanagar: Mar'18

Deliberation of the sub-Committee:

S.E. (C&O), NERPC informed that status of transmission projects awarded under NERSS-V, NERSS-II(B) and NERSS-VI is being followed up with respective TSPs and would be updated in the ensuing OCC meetings.

The Sub-committee noted as above.

D. NEW ITEMS

D.1 Generation Planning (ongoing and planned outages)

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

Generating Station	Units running	MW	MU	Reservoir
Khandong	2		27.61	720.1
Kopili-II	1			
Kopili	4		208.64	609.41
Ranganadi	3		Subject to inflow	
Doyang	3		3.15	309.20
Loktak	3		53.33	767.31
AGBPP	-	-	-	-
AGTPP	-	-	-	-

Hydro planning

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

Deliberation of the sub-Committee:

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

D.2 Outage Planning Transmission elements

It was agreed in the 99th OCC meeting that shutdown will be availed only after approval is given by the OCC forum. It was also agreed that deferment/revision of outages elements other than already approved in OCC will be henceforth put/displayed in the website of NERPC (under Operational Activities/OCC Approved

shutdown) as per CERC regulations/ CEA guidelines etc for ensuring smooth & secure grid operation.

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

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

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

S.E.(C&O) requested all the utilities to submit shutdown proposals within 5th of the month, and NERLDC to circulate the final compiled shutdown list for comments in advance of the OCCM.

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

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

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

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

The Sub-Committee noted as above.

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

Updated PSS/E Base Cases have been **mailed to all the SLDCs on 01.06.17**. All SLDCs are requested to assess the Total Transfer Capability (TTC), Transmission Reliability Margin (TRM) and Available Transfer Capability (ATC) for the month of June'17 using these cases, and submit the study cases and results to NERLDC by **12.06.17**.

NERLDC has assessed the state control area wise, state subsystem wise and group of control-area wise TTCs for NER Grid, on behalf of SLDCs of NER. The study results conducted by NERLDC **mailed to all SLDCs on 01.06.17**. SLDCs are requested to check the TTC of their control areas as computed by NERLDC and **give comments, if any, by 12.06.17.** The TTC figures for June'17 are as follows:

Name of States	Off Peak TTC in MW		Peak TTC in MW	
	N-0	N-1	N-0	N-1
Arunachal Pradesh	206	185	215	188
Assam	1585	1467	1505	1462
Manipur	282	261	296	260
Meghalaya	276	256	325	245
Mizoram	126	116	126	119
Nagaland	179	70	201	64
Tripura	225	140	276	187

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

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

Deliberation in the meeting

NERLDC informed that no comments have been received from any SLDCs of NER.

The Sub-Committee noted as above.

Action: All SLDCs.

D.5 Installation of 80MVAR, 1x400KV GIS Bus Reactor/ Bay Addition at RHEP

As discussed in several OCC meetings there is requirement of bus reactor to be installed at RHEP switchyard to control over voltage in the NER system. Against Agenda No. C.10. of 109th OCC meeting after detail deliberations, Member Secretary suggested NEEPCO to work out the tentative estimate for above cost and intimate in next PCC meeting so that the matter can be taken up for funding from PSDF since the matter is for the benefit of the region.

Accordingly, vide letter no. NO: NEEPCO/ED(O&M)/RHEP-09/2015-16/2646 dtd. 13/01/2016 NERPC was intimated a cost estimate of Rs. 3698.965 Lakh for procurement & installation of Bus Reactor at 400KV Ranganadi Switchyard.

In the MOM of 17th TCC meeting held on 04/10/2016 circulated on 26/10/2016 through e-mail it was observed that under item no. B.12 the proposal for installation 80MVAR Bus Reactor at RHEP SY has been approved in the 6th SCM and recommended in the TCC and RPC forum.

For open tendering process for procurement and installation of the Bus Reactor, the modalities of funding from PSDF as intimated in the 109th OCC meeting may please be discussed.

In 131st OCCM, Director, NPC informed that reactor installation for improvement of voltage profile of the grid may be funded from PSDF. However in this case approval has been obtained differently. DGM (AM), NERTS opined that since SCM approval has been accorded, no separate CERC approval is required and NEEPCO may directly file tariff petition. The forum requested NERPC to clarify from CEA/NLDC about funding from PSDF or execution by CTU.

Deliberation in the meeting

Upon consultation with CEA, S.E.(C&O),NERPC informed that procurement, installation and commissioning work has to be completed by NEEPCO. All the beneficiaries of Ranganadi HEP unanimously agreed to bear the increased tariff. The forum advised NEEPCO to complete the work and decided to drop the agenda item.

The Sub-committee noted as above

D.6 Pending issues with NTPC regarding vacation of land etc and failure of NTPC to honour the commitment:

NTPC has not yet vacated the 32M extended portion (32 x 248) of the plot of land which has prevented AEGCL from constructing the 132kv APM (Jogighopa) Bay. This vacation was agreed upon by NTPC — but has not materialized till date.

Boundary wall for AEGCL was supposed to be constructed by NTPC which has not yet been constructed by them even after more than three years of their commitment.

AEGCL has not been allowed to operate the entrance gate (constructed by AEGCL) as the CISF personnel of NTPC continue to .keep the lock and key of the same thereby causing acute difficulties for entry and exit of AEGCL personnel — so much so that AEGCL personnel are sometimes even prevented from entering the switch yard for attending to emergency operational problem in switch yard/control room. Separate entry gate for AEGCL should immediately be allowed to be operated.

Even after their commitment, the Guest House for AEGCL as agreed upon has not yet been constructed by NTPC.

In all these issues the NTPC authorities have been unexpectedly insensitive and no cooperative.

In 132nd OCC meeting, S.E.(C&O),NERPC informed that the matter should be resolved bilaterally. He however, mentioned that the issue will be raised to the competent authority of NTPC & Assam so that the matter can be resolved amicably.

Deliberation in the meeting

Representatives of NTPC and AEGCL requested that the agenda item be dropped as the matter has been sorted out amicably. The forum agreed.

The Sub-committee noted as above

D.7 Transformer Tap optimization

System study was conducted by NERLDC considering load, generation and network pattern of May, 2017 during Peak & Off Peak periods. Suggested taps position of important transformers in NER for maintaining bus voltages within permissible limit as well as to minimize system losses are attached at **Annexure D.21.**

In 132nd OCC, NERLDC informed that system study was conducted based on May, 2017 Off Peak & Peak Base Cases and suggested Tap position were given in the report. NERLDC requested all the utilities to go through the report and take necessary actions.

DGM (AM), NERTS informed that changing tap positions in peak and off-peak period is a tedious job and should be avoided as far as possible.

Deliberation in the meeting

NERLDC informed that system study conducted based on May, 2017 Off Peak & Peak Base Cases indicated high voltage (431 kV) at Byrnihat with present tap setting (D-9). After detailed deliberation it was decided to change the tap position to D-4 for 400/220kV 2x315MVA ICT at Byrnihat as a one-time measure.

The Sub-committee noted as above

Action: MeECL.

D.8 Over drawal by constituents

It has been observed that despite repeated requests for maintaining drawal within schedules, especially when BgTPP & Palatana generations are not available, some of the constituents namely Tripura persistently overdraws from the grid resulting in violation of inter-regional ATC on many occasions. Constituents, especially Tripura, are requested to please adhere to the real time advice of NERLDC for maintaining grid security & reliability. In this regard constituents are also requested to please make advance planning for meeting their demands considering contingency situations of generations outages.

In 132nd OCC Sr. Engineer, NERLDC while presenting the Grid Performance in April'2017 reported the repeated non-compliance of TSECL to deviation limit violation message/zero crossing messages. Sr. Manager, NEEPCO informed that overdrawal by Tripura has resulted in loss of generation from AGTCCPP. DGM(MO),NERLDC suggested that a detailed report highlighting the following be presented by NERLDC in the next meeting:

- 15 min graph of Schedule vs. Actual w.r.t. Tripura for specific days with high O/D.
- Actions which had to be taken by TSECL (eg. load curtailment etc.) but not done as well as the message given by RLDC on that particular occasion.

The forum after detailed deliberation requested TSECL to strictly adhere to schedule irrespective of grid frequency.

Deliberation in the meeting

Sr. Engineer, NERLDC informed the forum that for the month of May'17 there has been no gross overdrawal or deviation violation. DGM,SLDC, AEGCL also informed that upon discussion with their APDCL counterparts overdrawal issue has been sorted

out and assured the forum that within one month deviation violation message would reduce. Members agreed to drop the agenda item in the meantime and review later on.

The Sub-committee noted as above

D.9 Deviation Charges Outstanding of APDCL – Curtailment of Open Access

Outstanding deviation charges of APDCL is Rs. 50.84 Cr and deviation interest payable is Rs. 0.13 Cr as on 05.05.2017 (Till week -3 of FY 2017-18) out of which Rs. 26.30 Cr is outstanding for a period of more than last 13 weeks.
NERLDC may highlight the issue in details.

APDCL is required to liquidate the outstanding dues at the earliest to avoid curtailment of OA as per Regulations.

In 132nd OCCM, DGM(MO),NERLDC requested Assam to liquidate Outstanding dues at the earliest to avoid OA curtailment. He also informed that at the moment APDCL has to pay more than Rs. 55 Crores. AGM, APDCL responded that the matter is being taken up with their finance counterpart and hoped that dues would be liquidated very soon. DGM (MO), NERLDC requested APDCL to submit a time bound action plan to clear outstanding dues and pay current bills and it would enable non-imposition of any regulation on APDCL. APDCL representative agreed to submit an action plan after internal approval.

Deliberation in the meeting

GM (Comml-T), APDCL informed that they have submitted an action plan to NERLDC and as per action plan, current deviation charges bill would be cleared on weekly basis. The accumulated outstanding also would be cleared at the earliest possible tentatively by end of 2017.

NERLDC requested APDCL to follow the action plan.

The Sub-committee noted as above
Action: APDCL.

D.10 Tripping of OTPC Both Block Due to Grid Black Out

OTPC Both Block Tripped on 25/04/2017 at 13:05 hrs, Startup delayed on 26/04/2017 due to grid disturbance OTPC Both Block Tripped on 28/04/2017 at 19:10 hrs

In 132nd OCCM, DGM(O&M),OTPC stated that 400kV Palatana-Silchar D/C is lifeline for Palatana GBPP and its non-availability seriously affects evacuation of power from Palatana with subsequent unit tripping on over-frequency. He requested the forum to ensure the availability of 400 kV Palatana-Silchar D/C, 400kV Silchar -Byrnihat and 400kV Silchar -Azara at all times for reliable supply of power to NER beneficiaries and reduced damage to plant machineries. Members unanimously accepted the gravity of the situation and requested NERPC to convene a special meeting to discuss maintenance of aforesaid lines, SPS concerning evacuation etc. at the earliest.

Deliberation in the meeting

SE(C&O), NERPC informed the forum that a special meeting would be convened very soon at Shillong to discuss above issue as well as review of SPS, Islanding schemes thoroughly and members would be intimated well in advance. He also requested all concerned utilities to attend the meeting.

The Sub-committee noted as above

Action: NERPC.

D.11. Providing of Bank Protection of Dikrong River at Ranga De Reserve Village, Bihpuria Circle, Dist: Lakhimpur, Assam due to erosion of land on account of discharge of Ranganadi HEP:

The Ranga De Reserve Village is situated under Bihpuria Circle of Lakhimpur District in Assam at the left bank of Dikrong River where continuous erosion river bank is going on due discharge of Ranganadi Hydro Generation. At present, the fate of the villagers is in uncertainty. Earlier NEEPCO had provided river bank protection of Dikrong River from Bihari Basti to a part of Ranga De Reserve Village leaving around 2 kM bank unprotected which is suffering erosion endangering the life and property of the villagers.

In fact due to indiscriminate erosion of Dikrong River Bank, POWERGRID is shifting all the Towers of 400kV D/C Balipara-Ranganadi Line to pile foundation as per the approval of NERPC. Presently, the construction of those Pile foundations is in progress.

Now, the villagers of Ranga De Reserve Village are not allowing POWERGRID to carry out pile foundation in Location No. 48 & 49 which falls in said stretch of 2kM unprotected bank and pressing hard for providing River Bank Protection.

NEEPCO may extend the Bank Protection in unprotected 2 kM stretch in line with earlier execution of River Bank Protection as the river bank erosion is mainly on account of downstream discharge of Ranganadi HEP.

In 129th OCC DGM (AM), NERTS informed that matter was referred to GM, Pare HEP of NEEPCO but, GM, Pare stated that the matter does not come under the purview of Pare HEP. Subsequently, matter was referred to GM, Ranganadi HEP and Circle Officer of Bihpuria Circle of Lakhimpur District in Assam. S.E. (C&O), NERPC stated that NEEPCO should involve into the matter to resolve ROW in co-ordination with POWERGRID and Local administration so that POWERGRID can complete the pile foundation. Accordingly, the forum advised NEEPCO and NERTS to jointly conduct the site survey and revert back to the forum.

In 132nd OCCM, Sr. Manager, NEEPCO informed that the matter was consulted with ED (O&M), NEEPCO who opined that it does not concern NEEPCO and NERTS/POWERGRID should take necessary action. DGM (AM), NERTS informed that condition at site is grave and POWERGRID officials are being restricted to work, he requested NERPC to intervene. S.E(C&O), NERPC concluded that NERPC would write to concerned heads of NEEPCO and NERTS to resolve the matter.

Deliberation in the meeting

After detailed deliberation, the forum once again requested NERPC to write to CMD, NEEPCO to resolve the matter speedily.

The Sub-committee noted as above

Action: NERPC.

