सत्यमेव जयते

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
उत्तर क्षेत्रीय विद्युत समिति
Northern Regional Power Committee

No: NRPC/OPR/106/01/2018/11234-11275 **Dated: 01.10.2018**

विषय: - उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 151 वीं बैठक का कार्यवृत।
Minutes of 151st OCC meeting of NRPC.

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 151 वीं बैठक 13.09.2018 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट http://www.nrpc.gov.in पर उपलब्ध है। यदि कार्यवृत पर कोई टिप्पणी हो तो कार्यवृत जारी करने के एक सप्ताह के अन्दर दे सकते हैं I

151st meeting of the Operation Co-ordination Sub-Committee of NRPC was held on 13.09.2018. The Minutes of this meeting have been up-loaded on the NRPC web-site http://www.nrpc.gov.in. Any comments on the minutes may kindly be submitted within a week of issuance of the minutes.

-sd-

(उपेन्द्र कुमार)
अधीक्षण अभियंता(प्रचालन)

संलग्न: उपर्यक्त / Enclosures : As above.

सेवा में,
प्रचालन समन्वय उप-समिति के सभी सदस्य

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Minutes of the 151st Meeting of the Operation Coordination Sub-Committee (OCC) of NRPC held on 13.9.2018 at NRPC Secretariat, New Delhi.

151st meeting of OCC of NRPC was held on 13.9.2018 at NRPC Secretariat, New Delhi. The list of participants of the meeting is attached at **Annexure-A**

MS, NRPC welcomed all the members of the sub-committee to the 151st OCC meeting. He introduced the sub-committee with Sh. R. P. Pradhan, SE (C), who has joined NRPC Secretariat in place of Sh. Hemant Kumar Pandey on his transfer to CEA. He put on record the valuable contribution of Sh. Hemant Kumar Pandey to NRPC during his tenure at NRPC Secretariat.

On the operational aspect of the grid, MS, NRPC stated the following:

- The unstable operation of HVDC Champa- Kurukshetra is a big concern for ensuring the stability of the grid. In a meeting held at Kurukshetra for discussing the issue of unstable operation of HVDC, it was informed by POWERGRID that Reduced Voltage Mode Operation (RVMO) of the HVDC was not feasible for longer duration. However, it was observed that Pole-1 was operating in RVMO for 99.82% of duration in July, 2018 and 83.57% of duration during August, 2018. Similarly, Pole-2 operated in RVMO for 58.82% during August 2018. RVMO mode operation not only reduces the life of the valves but also reduces the power transfer capability of the pole. During the peak demand period, when NR import from WR is at peak, RVMO mode operation for such a long duration of time is a big concern for the grid.
- Commutation failures were also observed in the HVDC Champa-Kurukshetra due to outage of nearby ac transmission lines (Mandola- Wazirabad SW and Bhiwani – Jhatikara). POWERGRID in a reply has submitted the reason "*Delay in generation of inhibit dc line fault protection signal at Kurukshetra caused dc line fault protection at Champa & tripping of bipole*". Outage of bipole due to outage of nearby ac transmission lines is a very serious issue and the reason for the same needs to be examined and such situations may be avoided in future. It shall be ascertained whether it was a software issue because of which there was a delay in generation of inhibit dc line fault protection signal.
- BTPS will be shutdown from 15.10.2018 and therefore, Tughlaqabad substation needs to be commissioned well before closure of BTPS. PGCIL was requested to intimate the status of commissioning of substation. DTL was also requested to inform about the downstream 220 kV & 66 kV network which will be commissioned by DTL.
- Rajasthan is a renewable rich state in NR. Recently, it encountered a situation under which due to outage of 3 out of 4 ICT's at Akal substation, there was a loss of wind generation during the high wind season. Fire incident was reported as a cause for tripping of the ICT's. Rajasthan was requested to submit a detailed report about the incident. There was a need of devising guidelines for avoiding renewable energy loss which is a zero fuel power.
- As per the CEA standards, the ramp rate of thermal units is to be 3%/min, however, it was reported by NLDC that most of the RRAS provider was not able to meet even 1%/min ramp rate. Only few of the NTPC stations were able to provide a ramp rate of around 2%/min.

Even though Bawana CCGT is a very important generating station for Delhi, it has come to the knowledge that black start facility is not available at Bawana. This issue may be discussed separately about what can be done to modify the system to have the blackstart facility. OEM shall also be approached to ascertain whether they can support in having blackstart capability at CCGT Bawana.

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PART-A: NRPC

PART-B: NRLDC

PART-A: NRPC

1. Confirmation of Minutes:

1.1. Minutes of the 150th OCC meeting held on 21.08.2018 at New Delhi were issued vide letter of even number dated 31.08.2018.

1.2. NTPC requested to amend point No. 30.5 at para 5 which was recorded as:
"*NTPC representative stated that at present 0.9 APM Gas is available & O. S APM have been tied up with WR for running Auraiya.*" **to be replaced with**

"*NTPC representative stated that at present 0.09 MMSCM Domestic Gas is available & O. 5 Domestic Gas has been tied up with WR for running Auraiya.*"

1.3. DTL requested to incorporate the following in item No. 6.2 after para 4:

DTL representative informed that there are some locations where the space for providing reactors are not available in the grids. The same has been discussed in the 40th meeting of standing Committee on power system planning of Northern Region in Central Electricity Authority and after deliberations it was agreed that following reactors to be implemented by DTL

S. No.	***S/stn.***	***Voltage (kV)***	***Rating***
1.	*Mundka*	*400*	*125*
2.	*Bamnauli*	*220*	*2x25*
3.	*Indraprastha*	*220*	*2x25*
4.	*Harsh Vihar*	*220*	*2x50*
5.	*Electric Lane*	*220*	*1x50*
6.	*Mundka*	*220*	*25*
7.	*Peeragarhi*	*220*	*1x50*

Further DTL has also decided that in future wherever new 220 kV substations will be commissioned and in feeds are envisaged through 220 kV cables, 2 nos. 25 MVAr reactors should be considered in the scheme.

The NTPC plant at BTPS may be examined at CEA/NTPC level for its utilization for VAr management in NCR."

Sub–Committee confirmed the minutes of the 150th OCC meeting by incorporating the above amendments suggested by NTPC and DTL.

2. Review of Grid operations of August 2018

2.1. Anticipated vis-à-vis Actual Power Supply Position (Provisional) August 2018.

2.1.1. Sub-Committee was informed that there was more than 5.0% variation in the Anticipated vis-à-vis Actual Power Supply Position (Provisional) during the month of August, 2018 in terms of Peak demand for Chandigarh, Delhi & Haryana and in terms of Energy requirement for Uttarakhand.

Delhi:

Decline in anticipated demand from 6540 MW to 5937 MW in actual during August, 2018 was due to change in weather conditions in the second fortnight of the month.

Haryana:

Decline in anticipated demand from 10426 MW to 9415 MW in actual during August, 2018, due to heavy rain in the state and subsequent decreased demand for paddy harvesting.

Uttarakhand:

Decline in anticipated demand from 1260 MUs to 1177 MUs in actual during August, 2018, due to monsoon in the State.

The Sub-Committee requested all SLDCs to furnish the provisional and final power supply position in prescribed formats by 2nd and 15th day of the month respectively in compliance to the provision 5.3 of IEGC.

2.2. Power Supply Position for NCR:

2.2.1. The Sub-Committee was informed that the NCR Planning Board (NCRPB) is closely monitoring the power supply position of National Capital Region. Monthly power supply position for NCR till the month of July, 2018 is placed on NRPC website (www.nrpc.gov.in).

2.3. The highlights of grid operation during August, 2018 are as follows: -

Frequency remained within the IEGC band for 80.37% of the time during August, 2018, which is more than that of last year during same month when frequency (within IEGC band) remained 77% of the time. The maximum and minimum frequencies recorded were 50.18 Hz (01.08.2018 at 13:00 Hrs) and 49.64 Hz (09.08.2018 at 19:10 Hrs) respectively.

Utilities were requested to take necessary action to further improve the frequency regime viz. by not changing abruptly the loads at block boundaries and assuring primary response from the generators.

Maximum and minimum load for the region during August 2018 were 59,172 MW (21.08.2018 at 22:25 Hrs) and 42,939 MW (15.08.2018 at 17:25 hrs).

The average consumption, of the Northern Region, for August, 2018, increased by 5.39% (63 MU per day) with respect to the corresponding month in previous year. The reason for the same attributed to the increased temperature in the month of August and load growth.

The average thermal generation in August, 2018 showed an increase of 0.45% (3 MU/day) with respect to the corresponding month in previous year. The details are enclosed at **Annexure 2 (A).**

The average Hydro generation in August 2018 decreased by 22 MU/day with respect to the corresponding month in previous year. The reason for low hydro generation was less water availability on account of less snowfall.

The average Renewable generation in August, 2018 increased by 27.02 MU/Day with respect to the corresponding month in previous year. All utilities were requested to send the data for renewable generation regularly. The reason for the increase was highlighted as capacity addition, better sunshine & wind. Also, it was added that the telemetry of renewable had improved.

The average nuclear generation in August, 2018 was decreased by 4.05 MU/day per day as compared to corresponding month in previous year.

The net average Inter-Regional, import showed an increase of 66.03 MU/day during the month of August, 2018 as compared to the corresponding month in previous year.

The net average Import from WR showed an increase of 53.62 MU/day during August, 2018 as compared to corresponding month in previous year.

The net average import from ER increased by approximately 8.67 MU/day during August, 2018 as compared to corresponding month in previous year.

Net average import from NER was 15.70 MU/day during August, 2018.

The major reasons for increase in the import, from other regions were the decreased hydro generation and the enhanced demand in power on account of the weather conditions.

The transmission losses are depicted at **Annexure-2 (B)**

The STOA summary for August 2018 is placed at **Annexure-2 (C)**

Long outages of transmission lines were discussed and all constituents were requested to revive the elements under long outages at the earliest **(Annexure-2 (E)).**

The new elements charged were discussed and the list is attached at **Annexure -2 (F).**

Total outages during August 2018 were 540 including planned S/D (197) and forced S/D (Trippings-197+Emergency S/D-146).

3. Maintenance Programme of Generating Units and Transmission Lines

3.1. Maintenance Programme for Generating Units.

3.1.1. The maintenance programme for Generating Units for the month of October, 2018 was discussed on 14.09.2018 at NRPC Secretariat, New Delhi. The approved outages of generating units as per deliberations held in OCC has been issued vide letter of even no dated 24.9.2018.

3.2. Outage Programme for Transmission Elements.

3.2.1. The Outage programme of transmission elements for the month of October, 2018 was discussed on 14.9.2018 at NRPC Secretariat, New Delhi. The approved outages of transmission elements as per deliberations in OCC has been issued vide letter of even no dated 24 .9.2018.

4. Planning of Grid Operation

4.1. Anticipated Power Supply Position in Northern Region during October, 2018 as per LGBR for 2018-19:

Anticipated Power Supply Position in Northern Region during October, 2018 was discussed and updated and the same is attached at **Annexure 4**.

5. Information about variable charges of all the generating units in the Region

5.1. Sub-Committee was informed that the information of variable charges for different generating units is available on http://meritindia.in/, a Merit Order Portal. All utilities were requested to ensure that the process of scheduling is to be done as per Merit Order Dispatch and in case of variations the same should be informed along with the reasons for the same**.**

6. Reactive compensation at 220 kV/400kV level

6.1. In the 38th TCC & 41st NRPC following elements in NR were approved:

a) TCR of capacity 500 MVAr at Kurukshetra 400 kV bus.

b) Bus Reactors at 30 no. 220 kV sub-stations and 18 no 400 kV level sub-stations subject to the availability of space.

6.2. <u>Status:</u>

POWERGRID:

Representative of POWERGRID had earlier informed that bids for 500 MVAr TCR at Kurukshetra have been opened and was under Technical evaluation and the LOA is expected to be placed by **October 2018** with commissioning schedule of 2 years from the issue of LOA.

Regarding the 125 MVAr reactor being installed at Kurukshetra to compensate for the prevailing High voltage conditions until the TCR gets commissioned it was informed by POWERGRID that the reactor was ready for charging and would be charged within **two days**.

About the installation of the reactors at 400 kV ISTS substations which as per the Gazette Notification dated 08.05.2018 is to be done through TBCB route, POWERGRID representative was requested to update the progress of the same from CTU.

DTL:

DTL has informed that as submitted to SCPSPNR held on 22.06.2018 and agreed, DTL will implement 7 fixed reactors, six 25 MVAR, 220 kV reactors at Mundka, Harsh Vihar, Peeragarhi, Electric lane, Bamnauli, Indraprastha substation and one 125 MVAR, 400 kV reactor at Mundka substation. DTL has submitted that these reactors shall be commissioned by **December 2020**. Out of the above, scheme for five reactors at 220 kV level are under approval.

DTL representative informed that order for the above 7 (Six 25 MVAR and one 125 MVAR) reactors is expected to be placed by **December 2018**.

PSTCL:

Tender for 400 kV level reactor at Dhuri substation has been opened (technical bid) and is in the evaluation stage. Price bid is likely to be opened within a month. As regards 220 kV level reactors to be commissioned at Dhuri and Nakodar substation, tender has been opened on 15-06-2018 (technical bid) & is under evaluation. DPR for installation of 400 kV & 220 kV reactors has been submitted for PSDF funding.

It was informed that there were certain observations of TESG of PSDF to which the clarifications have been reverted on 07.09.2018.

Uttarakhand:

PTCUL representative informed that for 125 MVAR reactors at Kashipur retendering is being done. The last of submission of the Bid is extended to 15.09.2018. 80 MVAR

reactor at Srinagar has been received at site and shall be commissioned by 30.09.2018.

Rajasthan:

148th OCC meeting & 149th OCC meeting:

525 MVAR (450 MVAR + 75 MVAR) has been approved by WTD of RVPN and being proposed for PSDF funding. 3x25 MVAR (at 220 kV level) reactors one each at Suratgarh, Akal & Bikaner are to be funded by PSDF. As per the PSDF requirement, the DPR along with formats has been re-submitted to PSDF.

The reactive elements as per discussion in Techno-economic group of PSDF have been examined again through complete power system study. The study recommends size, rating & location suitable for providing reactive elements (Shunt reactors & STATCOMS) across various voltage levels i.e. 400 kV & 220 kV as per various level of " Renewable Energy Integration – Reactive Compensation Elements/ Equipments for Reactive Power Management and Voltage Control for Transmission Grid under Smart Transmission Network and Asset Management System''. Therefore, DPR has been submitted for consideration & approval of standing committee / CEA vide letter dated 18.06.2018 (letter enclosed at Annexure 6B of the minutes of the 148th OCC meeting)

MS, NRPC asked Rajasthan to submit their plan for installation of reactors as per the decision of the SCPSPNR meeting and subsequent approval of NRPC. The above reactor finalized based on the plan are exclusive of the reactor plan study done by Power grid, also needs to be clarified. The updated information received from Rajasthan is placed at Annexure 6C of the minutes of the 148th OCC meeting.

MS, NRPC requested Rajasthan representative to clarify the issue of installation of the reactors. He added that non installation of reactors will lead to high voltage of the system due to which lines have to be opened compromising reliability of the system. He added that 450 MVAR agreed in the standing committee should have been got installed even if the locations had changed. MS NRPC requested Rajasthan representative to take up the new proposal in the next standing committee meeting but the reactors already agreed and approved in NRPC meeting should be commissioned at the earliest. The Sub–Committee decided to write letter to Rajasthan for expediting commissioning of 25 MVAR Reactors at Suratgarh, Akal & Bikaner each.

150th OCC meeting:

Rajasthan representative stated that the clarifications sought by PSDF in respect of revised DPR for 3x25 MVAR (at 220 kV level) reactors one each at Suratgarh, Akal & Bikaner was submitted to PSDF on 28.07.2018.

Rajasthan representative was requested to give the detailed status of 150 MVAR (25 MVAR at Barmer S/s and 125 MVAR at Jodhpur S/s) in writing regarding the installation of reactors as per the decision of the 39th SCPSPNR meeting and subsequent approval of NRPC.

151st OCC meeting

Representative of Rajasthan stated that DPR for 3 Nos. each of 25 MVAR reactor (Akal, Bikaner & Suratgarh) i.e total 75 MVAR reactors has been submitted for PSDF funding on 27.04.2018. Further the reply of observations raised by NLDC has been submitted on 28.07.2018. The installation process of these 3 reactors shall be started on receipt of approval by PSDF. He further told that STU has been advised vide letter

dtd. 27.08.2018 to study and send the DPR of already approved 450 MVAR (13*25+1*125MVAR) reactors for PSDF funding even if location had changed.

Regarding status of 150MVAR (25 MVAR at Barmer and 125MVAR at Jodhpur), it is to submit that reactors at these locations are already included in proposal of 450MVAR reactors of Rajasthan, approved in the 39th SCPSPNR.

7. System Study for Capacitor Requirement in NR for the year 2019-20

7.1 **38th TCC & 41st NRPC meeting**: NRPC approved that the capacitor requirement study of NR shall be conducted at 11/33 kV level from CPRI so as to obtain the true requirement of capacitor for FY 2018-19.

Techno Commercial revised offer submitted by CPRI for System studies for assessment of capacitor requirements in Northern region for year 2019-20 for a peak and off peak load condition was enclosed at Annexure-VII of the Agenda of the 147th OCC meeting.