D.12. SPS for transfer of 160 MW to Bangladesh through Tripura-Bangladesh link:

POWERGRID vide. C/CTU-Plg/NE/02/Bangladesh dated. 07.02.2017 has informed that in the 12th India-Bangladesh JWG &JSC meeting decision was taken to enhance power transfer through 400kV S.M. Nagar-South Comilla link (charged at 132 kV). In this regard a SPS needs to be in place to increase reliability in power supply. Following SPS action has been suggested by POWERGRID:

Sl. No.	Contingency	SPS Action
1	Outage of one ICT out of 400/132kV	Limit transfer to 100MW on

	2x125MVA ICTs at Palatana	Cross-Border link, followed by shifting of 60MW load from Indian grid to Bangladesh grid.
2	Outage of 132 kV Palatana- S.M. Nagar line	Tripping of Cross border link followed by shifting of entire 160MW load from India to Bangladesh grid.
3	Outage of one circuit of SMNagar-South Comilla line	Limit transfer to 130MW on Cross-Border link, followed by shifting of 30MW load from Indian grid to Bangladesh grid.

In 129th OCCM, AGM (SO-I), NERLDC informed that as per the suggested scheme of SPS, it's implementation involves load reduction in Bangladesh system. In order for effective resolution, he suggested that a meeting be convened with Bangladesh Power Department officials, NERPC, NERLDC, CTU and TSECL. The forum requested NERPC to write to CTU for taking up the matter with MoP.

In 130th OCCM, S.E.(C&O),NERPC informed that the matter is being followed up with CTU/MoP and latest status would be informed in next OCCM.

In 132nd OCCM, NERLDC informed the forum that during three major disturbances in NER on 25.04.17, 26.04.17 & 28.04.17, Bangladesh load was also affected. NERLDC again requested the forum to organize the meeting as soon as possible since CTU is asking about the implementation of Bangladesh SPS.

S.E.(C&O),NERPC informed that the meeting would be convened within next week.

Deliberation in the meeting

Please refer to discussion in Agenda item **D.10.**

The Sub-committee noted as above

D.13. Regarding OTPC Stability issue At Tech Minimum as per IEGC 4th Amendment:

CERC has given effect the Indian Electricity Grid Code, (Fourth Amendment) Regulations, 2016 which was notified on 06.4.2016 on Regulation 1(2), sub-Regulation 6.3B of the this Regulations about 6.3B – Technical Minimum Schedule

for operation of Central Generating Stations and Inter-State Generating Stations. "The technical minimum for operation in respect of a unit or units of a Central Generating Station of inter-State Generating Station shall be 55% of MCR loading or installed capacity of the unit of at generating station". Which is came into force from 00:00 hrs of 15/05/2017.

Please find the events of Technical minimum of following date...

- On 16/05/2017, NERLDC given us SG 388 MW (Copy Attached) Ex Bus from block 25 to 32 as per IECG 4th Amendment, and during load reduction GT-1 & GT-2 Mode Change over happens at 07:22 Hrs at GT-1 and 07:20 Hrs at GT-2 @ ≈113 MW on GT-1 and 114 MW at GT-2, and Total EX bus 388 MW Total Load Plant 407 MW.
- On 30/05/2017, NERLDC Given us SG 385.65 MW Ex Bus from block 74 to 78 as per IECG 4th Amendment, but we are force to generate ≈ 10MW 15 MW Greater Then Given SG (Tech Min) for the plant stability, Please note that on 16/05/2017 the SG was 388 MW and our GTs mode changeover happens.

OTPC response on draft notification of IECG 4th Amendment submitted to CERC on 15/09/2015, we pray the Hon'ble Commission to allow a block-wise Technical Minimum Schedule of 65 % of Installed Capacity for OTPC Palatana Project on ground of following Point.

1. Plant Stability (Combustion Mode Changeover)
2. Reduced NOx emissions
3. Take or Pay Mechanism as per GSPA

Please Note that and As we mentioned in our submission to Hon'ble Commission that, For stable operation of station it is always desirable to run the gas turbines in PM mode and mode changeover from PM to PPM mode must be avoided as long as possible, it hampers machine stability and the turbine can trip during mode changeover.

Please be informed that current Technical Limit (55%) is on transient zone of mode changeover, and it is causing the instability of our Gas Turbine operation. It is request you to Please give us the SG 15 to 20 MW Grater then the Tech Min Load (or Freeze Tech Min for OTPC @ 60%) for plant Stability and system stability.

Deliberation in the meeting

VP, OTPC gave a detailed presentation (attached in Annexure **D.13**), major points are highlighted below:

- Palatana has 2x363.3 MW units with 2train configuration (1GT+1HRSG+1ST). There is no scope for open cycle operation due to non-availability of bypass stack.
- There are mainly two modes of operation Pre-Mix (PM) and Piloted Pre-Mix (PPM). In normal case it runs in PM mode however when unit load falls below 210MW (approx. depends on ambient temperature) it switches to PPM mode. Switchover follows complex control logic and may result in unit tripping, which is undesirable.
- Running unit in Pilot Pre-Mix mode results in higher pollution.
- OTPC requests Technical Minimum for Palatana be kept at 63% with a 5% safety margin.

NEEPCO representative also highlighted the problems faced by AGBPP and AGTPP units and expressed that maintaining at 55% level would not be practically possible.

Members empathized with the problem faced by OTPC as well as NEEPCO and requested the generators to take-up with CERC. Member Secretary, NERPC advised OTPC and NEEPCO to submit their difficulties in detail so that matter may be taken up with CERC.

The Sub-committee noted as above
Action: OTPC, NEEPCO, NERPC.

D.14. <u>Request for maintaining Shutdown co-ordination and taking code:</u>

Maintaining proper co-ordination in respect of availing of shutdown is very essential from grid as well as human security point of view. This is for all the elements covered by “List of important Grid element”. Moreover obtaining opening as well as closing codes from LDCs is very important in this regard to avoid any untoward incidence. 132 KV RC Nagar-Agartala-1 line S/D was approved for 30.05.2017 by NERPC provided real time grid condition is OK. But Tripura (TSECL) without consulting and without taking code from NERLDC, opened the line from Agartala end on 30.05.2017. It is to be noted here that NER grid was in alert state due to severe cyclonic storm MORA on that day. Caution messages were also sent from NERLDC to all constituents specially Tripura, Assam, Mizoram and Meghalaya. Despite of this situation opening of the line without proper co-ordination is very unfortunate. All constituents are requested to please adhere to the safety requirements in future.

Deliberation in the meeting

Sr. Manager, TSECL informed that the incident happened due to misinformation/maloperation by site officials. He assured that the matter has been taken care of and such incident would not recur in future.

The Sub-committee noted as above.

D.15. Dedicated Voice Communication:

In most of the stations of ISGS only one IP phone is installed which is creating problem in Grid Management. So minimum two nos of VOIP phones are required in all the stations of ISGS , 400 KV sub-stations, , S.M.NAGAR (International connectivity), Monarchak and SLDCs. Suitable measure may please be taken for installation of 2 nos of IP phones in all the stations. It may please be noted that in previous PUNWARE ULDC dedicated system in all the stations 2 nos of connections were provided and 4 nos in SLDCs

Moreover, IP phones are not installed in 1) SILCHAR, 2) PALATANA, 3) SLDC Manipur, 4) SLDC Mizoram, 5) SLDC AP, 6) SLDC Nagaland, 7) Mokokchung, 8) AZARA, 9) SM Nagar , 10) BYRNIHAT 11) SALAKATI 220 KV 12) NTPC, BgTPP, and 13) Ziro.

In addition to above, IP phones are not working in 1) Mariani(PG), 2) Jiribam, 3) Kolasib, 4) Haflong ,5) Kohima and 6) Kathalguri .

Ensuring availability of proper voice communication system is an integral part of smooth grid operation which may please be deliberated and necessary action may please be taken by concerned authorities.

Deliberation in the meeting

After detailed deliberation the matter was referred to the next NETeST meeting of NERPC.

The Sub-committee noted as above.

D.16. Non-reporting of RTUs :

Itanagar(PG), Ziro(PG), Kolasib(PG), Ranganadi, Doyang, Kopili , khandong, KOPEX are not reporting since long, So it is very important to restore the RTUs at the earliest as visualization of NER Grid has come down drastically and probability of disturbance of Grid is very high in absence of proper visibility. Correct assessment of grid condition during contingencies is seriously affected due to poor visibility and

restoration processes also are delayed. It is understood that NEEPCO has taken reinstallation activities of RTUs for their power stations; latest position in this regard may be provided by NEEPCO.

All concerned are requested to please restore the RTUs at the earliest.

Deliberation in the meeting

After detailed deliberation the matter was referred to the next NETeST meeting of NERPC.

The Sub-committee noted as above.

D.17. Non availability of state data at RLDC from SLDCs:

Even after the integration of SLDCs of Manipur, Mizoram the data of Manipur & Mizoram RTUs through respective SLDCs are not reporting at NERLDC.

Deliberation in the meeting

After detailed deliberation the matter was referred to the next NETeST meeting of NERPC.

NERLDC requested all concerned to take immediate necessary action for rectification of above problems as well as to provide additional communication facilities as highlighted in agenda items-D-15, D-16 & D-17. NERLDC also requested the forum to monitor the progresses in different aspects in subsequent OCC meetings after the NETeST meetings.

The Sub-committee noted as above.

D.18. Furnishing of daily operational line data:

As discussed and requested in previous OCC meetings all concerned utilities need to send their daily system operation data to RLDC in specified format, supplied by NERLDC, on regular basis through mail. But it is observed that utilities are not furnishing these data regularly in specified formats in spite of repeated requests from RLDC. So it is once again requested all to send data regularly to RLDC in new formats only through system operation mail. NERLDC is planning to Host the Reporting Software shortly in their website and the utilities will require to fill the formats online.

Deliberation in the meeting

All SLDCs agreed to submit the data periodically.

The Sub-committee noted as above.

Action: All SLDCs.

D.19. Delayed operation of SPS-2 on 16th May'17:

400 kV Silchar-Palatana 1 line was under shutdown w.e.f 0807 Hrs on 16.05.17 and at around 08:27 Hrs on 16.05.2017, 400 kV Silchar-Palatana 2 line tripped. **This satisfied conditions for operation of SPS-2** which is designed to reduce Palatana generation to house load immediately.

However, at the time of this event, Palatana generation was not reduced to house load immediately resulted in overloading of 132 kV AGTCCPP - Kumarghat line & 132 kV Agartala - Dhalabil line (low capacity) and subsequently tripped on over current.

Due to tripping of these elements, part of Tripura, Bangladesh (South Comilla), Palatana & AGTCCPP power systems were separated from rest of NER Grid and subsequently collapsed due to load generation mismatch

Deliberation in the meeting

Please refer to discussion in item **D.10.**

The Sub-committee noted as above.

D.20. Periodic Mock Testing of SPS:

In the PCC Subgroup Meeting of NERPC held on 05th May'17 at Shillong, it was decided to conduct mock testing of SPS periodically for checking healthiness.

In 132nd OCC, The forum stressed the need for periodical testing of SPS so that it operates as per design during emergency condition.

It is proposed to conduct mock testing of SPS-II & SPS-III related to reduction of Palatana Generation on 15.06.17 & 16.06.17 respectively.

Deliberation in the meeting

After detailed deliberation, forum requested POWERGRID & OTPC to conduct mock test on 15.06.17 / 16.06.17.

The Sub-committee noted as above.

D.21. Updated List of Important Grid Elements of NER, May 2017:

As per Clause No 5.2.c of IEGC, List of Important Grid Elements of NER May 2017 (Draft) prepared. Updated List of Important Grid Elements of NER May 2017 (Draft) was e-mailed to regional entities of NER and also available in NERLDC website.

In 132nd OCC, NERLDC informed the forum that Draft List of Important Elements has been uploaded in NERLDC Website under the Tab Download/Imp Elements and requested to give comments, if any, by 25th May'17. The document will be finalized by 31st May'17.

Views/comments were received from some power utilities of NER but the information provided was inadequate to complete the document. The compiled document (Revision-0) on **List of Important Grid Elements of North Eastern Region –May 2017 (R-0)**, is made available in pdf format in NERLDC website (www.nerldc.org) with password protection. Password may be obtained from SO-II Department, NERLDC.

Deliberation in the meeting

NERLDC requested all the power utilities of NER to furnish the pending information at the earliest.

The Sub-committee noted as above.

D.22. Review of UFR based load shedding schemes:

Under Frequency Relay (UFR) based load shedding schemes are meant to provide relief to the power system in case of decline in frequency and arrest further decline. However, in the case of disturbance on 28th April'17, load relief from UFR based load shedding schemes was only reported from Tripura and Mizoram. Manipur and Meghalaya have reported that UFR based load shedding schemes has not operated during disturbance on 28th April'17.

During analysis it has been observed that UFR feeders have not been identified in South Assam Area. Hence, no operation of UFR has been observed in Assam during disturbance of 28th April 2017.

Review of UFR based load shedding schemes and identification of feeders where UFR relay to be installed taking into consideration the changes in the power system in NER Grid, are to be carried out at the earliest.

Deliberation in the meeting

Please refer to discussion in item **D.10.**

The Sub-committee noted as above.

D.23. Review of Islanding Schemes:

Islanding of AGTCCPP (Island-II) with Tripura power system & Dullavcherra load failed to operate during the disturbances on 25th April'17, 26th April'17 and 28th April'17.

Load in the Island-II has increased and load relief from the UFR is not sufficient to balance load generation in this island. Due to this reason, island-II collapsed during disturbances in 25th April'17, 26th April'17 and 28th April'17.

Review of islanding schemes is to be carried out at the earliest, considering the changes in the power system.

Deliberation in the meeting

Please refer to discussion in item **D.10.**

The Sub-committee noted as above.

D.24. Updated Operating Procedures of NER July 2017 (Draft):

Operating Procedures of NER July 2017 has been updated and e-mailed to regional entities of NER and also available in NERLDC website.

Power utilities of NER are requested to send comment and suggestion for this document by **30th June'17**. This document will be finalized by **10th July'17**.

The document is password protected. Password may be collected from SOII department of NERLDC.

Deliberation in the meeting

NERLDC requested all the power utilities of NER to send comments/suggestions for Updated Operating Procedure of NER document by 30th June 2017.

The Sub-committee noted as above.

D.25. Updated Power Map of NER July 2017 (Draft):

Power Map of NER July 2017 has been updated and e-mailed to regional entities of NER and also available in NERLDC website. It will cover all the elements under operation, execution & planning stage.

Power utilities of NER are requested to submit comment and suggestion and check the line length, capacity etc., for this document by **30th June'17**. This document will be finalized by **10th July'17**.

The document is password protected. Password may be collected from SOII department of NERLDC.

Deliberation in the meeting

NERLDC requested all the power utilities of NER to send comments/suggestions for Updated Power Map of NER document by 30th June 2017.

The Sub-committee noted as above.

D.26. Technical Minimum and DoP on RSD:

Discussion on technical minimum under implementation of detailed operating procedure (DOP) on reserve shutdown and considering constraints in respect of AGBPP.

Deliberation in the meeting

Please refer to discussion in item **D.13.**

The Sub-committee noted as above.

D.27. Outage of 132kV Durlavcherra - Dharmanagar:

132 KV Durllavchara- Dharmanagar line is out of order for a long. Please intimate the status for restoration of the line as the said line has designated as interstate Transmission line by CERC.

Deliberation in the meeting

After detailed deliberation the forum decided to review the item under **B.1(2).**

The Sub-committee noted as above.

D.28. Study of Tripura Power System:

NERPC & NERLDC is requested to kindly review & study the Tripura power system as it is integrated with national Grid. This is essential for effective load management including power supply to Bangladesh.

Deliberation in the meeting

Member Secretary, NERPC informed that a detailed study of Tripura Power System would be undertaken by NERPC/NERLDC. NERLDC requested TSECL to furnish data up to 11 kV for proper modelling of Tripura System in PSSE.

The Sub-committee noted as above.

Action: NERPC/NERLDC.

D.28. Methodology of accounting Inter-state power transfer through LT system:

Drawal by Ar. Pradesh in 33, 11 KV via Assam system: APDCL vide letter dated 02.06.2017 desired to know the accounting system for drawal by AP in 33, 11 KV level.

Assam and Ar. Pradesh may note the existing system of accounting.

The detailed presentation is attached in **Annexure-D.28**

The Sub-committee noted as above.

D.29. Presentation on AI based Load Forecasting and Zero Load Shedding software:

Representatives from Climate Connect Pvt. Ltd gave a detailed presentation on their latest offering for power utilities. A copy is attached in **Annexure D.29.**

Members appreciated the product(s) of M/s Climate Connect.

The Sub-committee noted as above.

D.30. Presentation on SAMAST implementation

DGM(MO), NERLDC made a presentation on SAMAST which means SCHEDULING (S), ACCOUNTING(A), METERING(M), AND (A), SETTLEMENT OF (S) TRANSACTIONS (T) IN ELECTRCITY. The presentation is at **Annexure -D.30**.

He intimated that Forum of Regulators Technical Committee is regularly following-up the status of implementation of SAMAST in all States across the Country. The implementation would include Metering at intra-State level, AMR scheme to fetch data to SLDC, intra-State scheduling, Open Access web portal, Accounting, Settlement system etc. This would pave way for intra-State ABT implementation. He advised the States to proceed with the activities as listed in SAMAST report (highlighted in ppt) and apply for PSDF funding.

Assam, Tripura and Meghalaya expressed interest in the project. It was clarified that NERPC and NERLDC would provide support to the States on this.

It was agreed that the matter would be reviewed in OCC.

Any other point;

1. **Basic level training at NPTI, Guwahati:**

NERLDC informed the forum that NPTI, Guwahati is organizing 2 weeks basic level training programme for system operators (letter enclosed) batch –II in line with batch-I from 04-09-2017 to 15-09-2017. They requested all the utilities to nominate maximum no. participants to avail the facility.

The Sub-committee noted as above.

2. **19th meeting of FOLD:**

NERLDC informed that 19th meeting of FOLD will be held on 12th June, 2017 at 11:00 hrs at NRLDC (Letter of the secretariat is attached). It is requested to nominate 2-3 officials to attend the meeting. SLDCs were also requested to connect through VC with NRLDC. Members may also attend the meeting from NERLDC which will also remain connected through VC.

The Sub-committee noted as above.

Date & Venue of next OCC meeting

It is proposed to hold the 134th OCC meeting of NERPC on second week of July, 2017. 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 133rd OCC Meetings held on 08.06.2017

SN	Name & Designation	Organization	Contact No.
	No Representative	**Ar. Pradesh**	
1.	Sh. T.N. Dev Choudhury, CGM (Com)	Assam	
2.	Sh. A.K. Goswami, GM (Com)	Assam	09864105893
3.	Sh. A.N. Dev Choudhury, AGM (Com)	Assam	09854120791
4.	Sh. Dipesh Ch. Das, DGM (LDC)	Assam	09954110254
5.	Sh. B. C. Borah, AGM (LDC)	Assam	09435119248
6.	Sh. Anirban Roy, AGM, AEGCL (HQR)	Assam	09435301799
7.	Sh. Navajit Patir, DM, SLDC	Assam	09707380294
8.	Sh. Pranab Saha, DM, SLDC	Assam	09435561717
9.	Sh. Rajkumar Francis, Manager, TD-1,	Manipur	08794186792
10.	Sh. F.E. Kharshiing, SE, SLDC	Meghalaya	09863066960
11.	Sh. H.F. Shangpliang, SE(Gen)	Meghalaya	9863315562
12.	Sh. B. Nikhla, EE, SD MePTCL	Meghalaya	09436314163
13.	Sh. W. Khriem, EE GSPD	Meghalaya	9856007107
14.	Sh. Kakoli, AE, SCADA,	Meghalaya	07577843020
15.	Sh. H.S. Vanlalchaka, EE, SLDC	Mizoram	09436960363
	No Representative	**Nagaland**	
16.	Sh. Debabrata Pal, Sr. Manager (Comml.)	Tripura	09436500244
17.	Sh. Mrinal Paul, Manager	Tripura	09436137022
18.	Sh. Joypal Roy, Sr. Manager (E/M)	NEEPCO	09435577726
19.	Sh. Jayanta Deka, Sr. Manager (B/M)	NEEPCO	09859372294
20.	Sh. Nirup Sarma Sr. Manager (B/M)	NEEPCO	09435339716
21.	Sh. N.R. Paul, AGM	NERLDC	09436302723
22.	Sh. R. Sutradhar , DGM (MO)	NERLDC	09436302714
23.	Sh. Ankit Jain, Sr. Engineer (SO-I)	NERLDC	09436335381
24.	Sh. Jerin Jacob, Engineer	NERLDC	09402120113
25.	Sh. P. Kanungo, DGM (AM)	PGCIL	09436302823
26.	Sh. P.K. Singh Manager (E)	NHPC	09402951808
27.	Sh. Sudin Chattopadhyay, VP	OTPC	09748427600

28.	Sh. Smruti Ranjan Das, Sr. Manager	OTPC	9612400784
29.	Sh. E. Ngullie, DGM (O)	NTPC	9435139531
30.	Sh. Ashish Meena, Manager (O&M)	NTPC	9435326470
31.	Sh. Saurabh Srivastava, Director	Climate Connect	8126272050
32.	Sh. Ronjoy B, Analyst	Climate Connect	9663199758
33.	Sh. P.K. Mishra, MS	NERPC	-
34.	Sh. B. Lyngkhoi, Director/S.E (C&O)	NERPC	09436163419
35.	Sh. S. Mukherjee, AEE	NERPC	08794277306

APPROVED SHUTDOWN FOR 133 rd OCC

SN	Name of Element	Jun-17 9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	Jul-17 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Time	Remarks
1.TRANSMISSION LINES																																																
	132kV Transmission lines																																															
1	132kV S/C Dimapur - Imphal TL											↔	↔	↔	↔	↔	↔	↔																															08:00 to 16:00	For dis mental of existing Tower & erection of new tower at Loc. No.326 including stringing from Loc. No.324 to 326 (continuous S/D)
2	132kV Gohpur - Itanagar TL																												■																			08:00 to 16:00	AMP of Bay equipments at Gohpur End & Infringment clearing at loc. 80 , 120 & 123 .
3	132kV D/C Silchar Imphal # 1						↔	↔	↔	↔																																					09:00 to 16:00	For shifting of tower including Tower erection,Destringing,Restringing & Dismantling etc at Loc.No.244/0 (DC+0) & Loc.No.289B/0 (DD+0) , (Already approved S/D in 132nd OCC, Rescheduled)
4	132kV D/C Silchar Imphal # 2		↔	↔	↔	↔																																								09:00 to 16:00	For shifting of tower including Tower erection,Destringing,Restringing & Dismantling etc at Loc.No.244/0 (DC+0) & Loc.No.289B/0 (DD+0) , (Already approved S/D in 132nd OCC)
5	132kV D/C Silchar Imphal # 1																										↔	↔	↔	↔																	09:00 to 16:00	For shifting of two towers (tower no. 381 and dead end tower) in the substation to avoid obstruction to ongoing work in 400kV Imphall Substation (under NERSS-IV scheme upgradation work).
6	132kV D/C Silchar Imphal # 2																														↔	↔	↔	↔	↔	↔										09:00 to 16:00	For shifting of two towers (tower no. 381 and dead end tower) in the substation to avoid obstruction to ongoing work in 400kV Imphall Substation (under NERSS-IV scheme upgradation work).
7	132 KV S/C Badarpur - Kumarghat TL								■																																					08:00 to 16:00	CT Ten delta testing , attending hot spot observed in thermovision scanning , jumper tightening of loc. no 330 & 331. (Already approved S/D in 132nd OCC)
8	132 KV Badarpur - Silchar # 1 TL																								■																						08:00 to 16:00	For clearing of high rise trees on uphill side which pose potential threat to the line.
9	132 KV S/C Badarpur - Khliehriat TL																			■																											08:00 to 16:00	CT Ten delta testing , attending hot spot observed in thermovision scanning , For changing of broken Insulator discs at Loc. No. 169 . (Already approved S/D in 132nd OCC , Rescduled)
10	132 KV S/C Badarpur - Kolasib TL																		■	■																											08:00 to 16:00	i) loc no 342 to 343 -R phase binding of conductor. ii) Loc no 343 -Bamboo & Teak tree cutting done. iii) 277 to 278 tree branch cutting. (Already approved S/D in 132nd OCC , Rescduled)
11	132 kV S/C Khliehriat - Khandong - I T/L						■																																							08:00 to 16:00	For restringing of snapped E/W between Loc. No. 22 -23-24 , for insulator replacement at Loc. No. 19 and Loc. No. 23. (Already approved S/D in 132nd OCC)
12	132 KV Kumarghat - Aizwal T/L				■	■																																							08:00 to 16:00	Installation of Transmission line arrestor in 9 locations (Already approved S/D in 132nd OCC)
13	132kv Kumarghat-RC Nagar																																					■									08:00 to 16:00	For Re-tensioning Y-Ph Conductor at span No. 234 to 235 & 240 to 241
14	132kv DC Doyang-Dimapur II T/L		■																																											10:00 to 14:00	Rectification works of OPGW in between Loc.No.210-211.
15	132 kV Aizawl - Kumarghat T/L									■	■																																			08:00 to 16:00	For stringing of LILO of 132 KV Melriat-Zemabawk Line under transmission system associated with Pallatana GTPP and Bongaigaon TPS, Stringing of Span between Loc no 10/0 & 11/0 of LILO of 132 KV Melriat-Zemabawk Line.
16	132kV Aizawl Zemabawk II											■																																			08:00 to 15:00	For stringing of LILO of 132 KV Melriat-Zemabawk Line under transmission system associated with Pallatana GTPP and Bongaigaon TPS, Tapping of LILO portion with the existing 132 KV Melriat-Zemabawk Line.
17	132kV Aizawl Zemabawk I																										■																					10:00 to 14:00	Annual maintenance of Bay equipments .
18	132kV Jiribam-Haflong T/L		↔	↔	↔	↔																																								08:00 to 16:00	railway diversion work at Loc. 275 to Loc. 276 (Jiribam Section) work carried out by Railway Authority .(Approved S/D in 132 nd OCCM upto 4th June'17.Due to incremental weather condition,C/S/D extension requested till 11th June'17)
19	220KV Salakati - BTPS # 1 TL																				■																										08:00 to 16:00	For fixing of CC ring in polymer insulator in 15 locations.
20	220KV Salakati - BTPS # 2 TL																							■																							08:00 to 16:00	For fixing of CC ring in polymer insulator in 15 locations.
400kV BALIPARA SS																																															
21	50 MVA 220/132KV AEGCL ICT (ICT II)	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	Other ICT in service						08:00 to 16:00	Replacement of existing ICT with 160 MVA ICT . (Continous S/ D upto 17.06.2017 , already approved S/D in 132nd OCC , extension required citing work progress and bad weather conditions.)
22	80 MVAR Bus Reactor # 2 Main Bay								■																																					08:00 to 16:00	Annual maintenance of Bay equipments , no outage of element.
23	400kV BNC # 4 Main Bay											■																																			09:00 to 16:00	Replacement of CB auxillary contacts , no outage of element.
24	80 MVAR Bus Reactor # 2 Tie Bay									■																																					08:00 to 16:00	Annual maintenance of Bay equipments , no outage of element.
400KV BONGAIGAON S/S																																															
25	400/220 KV 315 MVA ICT Main bay													■																																	09:00 to 15:00	Annual maintenance of Bay equipments . (ICT shall remain in service)
26	400/220 KV MVA ICT and 400kV New Siliguri # 1 Tie Bay														■																																09:00 to 15:00	Annual maintenance of Bay equipments . (ICT shall remain in service)
27	50 MVAR Bus Reactor 1																			■					subject to real time grid conditions and return of line 3 reactor																						07:00 to 11:00	Annual Maintenance work , BR will be out of service [Approved S/D in 132nd OCCM, resceduled]
28	50 MVAR Bus Reactor 2																						■		subject to real time grid conditions and return of line 3 reactor																						07:00 to 11:00	Annual Maintenance work , BR will be out of service [Approved S/D in 132nd OCCM, resceduled]
400KV Misa Substation																																															
29	400/220 KV 315 MVA ICT # 2																											■																		08:00 to 16:00	Annual maintenance of ICT and Bay equipments . (ICT shall be under S/D)
220KV Salakati Substation																																															
30	220kV Main Bus # 2											■																																			08:00 to 16:00	To Attain Hotspots in Bus # 2 (All lines shall remain charged via Bus # 1)
220 KV Mokokchung Substation																																															
31	30MVA ICT 2	↔	↔	↔	↔					subject to availability of 132 kV Doyang-Mokokchung line																																						08:00 to 16:00	The ICT-2 (R) phase has been showing zero core to earth insulation value due to increased particle count. Filteration of ICT to be done in presence to OEM. (Already approved S/D in 132nd OCC)
132 KV Imphal Substation																																															
32	132KV 20MVAR Bus Reactor																			↔	↔	↔	↔																								08:00 to 16:00	Drying out of reactor and filtration of oil [Approved S/D in 132nd OCCM, Resceduled]
ERTS																																															
1	400kV Binaguri-Bongaigaon Ckt#I	■		■		■		■																																						08:00 to 17:00	For replacement of Porcelain insulator with polymer insulators
2	400kV Binaguri-Bongaigaon Ckt#II		■		■		■		■																																					08:00 to 17:00	For replacement of Porcelain insulator with polymer insulators
ENICL																																															
1	400kV Alipurduar-Bongaigaon Ckt#I									■				NLDC consent reqd																																	07:00 to 17:00	Checking Dead end clamp, tightening of jumpers & Corridor clearance
2	400kV Alipurduar-Bongaigaon Ckt#II										■			NLDC consent reqd																																	07:00 to 17:00	Checking Dead end clamp, tightening of jumpers & Corridor clearance
MSPCL																																															
1	132kV Loktak-Imphal(PG)				■	■																																								09:00 to 17:00	STRINGING OF 400kV LINE YUREMBAM TO THOUBAL BETWEEN LOC. NO. 5A/0 AND LOC. NO. 6/0
OTPC																																															
1	Palatana Block-2(363.3MW)									↔	↔	↔	↔	↔																																	06:00 to 06:00	GT-2 Borescopic inspection and GT-2 Compressor R0 & R1 inspection
2	400/132kV 125MVA ICT-2 at Palatana							↔	↔	↔	↔																																			06:00 to 06:00	replacement of defective Air cell
AEGCL																																															
1	220kV Samaguri-Mariani #2 TL											■	■																																	08:00 to 16:00	corridor clearing and jumper repairing
2	220kV Main Bus of Mariani GSS											■	■	■																																	08:00 to 16:00	augmentation related work from single conductor to twin conductor
3	132kV Pailapool-Jiribam TL													■	■	■																															09:00 to 17:00	double jumpering works & jungle cutting works
MeECL																																															
1	220kV Killing-Misa D/C TL																			■		■																									09:00 to 16:00	jungle clearing, Jumper changing at loc. No 4 & jungle clearing
2	132kV Epip-2 Main Bus																						■																							10:00 to 13:00	General Maintenance works including transformer.
TSECL																																															
1	132 kV RC Nagar-Agartala I		■	■																																										0600 to 0800 Hrs	Work in 132 kV Bus section 1 & 2 at 79 tilla Agartala S/S
NEEPCO																																															
1	AGBPP GTG#3											↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	C/S/D from 0000 Hrs of 19.06.17 to 2400 Hrs of 28.07.17	shutdown for forty(40) days w.e.f.00:00hours of 19/06/2017 to 2400 hrs of 28/07/17 for major overhauling inspection & replacement of rotor(Already Approved S/D in 132nd OCCM)