7.2 In the 147th OCC meeting MS, NRPC informed the Sub-Committee that CPRI has given a final (negotiated) Techno Commercial offer of Rs. 32 lakhs (Rs. 20 lakhs for previous study and Rs. 12 lakhs for additional assignment) excluding taxes. The approval of NRPC for the cost of the system study was obtained in the 39th TCC and 42nd NRPC held on 27.06.2018 and 28.06.2018.

7.3 **149th OCC meeting:** In the meeting members were informed about the methodology proposed by CPRI for conducting the study *(*Annexure-7 attached with the MOM of the 149th OCC meeting.*)* which provided with three options. Of the three options, members agreed to go with the third option of **working separately for each state utility(s) for its peak loading time & date to figure out the capacitor requirement for the state**. After having obtained the capacitor requirement for each state individually, the study will be carried out for the complete region so as to reduce the reactive power flow on ISTS lines (considering the capacitors which have been identified for each state).

All the utilities were advised to submit the data for their States in the prescribed format corresponding to date they have met peak requirement for their States. Utilities were requested to submit the data within a month so as to complete the study in time.

In case of any clarification at the time of data collection utilities were advised to directly contact Dr. Manohar Singh, CPRI (manoharsingh@cpri.in, +91-96329 40855).

7.4 **150th OCC meeting**: All the utilities expressed concern on the nature of the format. It was observed in general by all constituents that the format is very lengthy & will require some time for understanding the same and providing data accordingly.

MS, NRPC proposed that all utilities should highlight the problems being faced by them by the second week of September & thereafter a separate meeting will be held with CPRI representative for better understanding of the format and to resolve the issues**.**

7.5 **151st OCC meeting:** Representative of CPRI made a detailed presentation explaining the format in the meeting and based on the inputs received from the members, the format has been revised and has already been sent to the respective SLDC's through e-mail dated 24.09.2018. CPRI has also shared a video of the presentation explaining the format which can be viewed on Youtube at https://youtu.be/QTXx7owPF3g.

It was also requested to initially fill the data format for any one 220 kV or 132 kV substation and send it to CPRI (manoharsingh@cpri.in) to check its suitability for utilization in carrying out the study and further action.

8. Phase nomenclature mismatch issue with BBMB and interconnected stations

8.1 The action plan proposed by BBMB was duly deliberated in the first meeting held on 04.06.18. BBMB was advised to submit the detailed breakup of the work activity wise along with the team of officers responsible for execution location wise. The note submitted by BBMB was enclosed at Annexure 8 of the Agenda of the 148th OCC meeting. Further BBMB was directed to get the action plan approved in their Power Sub –Committee meeting as well as the Board meeting so that concern of all partner States is addressed. If required any clarification representative from NRPC/NRLDC/CTU may be invited by BBMB during their meeting of power Sub-Committee.

8.2 BBMB representative stated that they have submitted the proposed action plan to their partner States for early comments and assessment. The execution is tentatively planned during month of November –December, 2018.

8.3 In 149th OCC meeting all stakeholders were requested to kindly submit their comments on the proposed action plan at the earliest so that the outages for the lean period can be planned. The comments has been received from NTPC, PSTCL & POWERGRID (placed at Annexure 8 of the MOM of the 149th OCC meeting).

8.4 **150th OCC meeting:** BBMB representative stated that the clarifications on the comments received from POWERGRID has been issued (Annexure 8 of the Agenda of the 151st OCC meeting**).** POWERGRID representative assured that the issues raised by BBMB will be resolved by them at the earliest**.**

8.5 Comments from HPSEB have also been received and the action plan proposed by BBMB is agreeable to.

8.6 **151st OCC meeting**: MS NRPC, requested the BBMB representative present to resolve the issue and expedite the work of correction as per the action plan. He highlighted that as regard HPSEBL, Punjab& NTPC there were no clarification required as they had agreed to the action plan proposed. He added that POWERGRID was required to reply on the clarifications highlighted by them in the Annexure 8. POWERGRID representative stated that two regions NR 1 & NR 2 were involved for their stations at Panipat, Bhiwani, Panckula & Rajpura. MS, NRPC requested POWERGRID to resolve the issue expeditiously so that the correction could be done by BBMB in the upcoming off peak period. On deliberations it was decided that a letter to Executive director of NR 1`& 2 would be written by the NRPC Secretariat so that the issue can be resolved and BBMB can take further necessary action to get the approval from their Power Sub Committee for executing the work.

9. Follow up of issues from previous OCC Meetings – Status update

The detail of the updated status of Agenda items is enclosed at **Annexure 9.**

10. Status of FGD installation vis-à-vis installation plan at identified TPS.

10.1 The list of FGDs to be installed as finalized in the 36th TCC (Special) meeting held on 14.09.2017 was enclosed as Annexure 13 with the Agenda of the 144th OCC meeting. All SLDCs are regularly being requested since 144th OCC meeting to take up with the concerned generators where FGDs is to be installed and submit the progress of FGD installation on monthly basis regularly to NRPC in the available on the NRPC website.
This being a regular agenda item since 144th OCC, comments/deliberations on the issue are recorded in the respective OCCM.

10.2 **151st OCC meeting:** MS NRPC stated that in the meeting CEA held a meeting with generators on 28.08.2018 in which CE, TR&M, CEA informed that the FGD installation deadlines have been advanced for stations falling in NCR and also for the stations above 500 MW capacity or in stations located in the area having population density more than 400 persons per square km or are in critically polluted area. He further added that many IPPs like NPL are waiting for guidelines from the SERCs regarding the FGD installation cost adjustment. In this regard, he briefed the sub-committee that Ministry is concerned about the issue and a policy decision is being made about the cost to be adjusted duly and CERC is being directed in this regard to pass an order to the SERCs. He asked all the generators to seriously make efforts to meet the deadline of installation of FGD.

Updated status of progress of FGD installation is enclosed at **ANNEXURE-10.**
All constituents were requested to update the desired information in soft copy in excel format on a regular basis. He also added that all the utilities (except PSPCL) should give the contact details of the officer who is concerned with FGD installation so that the information can be expeditiously collected directly from him/her. All SLDCs were again requested to coordinate and submit the information.

PSPCL submitted the contact details of the officer concerned with FGD installation. Randhir Singh Bains, Dy. CE/GGSSTP, Ropar- M. 9646117711

11. LVRT compliance by wind generators.

11.1 As per the CERC order dated 05.01.2016 issued in Petition No. 420/MP/2014, CERC has directed that LVRT should be implemented in all wind turbines (except Stall Types) commissioned before 15.04.2014 having installed capacity equal to or more than 500 KW. Further, as per the CEA Technical Standard for connectivity to the Grid (Amend.) Reg.2013 (sub clause (3) of Clause B 2) of the station connected to the grid 06 months after publication of these regulations (i.e.15.04.2014) should have the LVRT capability as depicted in the sub-clause.

As LVRT are not installed in many of the wind turbines in State of Rajasthan, the issue is being regularly raised in the various meetings of NRPC so far without any result.

38th TCC/41st NRPC meeting: LVRT compliance was a pre-requisite according to CEA connectivity standards and these wind generators should not have been provided the connectivity in the first place itself. NRPC directed Rajasthan to issue a notice to all the LVRT non-compliant wind generators specifying a time period within which they need to get the LVRT compliance beyond which they would be constrained to deny scheduling to these generators. NRPC also advised other States to ensure compliance to the CEA connectivity standards and to not allow in future, connectivity to any LVRT non-compliant wind generators.

11.2 **145th OCC meeting:** RRVPNL submitted the letter from the Ministry of New & Renewable Energy in this regard in which the following is stated regarding LVRT compliance:

"*A Concerned WTG manufactures may apply for LVRT testing to any internationally accredited testing body or NTWE by 15.3.2018, which should include the following:*

i An affidavit that the manufacturer would comply with CEA Technical standards for connectivity to the grid.

ii A bank guarantee of Rs 1 crore per model, which would be returned on producing the compliance certificate for LVRT and other technical standards as stipulated by CEA."

147th OCC meeting: MS, NRPC stated that all the wind generators shall be LVRT complaint for which retro fitment needs to be done & it shall be responsibility of Rajasthan SLDC to get it enforced. Rajasthan should comply with the decision of 38th TCC/41st NRPC meeting & write letters to wind generators communicating the decision of NRPC.

11.3 **148th OCC meeting:** MS, NRPC apprised the Committee that the above reference order facilitates WTG manufactures to obtain statement of compliance/confirmation standard for demonstrating the compliance to applicable CEA Technical standards for connecting to the Grid for their WTG models which were unable to get LVRT compliance certificate from accredited testing agencies. He further stated that the time period for applying for LVRT testing to any internationally accredited testing body or NIWE stands expired on 15.3.2018. He added that notice should be issued to all Wind generators who have not done the needful. Rajasthan SLDC representative has intimated the same has been issued (Copy of the letter was placed at Annexure 11 of the MoM of the 148th OCC meeting).