■ day time S/D ↔ continuous S/D

ONGC Tripura Power Company

Presentation to NERPC regarding problem faced with technical minimum schedule(@55%)

IEGC 4th Amendment Reg 2015

- 6.3B- Technical Minimum Schedule for operation of generating stations The Technical minimum schedule for operation in respect of ISGS shall be 55% of MCR of unit / units of generating stations
- We submitted our plea to consider 65% to CERC in reply to draft regulation
- Our plea might have been overlooked

OTPC Plant configuration

- 2x363.3 MW gas based combined cycle power plant
- Gas turbine: GE 9FA , rated capacity 232.39MW
- Steam turbine: BHEL , rated capacity 130.91 MW
- Configuration: 2 trains, each 1 GT, 1 HRSG,1ST

Gas turbine operation

- Modes of operation
  - Diffusion: from Ignition to 800^0 F combustion ref temperature
  - Sub-piloted Pre-Mix: from 800^0 F to 1600^0 F
  - Piloted Pre-Mix: from 1600^0 F to 2300^0 F
  - Pre-Mix: above 2300^0 F and this mode change over happens at around 120MW load (depending on ambient and fuel condition) of gas turbine and corresponding steam turbine is 90MW. Thus total load at that moment 210MW in each unit.
- Plant is designed to operate in Pre-Mix mode for machine stability and environment compliance. OEM(GE) recommends operation in PM mode only.

Gas turbine operation

- Modes of operation(Continuation)
  - Non Pre-Mix mode operation creates accelerated combustion hardware degradation. There is detrimental effect on machine availability and maintainability
  - Gas turbine operated with very complex control logic and during mode change over for combustion stability it monitors all the gas control valves say D5, PM1, PM4 etc, minutely. Slight variation on operation of valves, unit trips. This phenomenon often happens.
  - With sudden trip of Palatana units definitely causes stress to NER grid.

Steam Turbine operation

- Steam turbine follows Gas turbine and Palatana project does not have bypass stack to run gas turbine in open cycle. Thus steam turbine load can not be reduced.

Environmental limitation

- State Pollution control board(SPCB) specified a condition in Consent to Operate to limit NOx to 50ppm.
- It has been observed during operation in other than pre-mix operation, NOx value exceeds 50ppm.
- Thus it is not advisable to operate other than Pre-mix mode
- We are registered with UNFCCC and we earn 1.7 million carbon credit every year

Gas supply contract(ToP)

- Take or pay condition: 90% of 2.65MSCMD
- This is 2.385 MSCMD
- For one unit =2.385/2=1.1925MSCMD

= 49688 SCM/hour

With is GT load will be 144 MW and ST will be 91 MW. Total=236MW

Thus with 55% IC (199.8MW), we get penalty

Cost of power

- OTPC Palatana is one of the cheapest power in the country.
- Merit order consideration

Palatana experience with 55% TMS

- Date: 16.05.2017: Palatana received tech min schedule of 388 MW for the block 25 to 32.
  - While reducing load , mode change over happened. But we faced problem to maintain load and also instability of gas turbines.
  - Pollution excursion happened
- Date 30.05.2017: Block 74 to 78: SG 385MW
  - We did not go to 385 MW to avoid tripping and instability
  - We were compelled to run 15MW more than technical minimum schedule to avoid instability and trip of machines.
  - We have over-generated and loss absorbed as DSM penalty

Palatana experience with 55% TMS

- In future also, we will be compelled to run above IEGC Tech Min Limit of 55%.
- Mode change over takes place at 210MW in each unit. So total for two unit is 420MW. This is the changeover point. We may be allowed with some safety margin say 5%. 420MW is equal to 58% of IC.
- In this circumstance, we pray to NERPC to consider our case of fixing technical minimum SG equal to 58% + 5%= 63%

Thank you

Methodology of accounting wheeling Power to Ar. Pradesh via Assam system

133rd. OCC meeting

08.06.2017

Letter from APDCL requesting methodology

ASSAM POWER DISTRIBUTION COMPAY LIMITED
CIN: U40109AS2003SGC007242
Office of Chief General Manager - Commercial
Phone:0361-2739515,Fax-0361-2739543, E-mail:acecomt.aseb@gmail.com

No. APDCL/ACE (COM)/PS-8(1)/PT-3/2006/ 95 Dated: 2/6/17

To

The General Manager,
NERLDC, POSOCO, Power Grid Complex,
Dongteih, Lower Nongrah, Lapalang, Shillong- 793006

Sub: Adjustment of power from APDCL to Arunachal Pradesh

Sir,

Kindly refer to the above subject. In pursuance of the 30th Commercial Committee Meeting dated 20/10/2016 of NERPC, a bilateral discussion was held on 15/05/2017 at Itanagar, Arunachal Pradesh between APDCL and Department of Power, Govt. of Arunachal Pradesh in the matter of interstate transaction of power between the subject states through 33KV and 11KV lines of APDCL. The matter is in the process of formulation at both ends. In this regard, I would like to request you to share with us the existing methodology used for adjustment of power drawn by Arunachal Pradesh from APDCL based on the meter readings sent every month.

This is for favour of your information and necessary action.

Yours faithfully,

Chief Gen. Manager (COM)

Assam export to AP/Nagaland – 33 & 11 KV

- **Matter was discussed in 22nd. CCM of NERPC held at Imphal on 12.09.2014**

- **SEM not installed in most locations**
- **Monthly energy readings are being sent by APDCL**
- **Corresponding peak and off-peak MW worked out from the monthly readings**
- **Same is used in subsequent period till receipt of next monthly reading**

- **Quantum MW added to AP,Nagaland and deducted from Assam drawal in deviation calculation**

ASSAM POWER DISTRIBUTION COMPANY LIMITED

No. ACE (COM) / IS METER RDG / 2012 /135 Dated 23.02.2016

To,

The General Manager,
North Eastern Regional Load Despatch Centre,
Dongteih, Lower Nongrah, Lapalang,
Shillong-793006.

Phone No. 0364-2535717.
-2536930.
Fax No. 0364-2535717.

Sub : Inter-state meter reading of 11 KV & 33 KV feeders of ASEB.

Sir,

With reference to above, I am sending herewith the meter readings for the month of **January'2016** of all 11 KV and 33 KV inter-state feeders leading to Arunachal Pradesh and Nagaland for favor of your information and necessary inclusion in monthly REA.

Yours faithfully

Gen. Manager (Tariff Regulatory Cell),
APDCL, Bijulee Bhawan,Paltanbazar, Guwahati-1.

Memo No. ACE (COM) / IS METER RDG / 2012 /135(A) Dated 23.02.2016.

Copy for information an necessary action to:

1. The Member Secretary, NERPC, Meghalaya State Housing Finance Co-Operative Society Limited Buil;ding, Nongrim Hills, Shillong-793003.

Gen. Manager (Tariff Regulatory Cell),
APDCL, Bijulee Bhawan,Paltanbazar, Guwahati-1.

Last reading received from APDCL was in March, 2016

Statement of Inter- State Meter Reading for the Month of January' 2016.

SL. NO.	FEEDERS	M.F.	E/I	IS METER READING.		EXCHANGE, Mwh		NET EXCHANGE Mwh
				01.01.2016	01.02.2016	Export	Import	
	Exchange with AP							
1	D'DOOMA NAMSAI	0.12	E	532952.00	573248.00	4835.520		
2	Santipur	1	E	3214.99	3214.99	0.000		
3	Sunpura	6	I	0.00	0.00		0.000	4835.520
4	L'PANI JAYRAMPUR	6	E	9572.11	9886.00	1883.340	0	
5	GOHPUR BALIJAN	0.3	E	22579.59	22579.59	0.000	0	
6	DHALAIBIL SIZUSSA	0.5	E	18463.03	18643.49	90.230	0	
7	* S'KATHANI KANUBARI	4	E	0.00	0	700.000	0	
8	M'RITA CHENGLENG	3	E	10878.55	11066.39	563.520	0	
9	DIGBOI- BORDUMSHA	2	E	2564.74	2601.90	74.320	0	
10	B'KUND - BALIMUKH	2	E	5072.06	5083.84	23.560	0	
11	LIKABALI - S'PATHAR	2	E	323.80	358.8	70.000	0	
12	RUKSIN JONAI	6	E	3961.33	4126.12	988.740	0	
13	DIPABASTI	2	E	983.13	989.7	13.140	0	
14	**Total to AP**					**9242.370**	**0.000**	**9242.370**

* Indicates Metering arrangements are not Working.

	Exchange with Nagaland							
15	*GARGAON N'MARA	0.06	E	0	0	570.000	0.000	
16	*SONARI TIGIT	4	E	0	0	1050.000	0.000	
17	CHANKI MORIANI	12	E	8231.37	8317.58	1034.520	0.000	
	Total to Nagaland			0		**2654.520**	0.000	**2654.520**

* Indicates Metering arrangements are not Working.