MS, NRPC added that as per 38th TCC and 41st NRPC decision, SLDC should not schedule the wind generators which are not LVRT complaint. Also he added that due to LVRT non compliance on part of the wind generators has lead to a near voltage collapse instances but luckily the grid survived. NRLDC representative also added that the compliance of the wind generators is mandatory for the safety of the grid as 2-3 incidents have already occurred in the grid which could have resulted in the catastrophe.

11.4 **149th OCC meeting:**

Rajasthan representative intimated that a meeting of wind turbine manufacturers was held on 05.07.2018 to sort out the issue of LVRT and to get its compliance

expeditiously. Further, the assessment of manufacturer wise non complied WTG has been identified and enclosed at Annex- XI of the MOM of the 149th OCC meeting. He informed the Sub-Committee that 638 generators are LVRT complaint & 106 do not require as per regulation. He further added that 2641 generators need to be LVRT complaint. The capacity of generators that are non – complaint is 3019 MW. He also informed that the cost of installing LVRT was 25-40 lakh per generator for which the generators will have to make arrangements. MS, NRPC stated that the cheaper solutions are available and they should be explored cost needs to be reviewed

MS NRPC requested that Rajasthan should submit these details to their SERC. He informed additionally that the wind generators had requested for scheduling of power till they review the time line for getting work done.

Rajasthan representative also informed that the next meeting with WTG manufacturers is scheduled for 23.7.2108 for further deliberating the actions in this regard.

Director, GM division, CEA representative added that LVRT compliance is mandatory as per connectivity regulation requirement of CEA. He added that a single LVRT solution can be used on the plant which will be cheaper.

11.5 150th OCC meeting:

Rajasthan representative intimated that in line with the discussions in the last OCC meeting the WTG manufacturers in the meeting on 23.07.2018 has been advised to review the possibility of having a single LVRT for a plant. MS, NRPC requested that the MOM of the meeting may be shared so that the progress in this regard can be monitored.

11.6 151st OCC meeting:

The MOM of the meeting held on 23.7.2018 stands shared (Annexure 11 of the Agenda of the 151st OCC meeting).

MS NRPC briefed the forum that M/S Suzlon and Inox have filed a petition for waiver of installation of LVRT on account of the additional cost involved.

RRVPNL representative intimated that the next meeting with the WTG manufacturers is scheduled for 05.10.2018.

12. System Protection Scheme (SPS) in NR

12.1 Revised System Protection Scheme (SPS) for 765 kV Agra-Gwalior line:

In the **37th TCC and 40th NRPC meeting** recommended for convening a separate meeting comprising members from NRLDC, NRPC Secretariat and POWERGRID for reviewing revised logic of the scheme presented by POWERGRID in 140th OCC meeting. A meeting for reviewing the logic of the scheme was held on 07th November 2017 and scheme was revised and finalized.

Since OPGW has now been laid, POWERGRID agreed for utilizing the signals from circuit breaker (CB Open/ CB close) of both the ends for SPS logic so as to negate the chances of mis-operation/ mal-operation of the SPS.

POWERGRID had informed that the circuit breaker (ON/ OFF) signal was being utilized from Agra end in the logic. However, that from Gwalior end was not being

utilized as the purpose of the scheme was being served by utilizing the CB signal from one end.

Representative of NRLDC stated that even if the scheme was functioning properly in normal circumstances there are chances that the scheme may not operate in case of breaker lockout from Agra end and the line getting tripped from Agra end.

NLDC also stressed on utilizing CB signals from both the ends as Agra-Gwalior is an important inter-regional transmission line and its implementation will make the scheme even more reliable.

POWERGRID agreed to implement the logic utilizing the CB signal from both the ends as per the decision of TCC. NRPC had concurred with the deliberations of TCC.

POWERGRID had informed that the work at Agra end was in progress but for the implementation at Gwalior end the issue needs to be taken up and highlighted with WRPC also

147th OCC Meeting:

POWERGRID representative stated that their management has enquired about the recovery of cost that will be incurred on implementation of the scheme. Representative of POWERGRID was informed that a decision regarding the same has already been taken in 129th OCC meeting and thereafter ratified in the 35th TCC and 39th NRPC meeting to book the cost of the implementation of revised SPS in some other ongoing project/work. POWERGRID was advised that the decision of NRPC to be implemented at the earliest as this is an important IR line between NR & WR.

NRLDC informed that average load now prevailing on the feeders approved for SPS might have changed and these feeders might not have remained radial and as such the list of feeders needs to be reviewed.

NRPC Secretariat has written a letter dated 28.5.18 regarding this issue to ED/ NR-III, POWERGRID (was placed at Annexure 12A of the minutes of the 148th OCC meeting). This issue has also been taken up with WRPC for implementation at Gwalior end by deliberating in their OCC/ RPC meetings. A letter in this regard had been written to WRPC & the reply received thereof was placed at Annexure 12A of the minutes of the 148th OCC meeting.

148th OCC Meeting:

POWERGRID representative intimated the Sub-Committee that for implementation of the scheme due coordination with the concerned States was required.

MS, NRPC requested each SLDCs to extend cooperation & provide all required support to Power Grid for early execution of the work.

39th TCC and 42nd NRPC meeting: MS, NRPC informed that there were 2 issues involved which needed to be discussed. One was for the utilization of CB signal from both the ends (Gwalior and Agra) in the logic and the other was for incorporating additional 1000 MW load for load shedding in the already approved scheme.

Regarding the additional 1000 MW load, MS stated that the same has been identified and were now pending at POWERGRID's end for wiring with the logic.

POWERGRID representative informed that the material has been received at the site and for 2 locations viz. Dadri and Bhiwadi the scheme was almost completed. Regarding other locations under the ownership of other utility, POWERGRID

requested to provide the details of nodal officers with whom they may coordinate. He further stated that, once the details of the nodal officers were received, additional load of 1000 MW shall be wired within 02 months (tentatively by end of August 2018).

MS, NRPC assured POWERGRID of all possible support by the utilities and to provide them with the list of nodal officers for each substation location identified for additional load shedding.

Regarding the issue of utilizing CB from both the ends (Gwalior & Agra) in the logic of SPS, MS, NRPC stated that even though the decision was already taken in NRPC/TCC forum, the issue of booking the cost of the scheme was again raised in the OCC forum. To this, Members expressed concerns and stated that once a decision has already been taken at NRPC/TCC forum, the issue shall not be raised again in any sub-committee of NRPC.

MS, NRPC requested POWERGRID to go ahead with the decision of 41st NRPC to utilize the CB signals from both the end in the logic of SPS so as to ensure more robust and reliable operation of the scheme. He further requested POWERGRID to not to cause any further delay in the implementation of the scheme as such delay may lead to some unforeseen catastrophic incident for the grid.

Representative of POWERGRID stated that the changed logic for utilizing CB signal from Gwalior end shall be provided to them so that the same may be incorporated in the SPS logic. Representative of NRLDC informed the committee that the logic had already been provided to POWERGRID and there was no need of again discussing the same. POWERGRID was advised to go ahead as per the decision of NRPC and complete the scheme in time.

149th OCC meeting:

MS NRPC stated that in the last OCC meeting the Name of the nodal officers for coordinating with Power grid was requested which have not been received till date. He added that as per directions of CERC a report has to be submitted within 15 days on the status of implementation of the scheme. Power grid stated that in the last week of July the mock testing can be done.

Further, on it was added by MS, NRPC that representative of CERC should also be called.SE (O) NRPC stated that the actual testing on the revised scheme be planned in the month of November in coordination with WRPC.

150th OCC meeting:

MS, NRPC apprised the Committee that mock testing for the Revised 765 kV Agra-Gwalior SPS is to be carried out after integration of additional 1000 MW load shedding and Hon'ble CERC has been intimated accordingly. He asked POWERGRID to complete the work at the earliest.

Representative of POWERGRID again requested for the Nodal Officers from the states as problems were being faced while working at the substation of state utilities.

It was informed that names of nodal officers have been requested again and again from the states but only U.P. has intimated the coordinator. MS, NRPC further asked representative of the concerned states present in the OCC to be coordinator for resolving any problems encountered by POWERGRID at substations of respective utilities. Accordingly, the following officers were nominated as Nodal officer:

Haryana – Shri. N. K. Makkar, EE, HVPNL
Punjab- Shri. Akshay Garg, ASE, PSTCL
Rajasthan – Shri. Kamal Patidar, EE, Rajasthan (SLDC)
Delhi – Shri. Loveleen Singh, GM, DTL

151st OCC meeting:

POWER GRID representative updated that the work for Delhi, UP & Haryana is completed. He further added that the work at 7 locations in Punjab & 6 locations in Rajasthan is remaining which is targeted to be completed by October 2018.

12.2 SPS for ICTs at 765 kV Unnao sub-station:

144th & 145th OCC meeting: UPRVUNL update: "Offer to incorporate the logic of SPS at Anpara "D" is pending with BHEL. The efforts are underway to get the offer from BHEL. The work is expected to be completed by 31.03.2018. The cost of the logic of SPS at Anpara "D" is to be indemnified by UPPTCL".
150th OCC meeting: It was informed that on continuous pursuance of matter with BHEL, negotiated offer for SPS has been received from BHEL on 16.08.2018 (ANNEXURE 12 of the MOM of the 150th OCC meeting) and the order for the same shall be placed within a week with completion target of September, 2018**.**

The copy of the LOI placed on BHEL is placed at Annexure 12 of the Agenda of the 151st OCC meeting.

151st OCC meeting:

UPRVUNL updated that order has been placed on M/s BHEL vide letter no 310/C&D-VI /DTPP/T-1 dated 20.08.2018.The work is to be completed in around 40days. The cost of the work would be 54.20 lac & UPPTCL has been intimated about the same.

12.3 SPS for Kawai – Kalisindh - Chhabra generation complex:

146th OCC meeting: RRVPNL updated as under:

"The communication scheme is being reviewed on PLCC/Optical fiber in place of earlier GPS scheme as tripping time on GPS scheme was higher. Tender is likely to be floated by 5/2018."

147th OCC meeting: RRVPNL representative intimated that feeder identification has been done & tendering will be done shortly. He added that further communication scheme is being reviewed on PLCC/Optical fiber in place of earlier GPS scheme as tripping time on GPS scheme was higher. Tender is likely to be floated by May-18.

148th OCC meeting: RRVPNL representative intimated that the Technical specification is under preparation & communication link are under review. Tender is likely to be floated in July 2018.MS NRPC expressed concern over inordinate delay & requested RRVPNL to take up the issue with the communication wing expeditiously or else NRPC Secretariat will take up the matter with higher management**.**

149th OCC meeting: RRVPNL representative intimated that the details from the communication wing stand received. & the tender will be floated positively by next month. He explained that the details of the OPGW involved have been accounted for in the details received from the communication wing**.**

150th OCC meeting: RRVPNL representative intimated that the Technical Committee has rejected the proposal on the basis that the reliability of the PLCC system proposed for the load shedding at the time of outage of Kawai-Kalisindh units along with Anta–Phagi line is not present. It was added by the Committee that till March 2019 the OPGW will be laid in the entire network (12000 Kms) & the same can be used for the purpose.

MS NRPC requested RRVPNL to submit the written communication from their STU in this regard.

151st OCC meeting:

RRVPNL representative submitted the written communication from their STU in this regard is enclosed at Annexure 12A. It has been intimated that the Technical specification for implementation of Automatic load shedding scheme under SPS for Kawai Kalisindh generation complex is under process of approval and the whole procedure till award of contract may be completed within 4-5 months and complete implementation of above scheme may take further at least 6-7 months.

12.4 SPS for Lalitpur Generating station

141st OCC meeting: UPPTCL updated as under

The Sub-committee was informed that the scheme has been commissioned at LPGCL end. If any 765 kV Lalitpur-Agra line trips, SPS would operate for their complex. At present the signal at Fatehabad end are not being received. The issue is being looked into, so that work can be completed by 31.12.17.

147th OCC meeting: UPPTCL representative intimated in this regard that the signal is being received from Fatehabad at their end whereas Lalitpur representative intimated that they were not receiving any signal.

MS NRPC proposed that UPSLDC should organize a meeting to resolve the long pending issue and make the SPS operational at the earliest.

148th OCC meeting: UPPTCL representative intimated that as desired in the last OCC a joint meeting has been organized on 6.6.18 with the officers of Lalitpur & Fatehabad. In the meeting it has been agreed that the SPS will be made operational by end of the June 2018.The final agreed scheme as intimated was placed at Annexure 12C of the MOM of the 148th OCC meeting**.**

149th OCC Meeting: UPPTCL representative intimated that the signal from Fatehabad to Lalitpur is not being received presently but the matter will be resolved within a week. The SPS will be commissioned within a week**.**

150th OCC Meeting:

UPPTCL representative stated that the status of the SPS implementation will be sent through SLDC.

151st OCC meeting:

UPPTCL submitted the report regarding the commissioning of SPS (Annexure 12B).

SE (O) stated that in view of the commissioning of the SPS, this item is now closed.

13. Automatic Demand Management System

13.1 147th OCC meeting: All utilities were once again requested to submit update on the action plan & status of implementation of the ADMS in their utility as it is mandatory requirement of IEGC.

Delhi, Haryana, Uttarakhand, & UP (SLDC) representative were requested to take up the matter expeditiously with their distribution companies. SE NPC stated that the problems if any in implementing the same may also be brought to the notice of the sub –committee as it is now 10 years, since the regulations were issued by CERC.

Punjab representative intimated that at SLDC level they were doing remote tripping for 96 locations. He added that the ADMS at 11 kV feeder level is to be implemented by Distribution Company. He added that the Tender specification had finalized and it has been targeted to be complete by 2020. The information was submitted by HP. MS, NRPC requested all SLDCs to plan and get the ADMS implemented soon in their States.

13.2 148th OCC meeting: TDDPL representative stated that the ADMS system is working well in their organization as per the latest regulations since last more than 5 years. He added that the scheme is also working in Rajadhani & Yamuna Power distribution companies.

Punjab SLDC representative stated that 26 locations remote tripping from SLDC has been tested. Around 10 percent of the running load can be disconnected through these locations. The latest status regarding implementation of ADMS by PSPCL is as under:

The matter of engaging a consultant for preparation of DPR of ADMS at balance location is under consideration with the higher authorities and work of ADMS would be implemented within stipulated time.

MS, NRPC stated that the all States should review their system demand and Automatic Demand Management System should be planned and implemented at the earliest for grid security.

13.3 149th OCC meeting: MS NRPC stated that the issue is lingering since many years & it is very important for the grid security. He stated that the States should submit a detailed scheme which they want to execute. Further Rajasthan representative stated as under:

That approval of PSDF for STNAMS (Smart Transmission Network & Assets Management System) project which is consisting of Automatic Demand Management System (ADMS) functionality at the level of 33 feeders at EHV Substation of RVPN under SCADA / EMS part of project has been received. Bid documents prepared and

under final approval with the CMD, RVPN. Bidding process will be initiated immediately on approval as above. Tentative timeline is as under:-

1. Issue of NIT – June, 2018
2. Finalization of Tender / Purchase order issued – August, 2018
3. Proposed timeline to complete the work – 18 months from date of issue of LOI/NOA

Further, the Automatic Demand Management System (ADMS) functionality at 11 kV feeders from 33/11 kV substation are under the jurisdiction of the Discoms and matter is being perused with discoms authorities.

NRLDC representative added that the updated list of the feeders of the state that can directly be made available to NRLDC, and should also be shared by all states as it is required in line with CERC guidelines.

PTCUL representative added that the issue is being taken up with the DISCOMs but no update has been received.

UP representative stated that they had submitted the details of the remote operation of 132kV feeders under ADMS.

MS, NRPC advised UP to have a detailed study on their complete system. He also stated that this issue will be discussed in the meeting on 30.7.18 wherein issues related to DISCOMs will be highlighted.

13.4 150th OCC meeting:

Concerned states (UP, Haryana and PTCUL) were requested to update.

MS, NRPC stated that the responsibility lies with the SLDC & STU to get the data from the DISCOMs**.**

UP, Haryana and PTCUL) are requested to update

13.5 151st OCC meeting:

PTCUL representative intimated that the matter stands taken up with the Operation circle of Uttrakhand Power Corporation limited.

Representative of Rajasthan stated that Tender for Smart Transmission Network & Assets Management System having ADMS part has been floated and Techno commercial bid has been opened on 30.08.2018. Evaluation of Techno commercial bid is under process.

UP & Haryana representatives were requested to also update.

14. Status of implementation of recommendations of Enquiry Committee on grid disturbances on 30 & 31.7.2012

14.1 147th OCC meeting: All utilities were requested to update the information as per the letter enclosed at Annexure 18 with the Agenda of the 146th OCC meeting. Compliance report from POSOCO & NHPC has been received.

14.2 148th OCC meeting: SE(O) stated that it is regretted to state that no information has been received from any quarters till date in spite of repeated requests/ reminders. He

added that the matter is viewed very seriously by CERC and would be taken up with higher authorities of each state utility.

MS, NRPC emphasized that it is very essential to get the protection audit done & it is for the betterment of the system of the State & the region as a whole.

14.3 149th OCC meeting: BBMB. PSTCL, Rajasthan, Koteshwar (THDC), HPGCL, NPCIL, POWRGRID (NR-2) have submitted the data. (Annexure 15 of the MOM of the 149th OCC meeting.)

14.4 150th OCC meeting:

NTPC submitted the information for NCR (Annexure 15 of the MOM of the 150th OCC meeting).