Assam export to Ar. Pradesh – 33 & 11 KV

	AP drawal via 33,11 KV feeders				
	Enter this :	**9242.370**		**wef April, 2016**	
	y==2x				Calculation
	18x +6y =	298.140968			
	18x +12x	298.140968			
	30x	298.140968		No decimel	
(30/31)	x =	9.93803226		9.938032	Off Peak MW
DAYS	y =	19.8760645		19.876065	Peak MW
Check					
	Daily	298.140968			
	Monthly	9242.37			

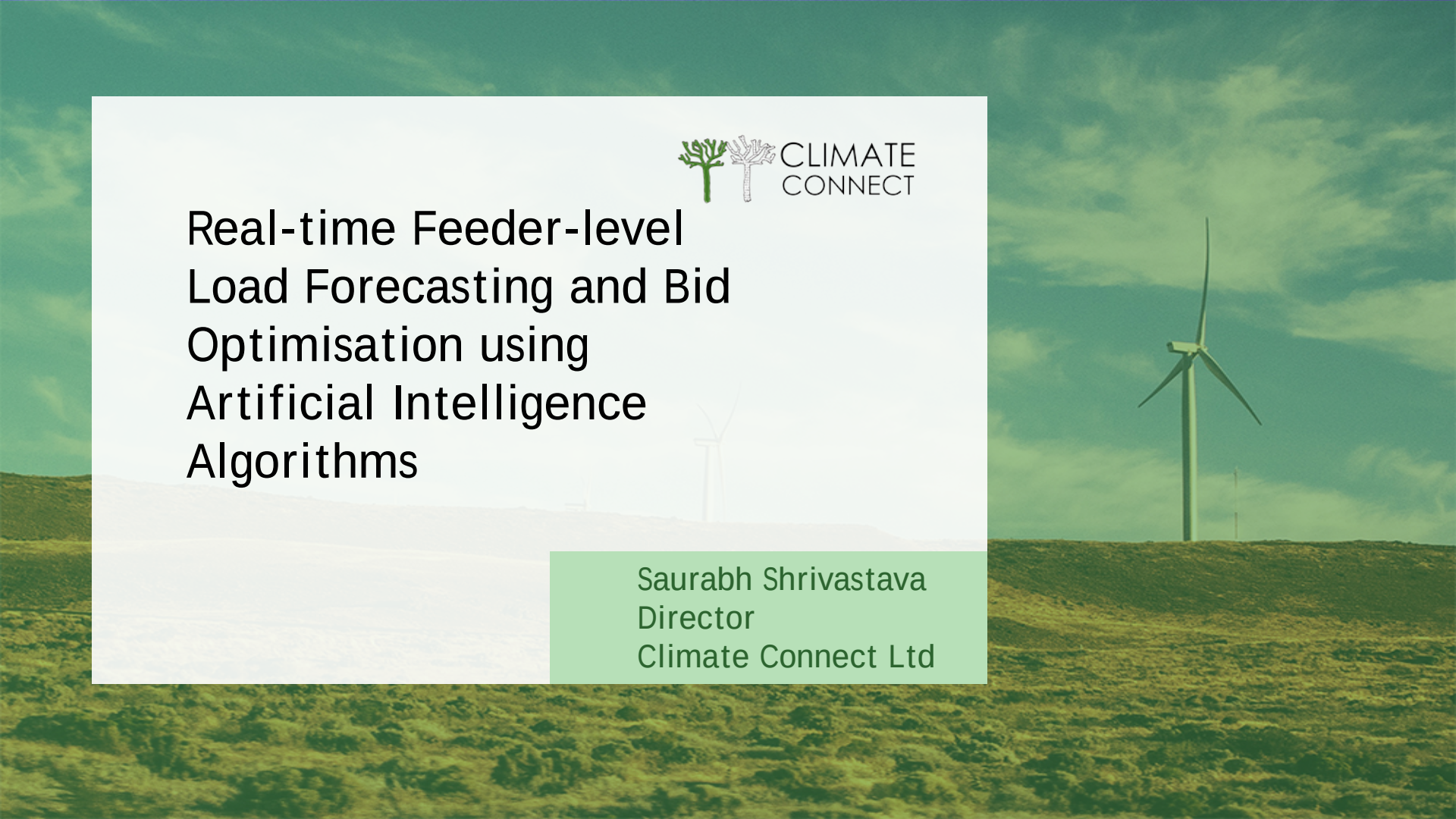
3% credit is given to Assam as wheeling loss.

Peak period: 1600-2200 Hrs ; Non-peak: Remaining period

Assam export peak : 19.876/0.97 = 20.49 MW

Assam export non-peak : 9.938/0.97 = 10.25 MW

Thank you



Real-time Feeder-level Load Forecasting and Bid Optimisation using Artificial Intelligence Algorithms

Saurabh Shrivastava
Director
Climate Connect Ltd

ABOUT CLIMATE CONNECT

Climate Connect Ltd, a data analytics company started in 2011, builds Data Analytics and Artificial Intelligence (AI) driven software for energy markets. The information and algorithms are used for power generation forecasting, day ahead price forecasting, scheduling and trading. Company's customers are spread across USA, India, Canada and Europe.

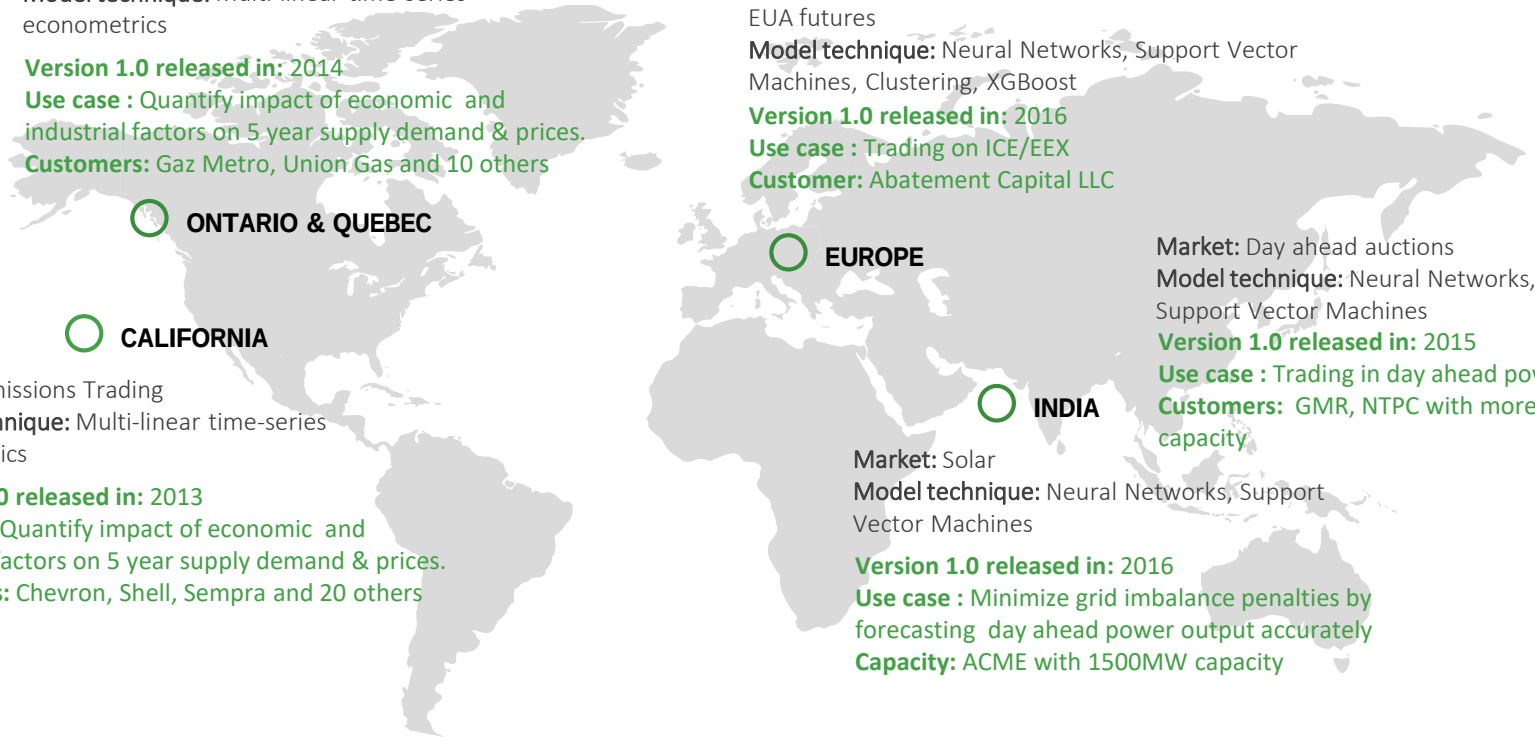
USA

INDIA

CANADA

EUROPE

CLIMATE CONNECT'S MODELLING AND ALGORITHM EXPERIENCE



ONTARIO & QUEBEC

Market: Emissions Trading
Model technique: Multi-linear time-series econometrics

Version 1.0 released in: 2014
Use case : Quantify impact of economic and industrial factors on 5 year supply demand & prices.
Customers: Gaz Metro, Union Gas and 10 others

CALIFORNIA

Market: Emissions Trading
Model technique: Multi-linear time-series econometrics

Version 1.0 released in: 2013
Use case : Quantify impact of economic and industrial factors on 5 year supply demand & prices.
Customers: Chevron, Shell, Sempra and 20 others

EUROPE

Market: German day ahead auctions (Phelix) and EUA futures
Model technique: Neural Networks, Support Vector Machines, Clustering, XGBoost
Version 1.0 released in: 2016
Use case : Trading on ICE/EEX
Customer: Abatement Capital LLC

INDIA

Market: Day ahead auctions
Model technique: Neural Networks, Support Vector Machines
Version 1.0 released in: 2015
Use case : Trading in day ahead power markets
Customers: GMR, NTPC with more than 45GW capacity

Market: Solar
Model technique: Neural Networks, Support Vector Machines

Version 1.0 released in: 2016
Use case : Minimize grid imbalance penalties by forecasting day ahead power output accurately
Capacity: ACME with 1500MW capacity

DATA SCIENCE TEAM AT CLIMATE CONNECT LTD

Michael Carter

Energy Forecasting Advisor, 20+ years in forecasting & modelling

Nitin Tanwar

CEO
MS Energy, 9+ years in energy

Sanand Sule

CTO
MS Computer Sciences, 10+ years in technology

Ankur Agrawal

AI Advisor
PhD Machine Learning, 10+ years in AI

Saurabh Shrivastava

Product Head
MBA Power, 6+ years in Power

Rohan Nongpiur

Project Manager
MS Energy Economics, 3+ years in energy

Harry Horner

Energy and AI Coordinator, BA Oxford

Peter Bishton

Energy Trading Advisor, 30+ years in commodities trading

Simon Kuttruf

Senior Data Scientist
MS Mathematics, 3+ years in modelling

Chandan Kumar

Lead Economist
MS Economics, 3+ years in modelling

Vivek Mishra

Data Engineer
BS Computer Sciences, 3+ years in coding

Sho Akama

Junior Data Scientist
BS Economics, 1+ year in coding

Akash Gandhi

Junior Data Scientist
MSc Financial Economics

Ronjoy Bezbarua

Carbon Analyst
MBA

USE CASE OF FORECASTS AND ALGORITHMS IN POWER SECTOR

Real time
Systems Data

Real time
Plant Data

Real time
weather data

Market
Price / Sentiment
Data

Machine Learning based Algorithms for Forecasting:

- **Energy Assets:**
  - **Solar** (ACME)
  - **State Demand** (Delhi)
- **Energy Trading:**
  - **Prices** (European Energy)
  - **IEX Bidding**

- **Avoid grid imbalance penalties**
- **Optimal scheduling of power supply**
- **Maximize profit of power supply**
- **Trade in Day Ahead Power markets**

ACME
Leading Through Innovation

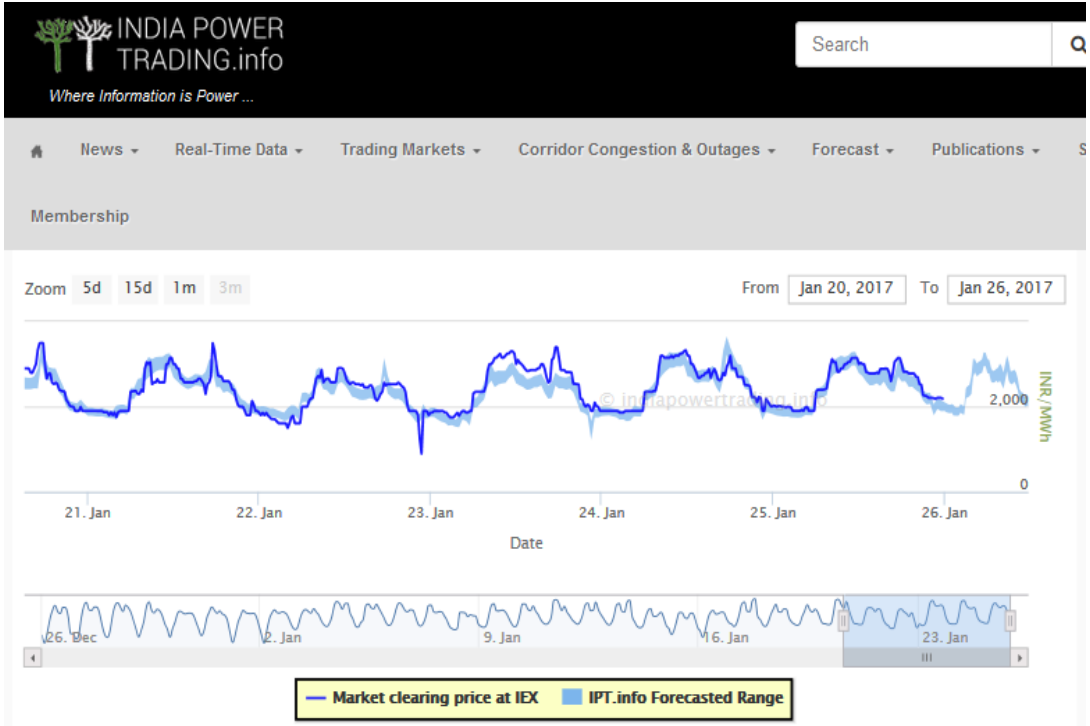
Solar Generation Forecasting

- Model Used – SVR
- Portfolio Handled – 26 Plant locations totalling 600 MW
- System integration – ABB & GE SCADA
- Accuracy Achieved – 99.9% (highest); 98%(average)
- Factored- GTI, GHI, Zenith angle, Azimuth angle, Cloud cover, Lat-Long factors, Plant operating parameters
- Granular Modelling – 48 different SVR's built and tuned for each solar time block
- Provision for revision – Models run every 2 hours to incorporate dramatic changes in weather condition

- Two Tiered: This approach ensures maximum knowledge gained from available data without creating noise