14.5 151st OCC meeting:

SE (O) requested all utilities (except NTPC, BBMB. PSTCL, Rajasthan, Koteshwar (THDC), HPGCL, NPCIL, POWRGRID (NR-2)) to update the status as per the prescribed Formats

15. Planning, procurement and the deployment of Emergency Restoration System.

The updated status in the 151st OCC meeting is as under:

DTL, PSTCL & UPPTCL - 02 nos. of ERS procured.

RRVPNL: - For procurement of ERS, preparation of Tender documents has been completed and it's under approval. The Tender is likely to be floated in the month Sept' 2018.

HVPNL: - BOQ finalization it's under process.

MS NRPC once again stated that the deadline for finalization should be intimated as the matter is pending since long.

PTCUL: - 147th OCC: NIT was placed but due to no response same has been extended

148th OCC: PTCUL representative stated that no such action has been taken. He has been asked to clarify the matter with the management.

149th OCC: PTCUL representative stated that in light of tower being damaged issue is being discussed again and by September further progress will be intimated.

150th OCC: PTCUL representative stated that issue is under discussion.

151st OCC: PTCUL representative stated that they have taken up the matter for providing the definite status with the Chief Engineer O&M (Dehradun & Haldwani)**. He further informed that a committee has been formed to finalize DPR.**

HPSEBL: – The process of arranging funds for procurement of ERS has been initiated. HPSEBL representative intimated that they were coordinating with PTCUL. He was advised to coordinate with J&K, citing the status of PTCUL

149th OCC: The process of arranging funds is being looked into.

150th OCC: The process of arranging funds is being looked into.

151st OCC: The matter is under consideration

J&K: - Order has been placed for 2 nos. ERS. No further update.

BBMB: - BBMB representative stated that the issue will be taken up in the Power Sub –Committee meeting of BBMB.

149th OCC: BBMB representative stated that the issue will be taken up in the Power Sub –Committee meeting of BBMB

CEA representative stated that being a transmission licensee they can go ahead with the procurement of their own ERS. He also added that instructions for procurement of ERS were issued from the Ministry. ERS are very essential for the safety of the nation also in case of any attack.

SE(O) NRPC stated that guidelines have been issued vide which the Ministry of Power has directed that for 500 ckt kms minimum 2 numbers of ERS are required (Annexure 16 of the MOM of the 150th OCC meeting). All utilities were requested to review accordingly**.**

BBMB was stressed in view of above to review their decision as two of their beneficiaries Haryana & Rajasthan have also not procured ERS yet

BBMB was requested to update & review in light of the details discussed in the 150th OCC meeting.

HPSEBL, Haryana & Rajasthan were requested to expedite the issue of procurement of ERS. All other utilities were again requested to review& update in view of the Annexure 16 of the MOM of the 150th OCC meeting.

16. Cleaning and Replacement of porcelain insulators

16.1 All utilities were requested to plan insulator replacement work from September 2018 onwards. All utilities were requested to submit the insulator replacement targets set for the year 2018-19 so as proper planning of outages can be done.

16.2 148th OCC meeting:

SE (O) NRPC requested all utilities to submit the plan positively by the last week of July as the outages of transmission elements for replacement of insulators will be planned with effect from the OCC for the month of August, 2018. He added that in the absence of the said action, outage will not be allowed on this account.

16.3 149th OCC meeting:

BBMB & POWERGRID (NR 1) have submitted the data .MS NRPC requested all other utilities to update so that better outage planning could be done as from September onwards outages for replacement of porcelain insulators will be allowed.

16.4 150th OCC meeting:

SE (O) NRPC requested all utilities to submit the plan meticulously & submit the data.

MS, NRPC added that cleaning & replacement work be planned in such a way that before the onset of fog the requisite action is taken.

16.5 151st OCC meeting:

All utilities (except DTL, BBMB, POWERGRID (NR 3& 1)) were requested to update the plan for the replacement of porcelain insulators in the format available on NRPC website by the first week of October as the meeting for review of cleaning and replacement work will be called along with next OCC meeting.

17. Cyber Security Preparedness Monitoring

In the **37th TCC and 40th NRPC meeting** held on 27th and 28th October, Chief Engineer IT, CEA and Chief Information Security Officer, MoP, Sh. Vijay Menghani, gave a detailed presentation on potential cyber threats for power sector, the agencies working on this aspect, recent incidents of cyber attacks on and the action points to prevent the cyber threat. It was stated that in view of increasing incidents of cyber-attacks and threat to the integrated grid operation, all utilities need to monitor action being taken in regard to the following points and report the status to respective Computer Emergency Response Teams (CERTs):

a. Appointment of organization-wise Chief Information Security Officers and its status.

b. Identification of organization-wise Critical Infrastructure and its status.

c. Preparation of organization-wise Crisis Management Plan and its status.

d. Status of Cyber Security Mock Drill activity in coordination with CERT-In.

e. Status of Training / Workshops on Cyber Security organized / participated by power sector entities.

f. Status of action taken on CERT-In / NCIIPC advisories.

All the utilities were again requested to furnish the above information, however, except from TATA Power – DDL the information has not been received from any of the utilities. The report as submitted by TATA Power- DDL was attached at Annexure-21 with the Agenda of the 146th OCC meeting. NHPC have also submitted the status. All the other utilities were once again requested to furnish the information in the format as submitted by TATA Power**.**

147th OCC meeting: NTPC updated the information. All utilities (except NTPC, NHPC & TATA Power) to kindly update the status. Some of the members enquired about the training to be imparted by NRPC/CEA on cyber security. They were asked to contact CE (IT), CEA in this regard as they are organizing training on cyber security and other related issues.

148th OCC meeting: THDCIL submitted the information in the meeting. All other utilities (except NTPC, NHPC & TATA Power) were again requested to update the status. Rajasthan representative intimated that the issue is being taken up with their IT wing and information would be submitted shortly. Tata Power representative stated that they welcome any utility to visit their station for seeing the implementation of

Cyber security done at their end.

149th OCC meeting & 150th OCC meeting: The information from NAPS & PSTCL stands received. **All utilities except NTPC, NHPC, Tata Power, THDCIL, NAPS & PSTCL were requested to update**. SE(O) stated that it is a long pending issue and the information in the desired format should be submitted by all utilities. Rajasthan representative stated that they had forwarded the information to CEA.

151st OCC meeting: The information from NPCIL RAPS Site, DTL & PTCUL submitted (Annexure 17)

All utilities except NTPC, NHPC, Tata Power, THDCIL, PTCUL, NPCIL RAPS, NAPS & PSTCL were requested to update

18. Requirement of Data for the GIS based Energy map being developed by Energy division of NITI Aayog.

The Sub –Committee was informed that a copy of a letter from the Chief Engineer (DP&T) was placed at Annexure 22 of the Agenda of the 147th OCC meeting.

148th OCC meeting: MS, NRPC requested all DISCOMs /Power Departments to furnish the information regarding the name, voltage level, capacity, longitude & latitude of 33 kV & 66 kV Substations and lines as detailed in the letter. He informed that RPCs have been given the work of collecting the data from States and forwarding to CEA.

Except NHPC, the data has not been received from any of the utilities**.**

UPPTCL representative intimated that the data needs to be collected from the DISCOMs and if a communication from the NRPC secretariat is sent to the DISCOMs the matter could be expedited**.**

Rajasthan representative intimated that they are also taking up the issue with their distribution companies.

SE (O) stated that SLDC being the nodal agency for the state, matter should take up by them with their DISCOMs for early submission of the data. All agreed for the same**.**

149th OCC meeting: All utilities were again requested to submit the desired information. Rajasthan representative sated that they are taking up matter with distribution companies.MS NRPC added that the issue will also be discussed in the meeting to be held on 30.7.2018 with the DISCOMs

150th OCC Meeting: All utilities were again requested to make all out efforts and submit the desired information by taking up expeditiously with the DISCOMs.

151st OCC Meeting:

Punjab has submitted the information that has been forwarded to concerned office of CEA. All other utilities were requested to make all out efforts and submit the desired information.

19. Distribution automation and development of smart grid in NCR

Smart grid will enable optimization of energy generation, transmission, distribution and consumption. It provides an opportunity for energy companies to make power

delivery more efficient, whether by minimizing the visits of personnel to transmission and distribution locations or by enabling better decisions through timely information. Automation is the key to development of smart grid. The implementation of automation may be take up in the selected towns initially which would be the first step towards implementation of smart grid in the NCR.

SE(O) stated that at present, the level of preparedness of distribution sector to adopt smart grid is in a very preliminary stage and every DISCOM has to prepare a clear road map for implementing automation and smart grid in their area of operation along with the financial requirement and sources for all funding to roll out the plan in coming years.

MS, NRPC stated that Delhi DISCOMs are proactive in this case. He requested that the concerned (Haryana, Rajasthan & UP) STUs & SLDCs to coordinate with the respective DISCOM & take active action for upgradation of automation by deploying smart grid. All states to take note and intimate the progress in this regard in each OCC.

All members (Haryana, Rajasthan & UP) were again requested to update.