IEX Day-Ahead Exchange Price Forecast

- Models used – Machine Learning, NN, SVM
- Accuracy achieved – 100% (highest, for W3); 92% (average, for N2)
- Factors in version 1.0 - Holidays, weekends, outages.
- Version 2.0 in-progress, will include effects of forced outages, congestion etc.
- Granular Modelling – 96 different SVM's built and tuned for each bidding time block across all bid areas
- Provision for revision – Models run every day and forecasts upto 15-days ahead on a rolling basis
- Identify promising time blocks, induce bidding strategies



- Optimize plant operation (scheduling, storage)

EXCERPTS FROM PILOT-RUNS WITH MAJOR STAKEHOLDERS

- Portfolio handled – 2x75 MW from Korba & Farakka project
- Optimisation was modelled basis ECR of each Unit
- Average additional clearing done using IPT software and AI based models – 250 MWh/day
- IPT Forecasts Resulted in increased cleared volumes by 15% on a 7 day pilot period
- Paid customer

- Portfolio Handled- 300 MW from Chattisgarh Plant for 15 days
- Modelling constraints of ramp-up and ramp-down, along with ECR
- IPT forecasts resulted in increased revenue generation by Rs 30,000 per day
- Trading plans by GMR team on basis of 14-days ahead forecast
- Paid customer

- Portfolio handled – 1000 MW pooled power from multiple plants with varied ECRs
- Strategic decisions on bidding patterns
- Additional clearing of volumes upto 1000 MWh in a day
- Additional revenue generated upto a maximum of Rs 24 Lakhs in 1 day
- Successful pilot executed

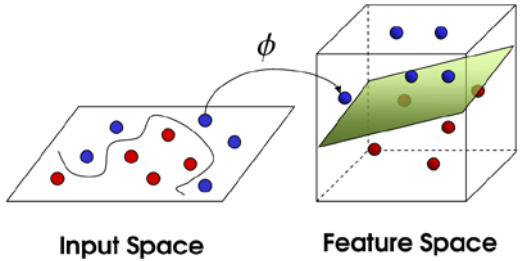
- Assumption: “we can learn from the past”
  - numerical information about the past is available
  - some aspects of the past patterns will continue into the future.
- Models:
  - Fundamental Models, Physical Laws
  - Multivariate Regression, Time Series Modelling
  - Machine Learning: supervised, unsupervised, reinforcement
  - SVM, SVR, XG-Boost

"A computer program is said to learn from experience E with respect to some class of tasks T and performance measure P, if its performance at tasks in T, as measured by P, improves with experience E.”

(Tom Mitchell, 1997)

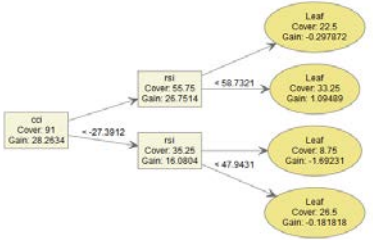
Support Vector Machines for classification:

Representation of the training examples as points in some high dimensional feature space, mapped so that the examples of the separate categories are divided by a gap as wide as possible, the "separation hyperplane".



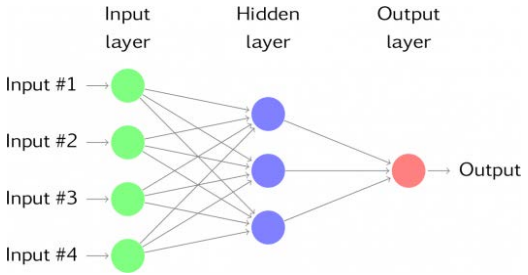
Random Forests:/Tree Boosting:

Ensembles of tree structures where leaves represent class labels and branches represent conjunctions of features that lead to those class labels. Trees are fitted by a gradient approach optimizing a function of two measures: model accuracy and model complexity



Neural Networks for regression:

The inputs to each node are combined using a weighted linear combination. Each node transforms the input by a nonlinear function and provides it as output to the next layer. The connection weights are iteratively updated.

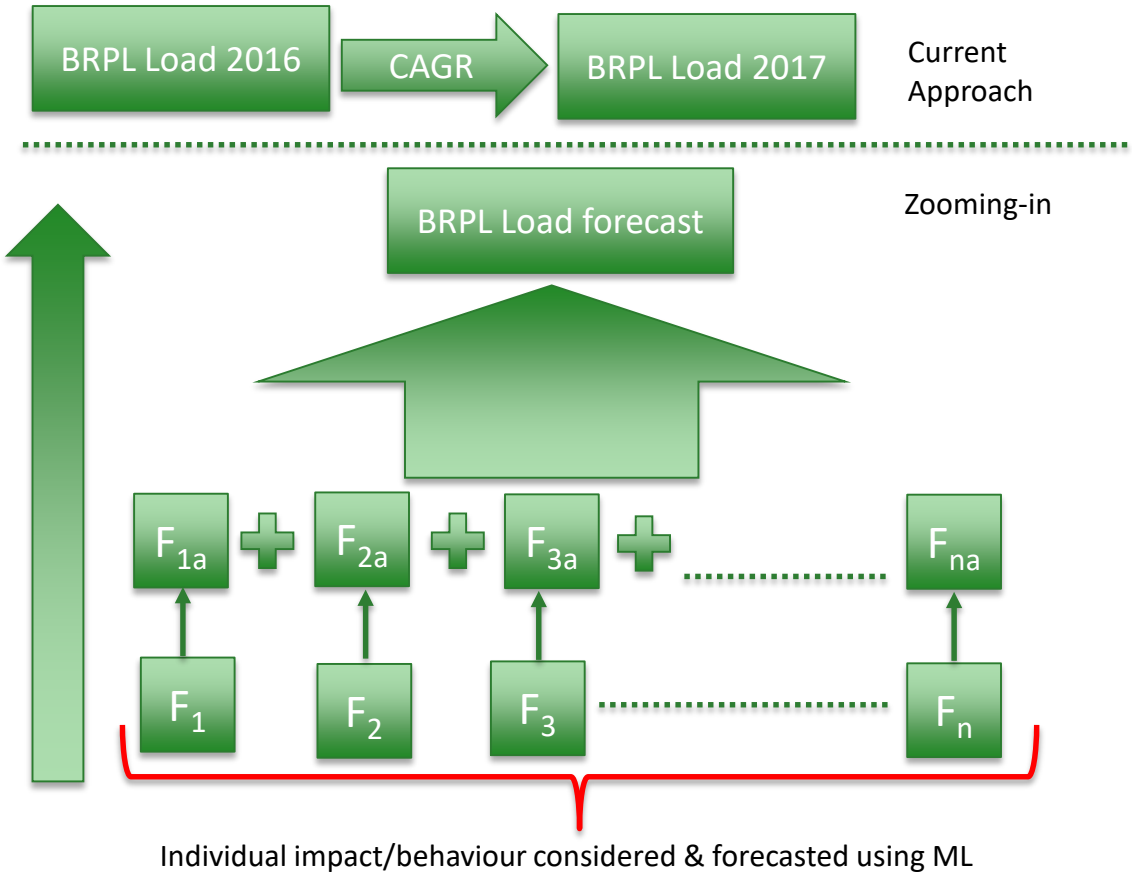


MICRO LEVEL FORECASTS

Because every feeder is not born the same:

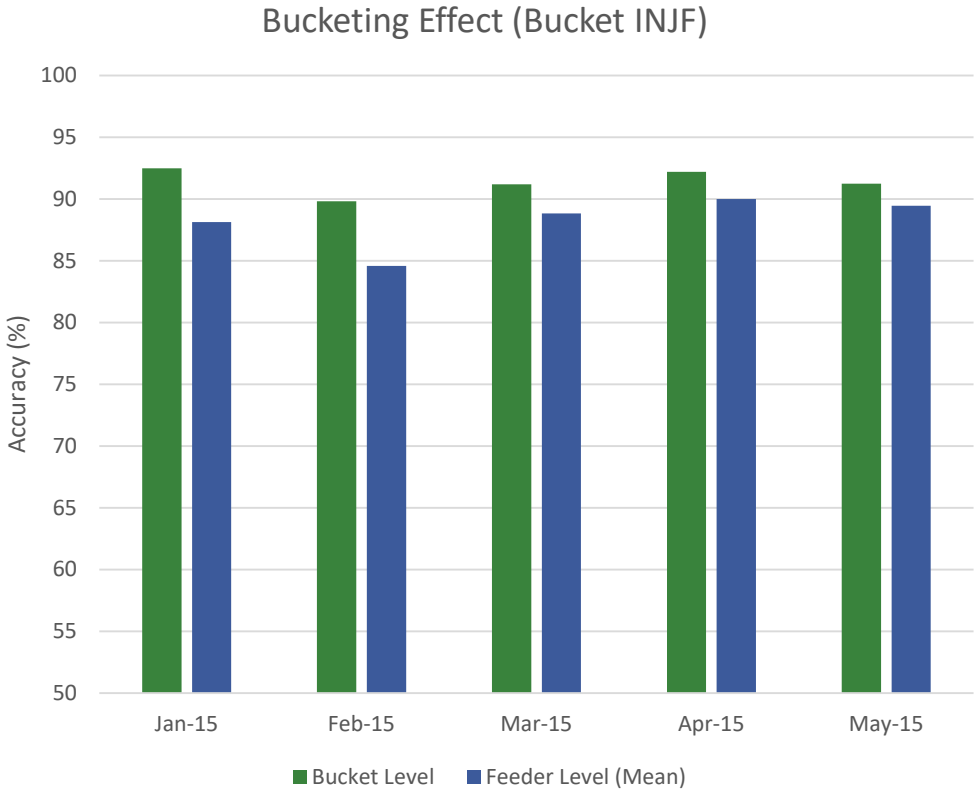
- Self-learning and adaptable model for each feeder based on location, bucket, impact, seasons etc
- Replicable to 1400 DTs
- Accuracy being proportional to granularity

Forecasting of individual feeder load at 66 KV, accumulated to BRPL load



Discovery 1: FEEDER BUCKET SEGREGATION

- Location based mapping
- Load balancing
- Stability of Forecast Accuracy
- Leveraging Statistical Effects



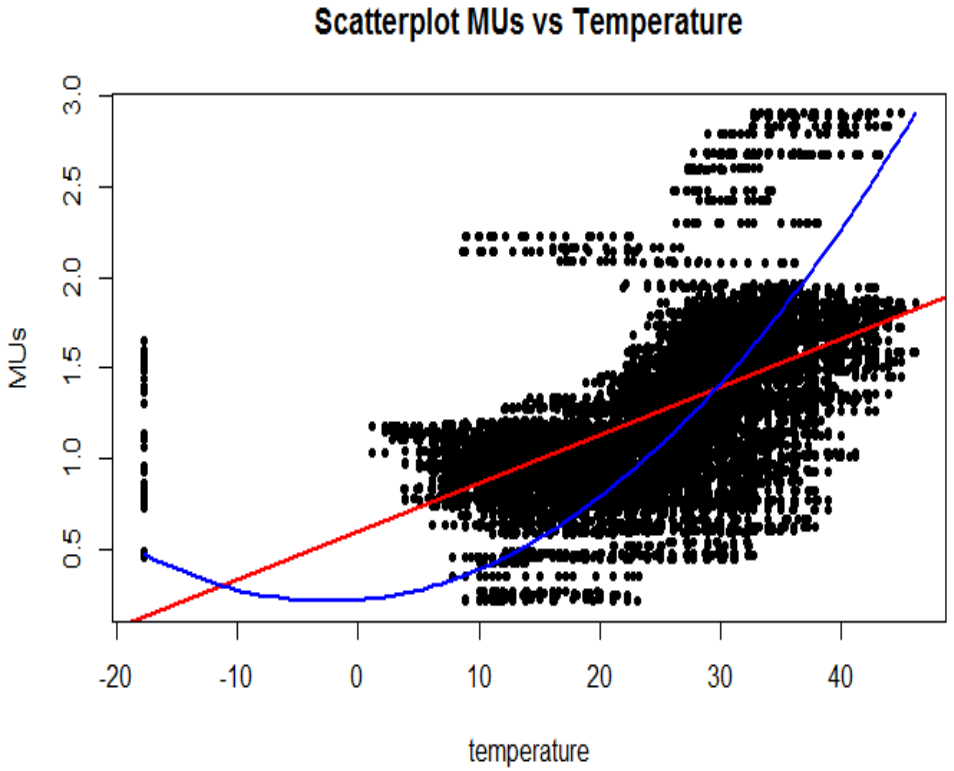
Improvement of forecast accuracy for bucketing

- Capturing the non-linear effect of temperature on load
- Temperature Regimes

→ Machine Learning Approach

Impact of weather variables on Load:

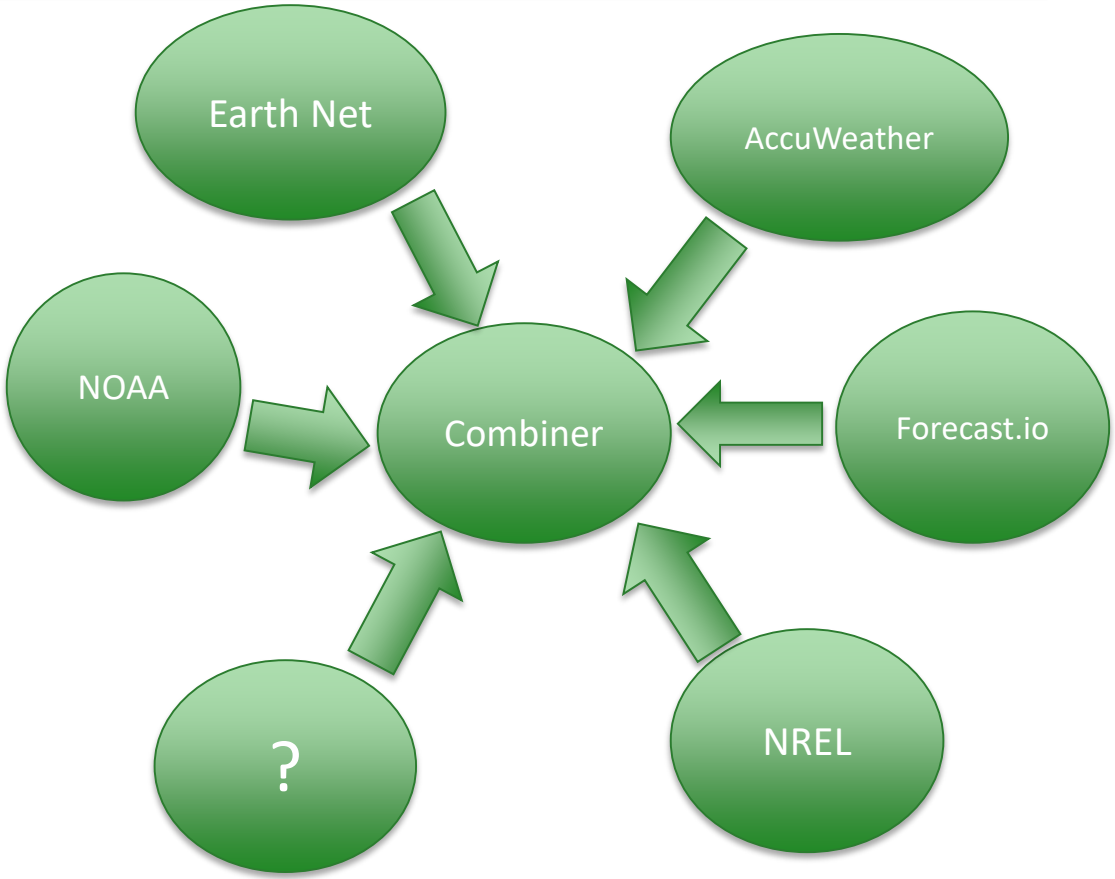
Temp	Humidity	THI	WCI	Wind
0.72	-0.35	0.72	0.71	0.07



Weather Combiner Tool – To combine several weather sources into single data stream by performing a multivariate linear regression

Why a Combiner ?...

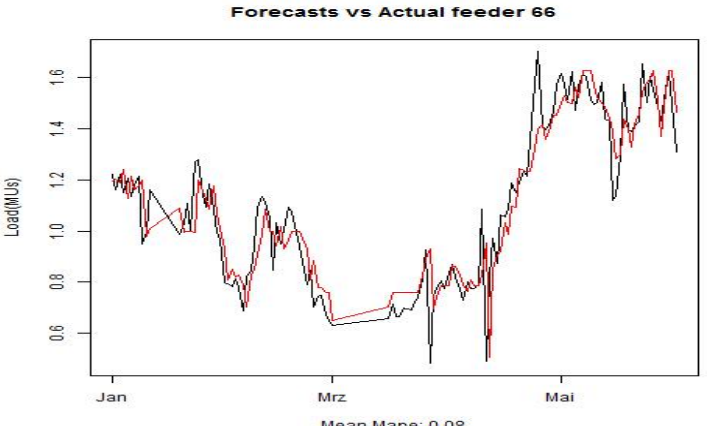
- *Weather variables have a high correlation with load*
- *Accuracy varies with season, days etc.*
- *Finding the best number for each weather parameter, for a situation*
- *Covers risk of inaccuracy from a single source*
- *Normalisation & Modelling*
- *The more.. The better*

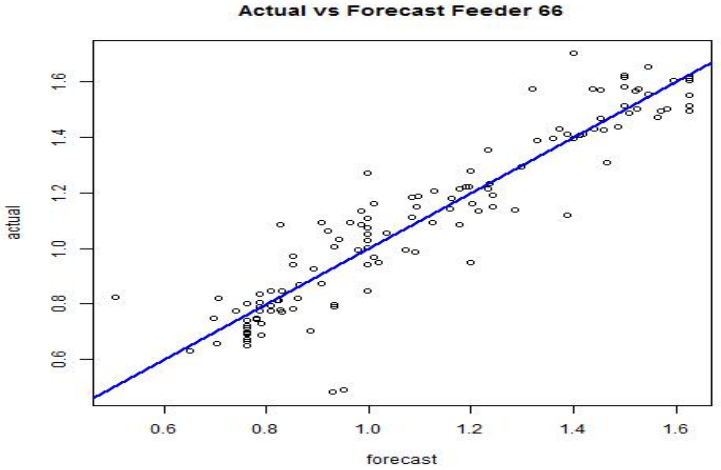


SAMPLE ACCURACIES

Feeder	Month in 2015	Model Acc	Monthly Load
Mehrauli TX-1	Feb	0.02588655	18.603888
Pappankalan TX-2	May	0.04326838	46.185
Pappankalan II TX-2	Jan	0.04564469	19.459998
Pappankalan II TX-2	April	0.05462928	27.044646
Nangloi Water Works	Jan	0.07290898	19.333057
Pappankalan TX-2	Jan	0.07347411	26.542692
Mehrauli TX-1	Jan	0.07547075	24.376068
Nangloi Water Works	May	0.07576682	31.463573
Najafgarh TX-3	March	0.07726269	19.013772
Pappankalan TX-4	May	0.08039827	41.940348
Pappankalan II TX-2	March	0.08040078	12.124542

Monthly average of Mape error for day ahead forecasts

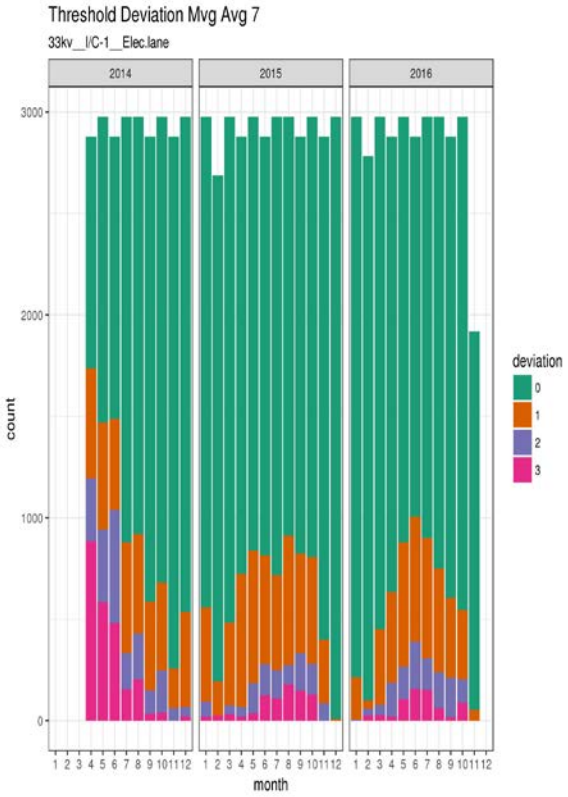


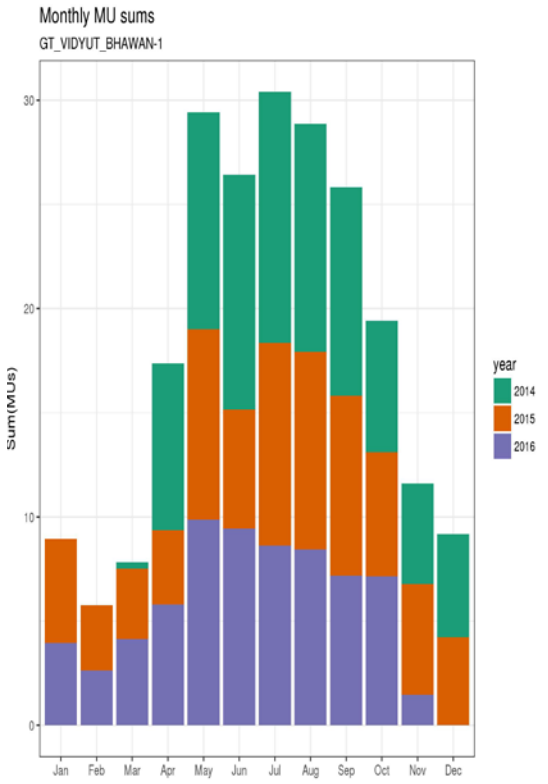


- Historical data analysis for 46 NDMC feeders and 140 BRPL feeders in Delhi
- Anomaly detection for all feeders (~5 Million data points)
- Faster error detections

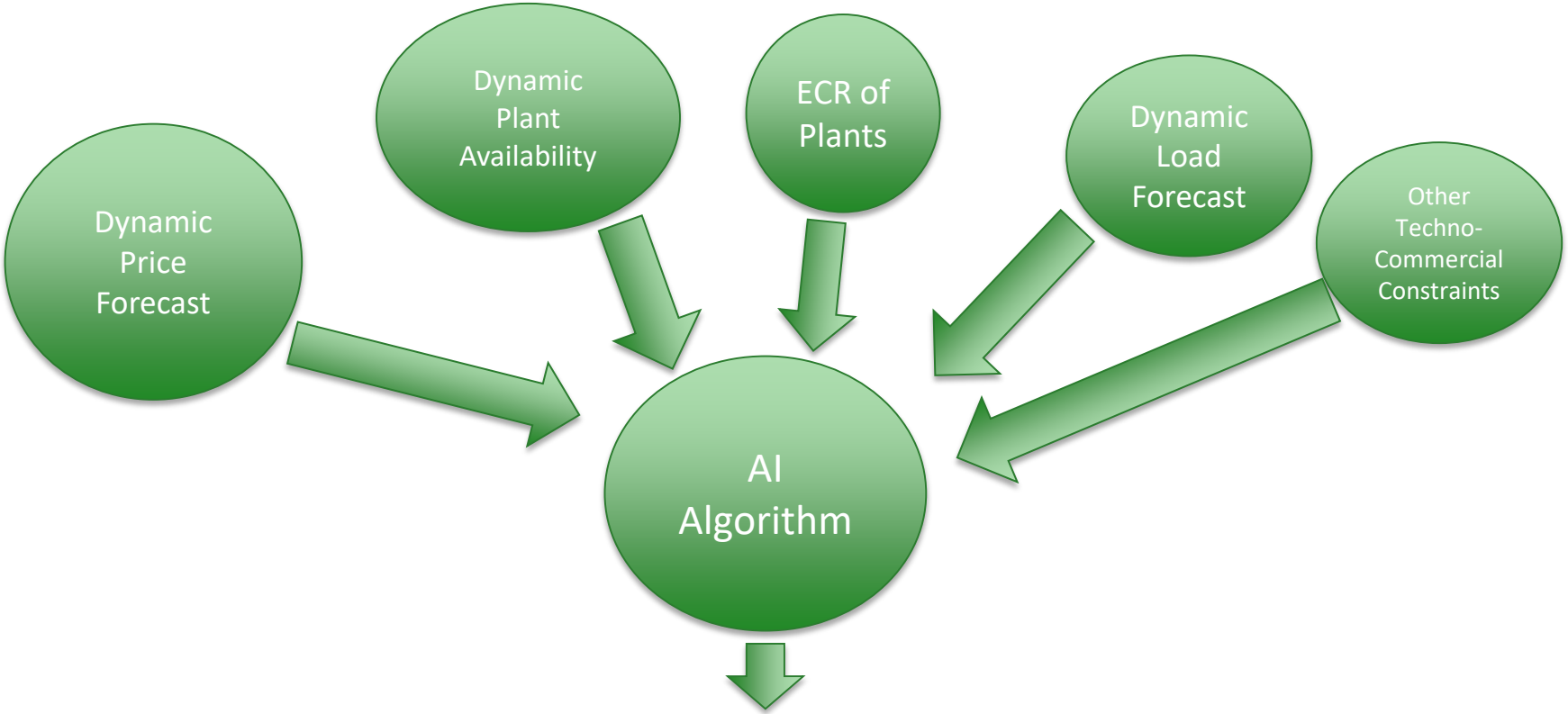
The Guest House Feeder

- BRPL Team on field to take action on anomaly, the outcomes exactly coincide with ML analytics represented from accumulated dataset
- Full automation for accurate and fast service





ASSISTING POWER EXCHANGE BIDDING



Towards Zero Load Shedding in India

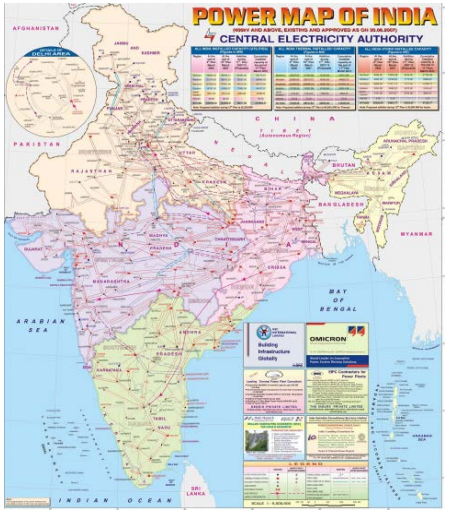
Saurabh Shrivastava
Director
Climate Connect Ltd

CURRENT POWER SYSTEM IN INDIA

Over Supplied Market – With a reasonable portfolio mix

Availability at low prices, through PXs or otherwise

Stringent Grid Discipline – Regulation via DSM & Ancillary Services



Buyer's Dominance – With sellers competing through Reverse Auctions, etc..

Stronger Transmission Infrastructure – compared to past years

Multiple Trading Instruments – for effective purchase planning

Then Why Load Shedding ?

LOAD SHEDDING – WHY DOES IT OCCUR

- Sudden increase in demand for state
- Lack of ability for discoms to arrange power, though its available in system
- Infrastructure Breakdown – Generation, Transmission Distribution
- Mismatch in Demand and Availability
- Addressing theft prone areas

Can this be avoided ?