20. Problem of excessive vibrations in GTs of Rihand Stage – III and Vindhyachal Stage-IV during operation of Rihand - Dadri HVDC, on monopole mode with ground return.

148th OCC meeting:

NTPC representative highlighted as under:

- Shifting of 2x500MW Rihand Stage-III units (Unit# 5&6) from NR Grid to WR Grid through Vindhyachal Pooling Station was successfully done on 28th Nov' 17 with coordination in real time between POSOCO, NTPC and POWERGRID (WRTS-II).
- With Rihand stage-III units connected to Vindhyachal Pooling Station, problem of excessive vibrations in GTs of Rihand stage III (and Vindhyachal Stage-IV also) has been observed whenever Rh- Dadri HVDC is run on single pole in ground return mode. The observations during the period 27th Nov'17 to 5th March'18 at Rihand is enclosed in the attached sheet (ANNEXURE AA of the Additional Agenda OCC 148th Meeting).
- The issue was briefly discussed in the 142nd OCC Meeting against agenda point no 18 and where it was decided that system study was required to be done to further deal with this problem. Previous experience of NTPC in this regard was also sought which was subsequently provided to NRLDC by Rihand station.
- It is apparent that DC current passes through these GTs during above situation which is detrimental for the GTs and which may lead to their failure.
- It is therefore requested that a solution may kindly be arrived to deal with the above situation at the earliest.

The issue was deliberated in light of the discussions held earlier in the 142nd OCC meeting NTPC was requested to check transducer at Vindhyachal end as there was huge mismatch in MVAr and also get assessment of earthing system at Rihand done. Further it was decided that as per decision in the 38th TCC & 41st NRPC meeting the committee will look into resolving the issue. Nominations for committee has been sought from the utilities concerned vide this office letter dated 22.6.2018. MS NRPC requested that the nominations from CTU. POSOCO, CEA and NTPC may be submitted at the earliest so that the meeting can be called at an early date

149th OCC meeting: Nomination from CTU/POWERGRID and NTPC stands submitted.CEA & POSOCO were requested to send their nomination.
MS, NRPC proposed that the meeting should be held at Rihand. It was also stated that the nominations from BHEL & UPPTCL were also awaited. Also it was proposed that an expert in the field from it may also be included in the forum. In addition, he highlighted that the nominations from Vindhyachal & Rihand HVDC may also be included.

150th OCC meeting:
CEA, POSOCO, POWERGRID, CTU, UPPTCL & CG Power and Industrial Solutions Limited were requested to send their nomination so that further necessary action can be taken.

151st OCC Meeting:

Nomination from POSOCO stands received.

CEA, UPPTCL & CG Power and Industrial Solutions Limited are requested to send their nomination so that further necessary action can be taken by the office. It was decided that meeting of the committee would be held tentatively in the first week of October. (Finalized for 4th October at Rihand)

21. Issues for Information of Sub-Committee

1. **Flexibility of coal fired power stations.**
   MS NRPC briefed that recently UPSERC has passed an order in which the Technical Minimum for its generating units will be 55%. He added that all other states should also take lead as it is very important for allowing the integration of renewables.
   He further added that Director(SO), POSOCO has written to Member thermal CEA in which it has been stated that as per RRAS AS-I format status specify RAMP rate less than 1%/min for more than 50 plants. He added that it has been highlighted that this is much less than the minimum standard of 3%/min as per CEA standard. He added that this is a matter of concern and needs to be looked into as at the time of COD of a unit an undertaking is given by the highest authority that all CEA standard have been complied with.
   SE (Operation) briefed the Sub –Committee on the issues detailed below attached at Annexure 21 of the Agenda of the 151st OCC meeting.
2. BRPL concerns regarding coal shortages and reduction in DC at NTPC Dadri
3. Delay in commissioning of Teesta III -Kishanganj line

4. **Comments of stakeholders on the draft of the "Guidelines on Availability of Communication System"**
   MS, NRPC proposed that the actual availability & deemed availability of the communication system shall be calculated separately. However, for commercial purposes, the sum of the two shall be used.

AA. Additional agenda for 151st OCC meeting by POWERGRID - Switching of Bus Reactor and Switchable Line Reactors for voltage regulation:

Representative of POWERGRID stated that

- As per CERC regulations & other established rules, outage of bus reactors & switchable line reactors which are used to regulate voltage, shall be deemed to be available & outage shall be attributed to the system & not to the transmission licensee.
- The operating procedure for Northern region issued by NRLDC under Point No. 6.5 states as follows:
  "Bus reactors at 400 kV shall be taken into service whenever bus voltage exceeds 405 kV and they shall be taken out of service when voltage is below 395 kV. Standing instruction may be issued to the operating personnel at the substation. There may be exception with permission of NRLDC. NRLDC shall issue operating code for switching of switchable line reactors."
- He stated that sometimes it has been observed that due to grid conditions, there may be a situation under which in some pocket in the grid voltage observed is high, however, in some nearby substations it may be observed to be low. Based on which, during real time operation, after having obtained the consent of NRLDC and also considering the practices being followed in the past, the operator has a better knowledge about the situation under which the switching operation of bus reactors is warranted for.
- Regarding certain objections which were raised about the outage of bus reactors for longer duration, POWERGRID representative stated that they were out as per the system conditions and operating procedures with the consent of NRLDC. Their availability could only be challenged only if NRLDC had issued a code and the equipment was not brought in service in due time. He further stated that the outage for the above mentioned Bus reactors was being forced on their part.
- He requested that if there were certain changes warranted for in any procedure which was being followed till recently, due deliberations with the stakeholders should have been held and their consent should have been obtained.
- Citing the prevalence of High voltage conditions in the grid for longer duration, POWERGRID requested that the upper limit of 405 kV voltages to bring the reactor in service needs to be revised.
- It was further requested by POWERGRID that, NRLDC shall issue codes for all switching operations of bus reactors and switchable line reactors. And also for certain other similar issues, it was requested by PGCIL that before taking any unilateral decision, deliberations with all the stakeholders may be done beforehand.

Representative of NRLDC stated that

- The standing instructions as per the Operating procedures for Northern region needs to be strictly adhered to and the Bus reactors shall be taken into service whenever bus voltage exceeds 405 kV and shall be taken out of service when voltage is below 395 kV. Regarding any issue being encountered by any utility such as multiple switching operations due to prevailing voltage conditions in the grid, the same may be brought to the knowledge of the forum for deliberations & necessary action. Upper limit for switching in of reactors may also be revised, if required.
- Regarding issuance of codes for switching operations of bus reactors and switchable line reactors, he stated that if there are standing instructions already issued, then there was no need for issuance of codes every time.
- **POWERGRID representative** stated that, suppose in some hypothetical condition if the voltage at a node goes beyond 405 kV and due to any reason POWERGRID has not put the reactors in service then whether it should not be the duty of RLDC to flag the issue to the concerned substation and get the reactor in service to counter the high voltage conditions in the grid.
- **NRLDC representative** stated that it is certainly the responsibility of NRLDC to see for the same but if there are certain standing instructions specified for a given conditions then the same shall be followed as such.
- **MS, NRPC** informed the forum that IEGC clause 6.6 sub-clause 5 stated that:
  "*Switching in/out of all 400 kV bus and line reactors throughout the grid* ***shall be carried out as per instructions of RLDC****."*
  IEGC clause 5.1 (d) states:
  "*All licensees, generating company, generating station and any other person connected with the operation power system* ***shall comply with the directions issued by the respective RLDC/SLDC*** *to ensure integrated grid operation and for achieving the maximum economy and efficiency in the operation of the power system."*
  IEGC clause 5.1 (f) states:
  "*A set of detailed procedures for each regional grid shall be developed and maintained by the respective RLDC in consultation with the regional entities for guidance of the staff of RLDC and shall be consistent with IEGC to enable compliance with the requirements of this IEGC"*
- Citing the above clauses of IEGC, MS, NRPC stated that the standing instructions given by NRLDC for switching of bus reactors is binding on all the licensees and shall be followed as such. If there were any issues regarding the upper limit of voltage for switching in of reactors, the same may be informed to NRLDC and may be deliberated upon and amended, if required and the same shall be valid from the date of implementation of the amendment.
- **POWERGRID representative** stated that certain practices which were being followed for the past many years cannot become wrong suddenly and if there were certain observations and objections regarding the prevailing practices, the same may have been flagged to the concerned for its rectification accordingly.

- **NRLDC** representative requested POWRGRID to come up with the data of multiple switching operations of reactors and assured that the upper limit for reactor switching operations shall be revised, if required.
- **POWERGRID** requested that the matter may be discussed further and the outages which have been attributed to them on this account shall be reviewed after the amendment made to operating procedures. POWERGRID requested that if the same cannot be ensured, then for reactor switching operation also, NRLDC shall issue code to them.
- **SE (O), NRPC** stated that for certification of availability the existing laid down procedures has been followed and if there were certain changes warranted, they shall be made after deliberations and approval of NRPC/TCC.