IF ANSWER IS YES, THEN NEXT QUESTION IS HOW

Apt Combination of

- Real time Continuous Demand and Availability Matching
- Accurate Forecasting Tools – Day Ahead and Intra Day
- Intra day load management solutions
- Removal of Human Interfacing using Artificial Intelligence
- True implementation of One Nation One Grid
- Robust & Reliable Tech + Algo based solutions

Climate Connect's Zero Load Shedding Software

IMPACTS OF LOAD SHEDDING

Social	Political	Economic
• Discomfort and Inconvenience for people. • Pollution due to increased usage of diesel generators • Rise of unfair means of procuring electricity • Deforestation, habitat destruction, loss of biodiversity and cumulative impacts of fuelwood collection	• Weak regulatory bodies and inefficient resource use. • Lack of political accountability for electricity, the supply of electricity to particular groups and the allocation of subsidies are both used for political advantage • Loss of trust in ruling government	• Fall in agricultural and industrial production • Rise in running cost of businesses due to usage of diesel generators, decreased revenues • Indicated significant GDP loss because of power shortage.

CONCEPT FLOW OF ZERO LOAD SHEDDING SOFTWARE

Automated monitoring of every Discom and generator in real time → Continuous Matching of Demand & Availability by SO, instead of DIscom → AI to replace human interface, to reduce system reaction time and improve demand response

* Automated algorithm to react with available generation ramp up when demand shoots or ramp down to avoid UD/OD situation, based on MoD.

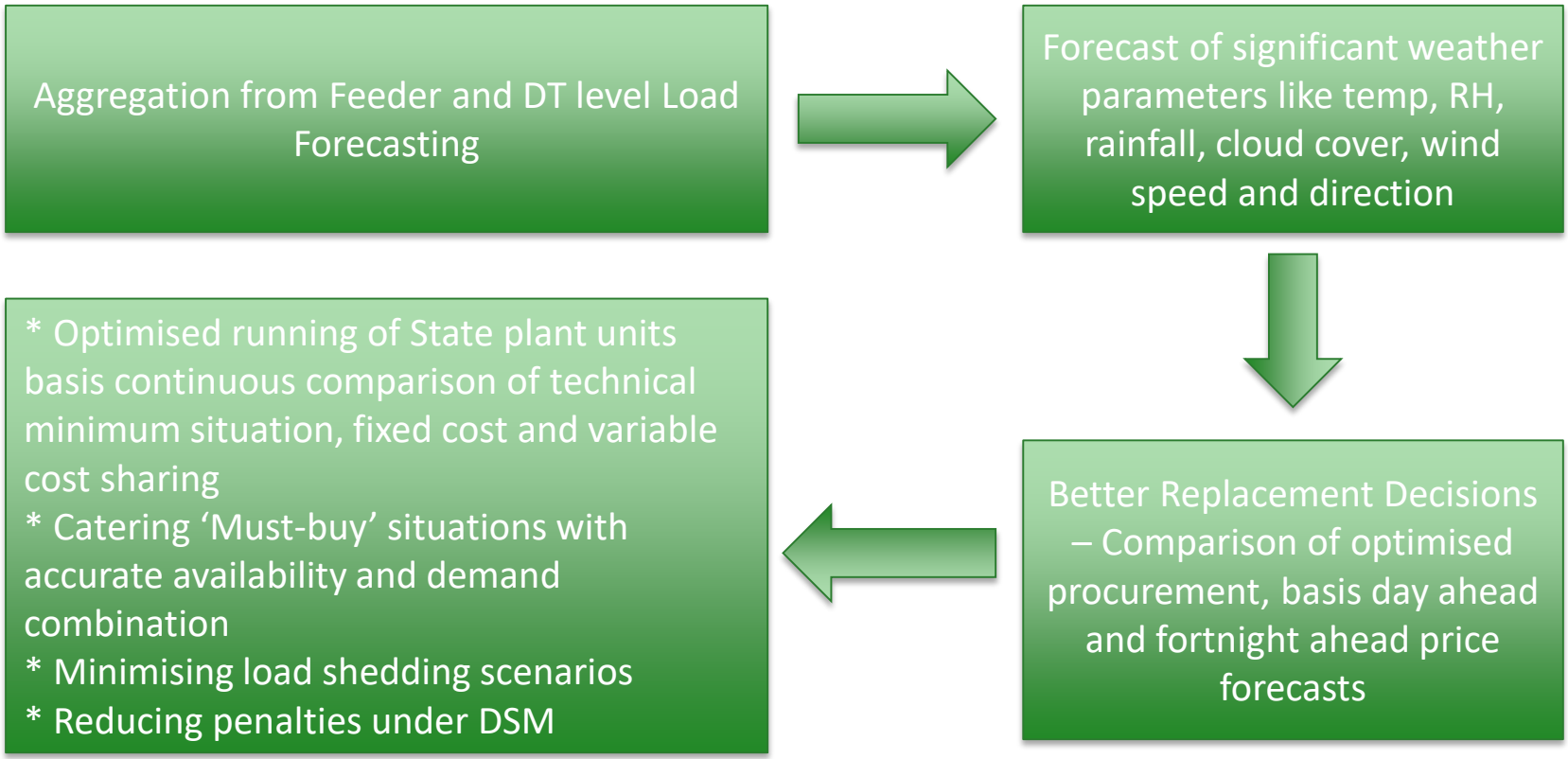
* Intra Day arrangement may be possible with 4-5 hours ahead demand forecast.

*Automated calling/recalling of available URS power, in response to change in demand.

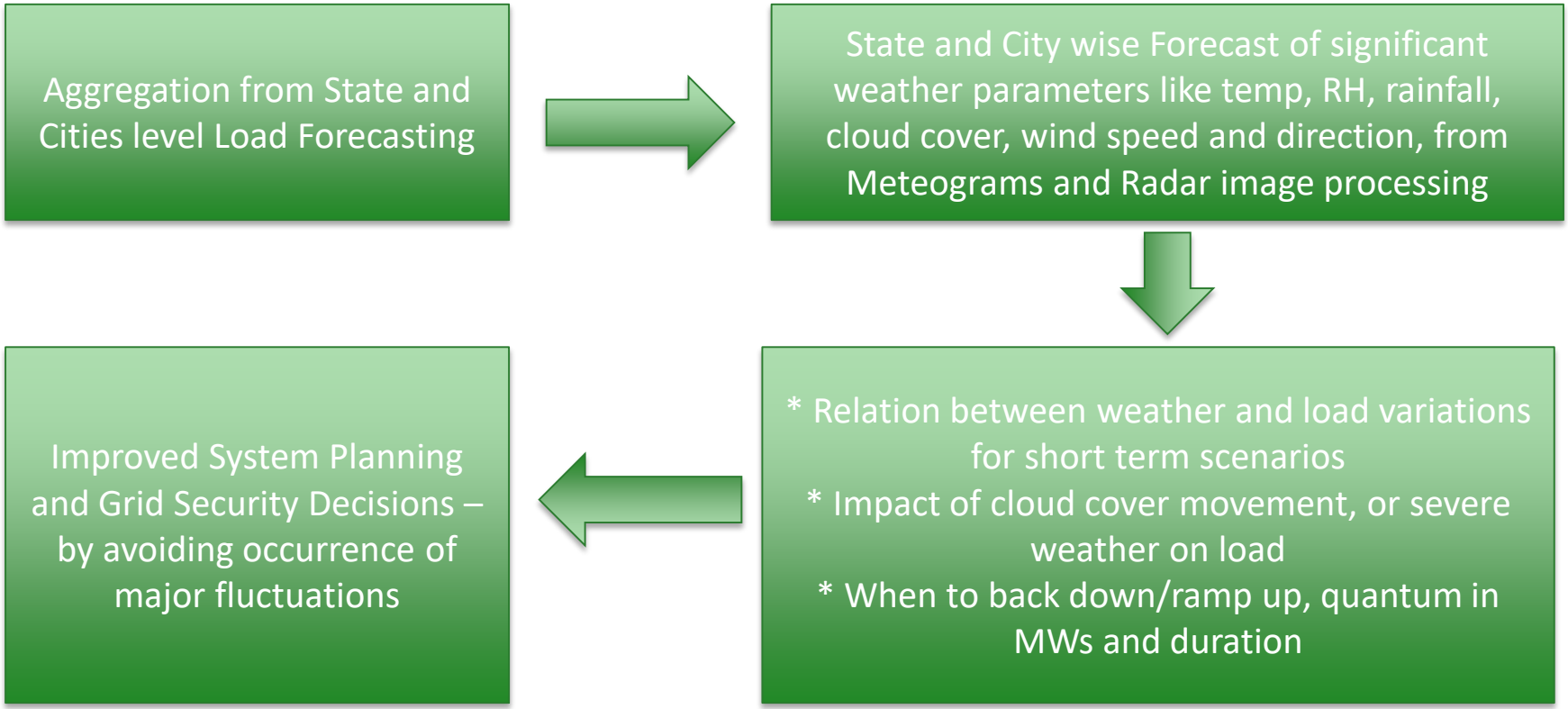
*Requires accurate day ahead & intra day weather forecasts and correlation with load.

*A robust automated system for schedule implementation, may reduce implementation time from 6 time blocks to 1 time block or even less.

ACCURATE INTRA DAY LOAD MANAGEMENT SOLUTION FOR DISCOMS



ACCURATE INTRA DAY LOAD MANAGEMENT SOLUTION FOR REGIONAL SYSTEM OPERATORS



AN ARBITRARY USE CASE OF ZERO LOAD SHEDDING SOFTWARE

Forecasted Utility Load = 1000 MW
Intra Day load forecast 2 hours in advance = 1200 MW
Automated systems to identify basis MoD, which capacities can be ramped up
Only 100 MW state generation ramp up possible
Balance 100 MW cannot be overdrawn from grid due to 12% OD constraint

Without Zero Load Shed Software	With Automated Zero Load Shed Software
1. If its service obligation, then forced overdrawal, outruling DSM constraints 2. Resort to load shedding	1. Intra day management in advance of 4-5 hours 2. Ramp up generation in advance of 3 hours 3. Weather forecast can send alert in advance to plan severe situation 4. 10-minutely load forecast curve for next 96 time blocks on rolling basis – keep an eye on zigzags 5. Optimum utilisation of available URS power 6. Use of intra day trading instruments 7. Cater balance 100 MW demand rise, even 1 time block in advance 8. Minimising load shed chances to almost 0.

ASSISTING POWER EXCHANGE BIDDING

- Replacement Decisions – Comparison of optimised procurement, basis day ahead and fortnight ahead price forecasts
- Optimised running of State plant units basis continuous comparison of technical minimum situation, fixed cost and variable cost sharing
- Catering ‘Must-buy’ situations with accurate availability and demand combination
- Minimising load shedding scenarios
- Reducing penalties under DSM

Predictive Simulations Across Entire BSES Network in Delhi and Mumbai

- Real time SCADA system or SLDC data integration for further more accurate forecasts at 66 KV feeders which can be used for effective short term portfolio planning and management
- SCADA integrated forecasting solutions at 11 KV Distribution Transformers and upto consumer level
- Input energy forecast for accurate transmission planning and annual operations plan (AOP) for utility

ADDITIONAL CAPABILITIES

- Handling and analysing large volumes of data
- State of the Art approaches to normalise and synchronise data gaps/mismatches from different sources
- Expertise in cutting edge software for Big Data Analysis and Machine Learning
- Proactive, hands-on engagement with SLDC, DTL etc., to assist team BRPL in benchmarking a legitimate database for load, thus minimizing billing inefficiency
- Agile and flexible team, based in New Delhi, thus reducing reaction time, catalysing responsiveness and navigation

THANK YOU

www.climate-connect.com

CLIMATE CONNECT

SAMAST

SCHEDULING (S)
ACCOUNTING(A)
METERING(M)
AND (A)
SETTLEMENT OF (S)
TRANSACTIONS (T)

IN ELECTRCITY

SAMAST

- The **integrity, probity and timeliness of the energy accounting and settlement system** is indispensable for the viability, financial stability and sustainability of Power sector.

- The Central Government recognized the benefits of ABT and the following was stipulated in the National Electricity Policy notified on 12.2.2005.
- Quote
- "5.7.1(b) The ABT regime introduced by CERC at the national level has had a positive impact. It has also enabled a credible settlement mechanism for intra-day power transfers from licensees with surpluses to licensees experiencing deficits. **SERCs are advised to introduce the ABT regime at the State level within one year.**"
- Unquote

SAMAST

- scheduling and settlement system are critical for success of the electricity market.
- **Total number of interface points at the intra State level are 23301 while the number of Interface Energy Meters is 22406.**
- It may be seen that the placement of Interface energy meters in several States is inadequate.
- Roughly only **30% of the Interface Energy Meters in the country are read through AMR system.**

SAMAST

- The **intra state deviation settlement system** for all the intra-state entities within a State/UT has been introduced only in six (6) States viz. Delhi, Maharashtra, Gujarat, Madhya Pradesh, West Bengal and Chattisgarh.

- The States of Andhra Pradesh, Haryana, Karnataka, Kerala, Odisha, Meghalaya, Punjab, Rajasthan, Telangana, Uttarakhand and Uttar Pradesh have implemented **deviation settlement system only for IPPs selling power to the discoms under open access** in the respective States.

PSDF Funding

SMART TRANSMISSION OPERATION MANAGEMENT SYSTEM (STOMS)

- Complete automation of ABT related workflows in LDC for Scheduling with self service web portal access for all beneficiaries such as DISCOMs, Generators.
-
- Beneficiaries can view their schedules on line and make revisions on real time.
- Automated collection of meter data (AMR), validation and generation of accounting statement.
- Open access customer shall be enabled with self service web portal where they can make requests, pay approval charges etc where by reducing the work load on SLDC related to OA data entry and approval.

Suggested action plan for SLDCs/STUs in NER

- Identification of Intra State Entities
- Demarcation of Interface boundary for each Intra State Entity
- Assessment of Meters – Main, Check and Standby

These activities can be started immediately.

Suggested action plan for SLDCs/STUs in NER

- Assessment of Automatic Meter Reading requirement
- Assessment of IT infrastructure (Hardware and Software)
- Preparation of Bill of Quantities
- Preparation of **Detailed Project Report**
- **Submission of application for funding from PSDF**