PART-B: NRLDC

1. Winter Preparedness 2018-19

NRLDC representative stated that in 150th OCC meeting discussions were held on common challenges being experienced during winter season. The actions that need to be taken by all utilities were also deliberated in the meeting. In 151st OCC meeting, it was highlighted that this year hydro generation (lower by 30-40 MUs) and reservoir level are much lower as compared to last year. Therefore, utilization of available hydro resources for meeting the ramp in demand during winter months needs to be done judiciously.

It was highlighted that last year in the month of September, in first two days comparatively lower demand was observed due to active monsoon. But, as we progressed in the month of September, NR demand started to rise steadily in the first two weeks. During this time as hydro generation started to decline, internal thermal generation of NR was increased to meet the rising demand. However, during this time many coal stations reported coal shortage and wet-coal issues. As a result more power was being imported from other regions. At times, the import of power even violated inter-regional ATC/TTC limits during this time.

NTPC representative informed that at present RLNG based generation is available and would further be available in the month of September for the beneficiaries.

MS NRPC requested utilities to be prepared for such situation and ensure availability of sufficient coal stocks.

NRLDC representative highlighted that even after utilizing available resources, the voltages in grid continued to remain high for most of the time (above 420kV for more than 60-70% of time) in winter months especially in Punjab, Delhi, parts of Haryana, UP, Rajasthan and most hydro generating stations. Thus, there is need for better implementation of measures for controlling high voltages in the grid. Few of these measures are:

- Ensure switching off capacitor & switching on reactor

- Ensure the healthiness of bus reactor, line reactor that can be used as BR etc.
  - NRLDC representative stated that the list of Line Reactors which can be used as Bus Reactors (prepared based on information received from utilities) is available in NR Reactive Power document. Utilities were requested to check and provide update, if any, on the list including addition of new line reactors that could be used as bus reactors.

- Tap optimization
  - Tap optimization at 220/132kV nodes by respective SLDC.
  - Utilization of reactive energy account for identification of nodes injecting MVAr at time of high voltage.

- Synchronous condenser mode of operation
  - Larji, Chamera-II, Tehri units have trial tested last year & can be operated in condenser mode as required. NRLDC representative requested Tehri to resolve the issue of running of machines in synchronous condenser up to two hours only before winter season for better utilization as synchronous condenser.
  - Punjab representative informed that OEM has confirmed that RSD could be operated in synchronous condenser mode upon small modifications although with added cost for which the issue is being taken up with higher officials.
  - Delhi is having considerable network in the form of underground cables therefore high voltage are generally seen and utilization of synchronous condenser mode could be really helpful. Delhi was asked to explore capabilities of GTs to operate as condenser mode. It was also requested to explore capabilities of Badarpur TPS to operate in synchronous condenser mode.
  - Other stations were requested to explore & share their generating station capabilities to operate as synchronous condenser

- Opening of EHV lines
  - Listing of lines to be opened on priority basis based on voltage relief observed in simulation studies.
  - Opening of lines considering reliability & security of Grid.

- Document available at NRLDC website (reactive power management) has data about the resources available in NR for reactive power management. These resources could be used by constituents for better reactive power management.

- Reactive power support from generators as per capability curve
  - NRLDC representative stated that NRLDC has been presenting (especially during winter months) Voltage v/s MVAr plots for generators to assess reactive power support being provided by generators. All generators shall provide MVAr generation/absorption as per its capability curve. However, based on last year winter performance, most of the generators in Northern region have scope for improvement. SLDC/RLDC monitor the generator response in real time through SCADA displays. For better utilization it was requested for:
    - Updation and checking of reactive power telemetry.
    - Monitoring of voltage vs. reactive power output plots.
    - Sending generator reactive power response of each generator for 3 days of the month viz. 01st 10th and 20th day of the month as agreed earlier.

It was also highlighted that NRLDC is having SCADA display for monitoring of temperature and humidity from stations. However, temperature and humidity data from most of the stations is either not available or suspect. The temperature and humidity data is especially useful during winter months to identify fog affected areas. This issue was also highlighted last year during winter months; however, actions are yet to be taken. Utilities were requested to take steps to ensure correct and reliable temperature and humidity data at NRLDC/SLDCs.

MS NRPC stated that all utilities shall actively take measures for preparedness before winter season. Also, utilities were requested to practice above highlighted measures for better grid operation.

All members agreed for the same.

2. Wind generation evacuation issues at Akal

NRLDC representative stated that N-1 non-compliance issue at Akal ICTs has been addressed in various OCC/TCC meetings and also through various NRLDC communications through letters & emails to concerned utilities.

These issues were flagged in 150th OCC wherein along with N-1 non-compliance at Akal, renewable energy evacuation was further restrained due to tripping of ICT-4 of 500 MVA on fire dated 04th Aug 2018. At present, 400/220kV ICT-2 and ICT-1 of 315 MVA each are also under outage from 22nd Aug 2018 and 04th Sep 2018 respectively and only one ICT-3 of 315 MVA is available out of 1445 MVA to evacuate the pooled wind power at Akal.

NRLDC representative stated that alternate path is available from Ramgarh (power flow from 220kV side to 400kV side) for evacuation of renewable power and Rajasthan shall try and expedite the same.

Rajasthan representative stated that although they have done some rearrangement of networks in that area, curtailment had to be done due to system constraints. Further, in respect of tripping, it was reported that fire incidents took place due to bushing failure.

MS NRPC asked Rajasthan to present a detailed report on the fire incidents, rearrangement of network carried out and renewable curtailment done during this time.

Additional Points:

3. Reliability issues

State	Actual Constraints observed (Real-time)
Punjab	• N-1 non-compliance issues at Dhuri, Rajpura, Muktsar and Amritsar. • High loading of Underlying network of Amritsar, Ludhiana, Dhuri & Jalandhar • ICT at Dhuri (out since Aug'17) need to be revived.
Rajasthan	• Aggravation of evacuation constraints in Akal region due to outage of three ICTs (including renewable curtailment) • N-1-1 non-compliance of Kawai-Kalisindh-Chhabra complex evacuation.
Delhi	• N-1 non-compliance was observed at Bamnoli and Maharanibagh when ATC was violated.

Uttar Pradesh	• N-1 non-compliance has been observed at 400/220kV ICTs of Azamgarh, Lucknow (PG), Unnao etc. • Evacuation constraints of Anpara-D, Lalitpur TPS, Paricha TPS and Bara TPS under N-1/N-1-1 compliance are still persisting. • High generation at Anpara results in high line loadings in the complex (no generation at that time in Lalitpur). NRLDC requested UPPTCL to have some generation at Lalitpur also to reduce line loading in Rihand-Singrauli-Anpara complex.

MS NRPC requested to state utilities to take note of TTC/ATC and N-1 violations that are observed (attached as Annexure-I).

4. Deviation by NR entities

NRLDC/NRPC has been advocating continuously to state utilities of NR for portfolio management in advance so that deviations remain within permissible limits in real time. It has been discussed in number of previous meeting that load forecast should be carried out accurately and subsequently states shall plan their load generation balance. Deviation of NR utilities is being shown in every OCC meeting to sensitize the issues on regular basis still it has been observed that NR utilities are over/under drawing from the Grid on various instances. Deviation Graph for Aug-Sep'18 (12 Aug-12 Sep'18) is enclosed in **Annexure-II**.

Major observations discussed are as:

1. Himachal Pradesh and Haryana were seen to be highly overdrawing most of the time. Even though major simultaneous silt based outages were not reported this year, HP had overdrawl for most of the time which needs to be restricted.
2. Uttar Pradesh and Rajasthan had overdrawl for considerate (major) portion of the time.

OCC directed the state utilities to plan their portfolio firmly and restrict deviations from the Grid for safe & secure Grid operation.

5. Deviation by generators

NRLDC representative highlighted the following issues related to deviation by generators observed in first ten days of September as **Annexure-III**:

Over injection at Rihand III: It was reported that Rihand-III has been over injecting most of the time in past few days. Even when Rihand-III was given schedule near its technical minimum, Rihand-III continued to over inject into the grid by large quantum. NTPC was asked to provide reason for the same.

Under injection at Dadri Thermal-1 and Unchahar TPS: Dadri Thermal-1 and Unchahar TPS were seen to be under injecting frequently. This under generation by Unchahar and Dadri-I has been highlighted in previous OCC meetings as well. However, under injection by these stations is still continuing.

MW data at Singrauli showing under injection: The injection figure of Singrauli (MW) available in SCADA was lower than the actual generation at Singrauli. This gives wrong perception to the system operator that generating station is under generating.

MS NRPC asked NTPC to look into the matter and resolve the issue at the earliest. NTPC agreed for the same.
MS NRPC also added that Unchahar and Jhajjar even after being given RRAS schedule are under-injecting most of the time and are not able to meet the schedule, which needs to be attended at the earliest.

MW data at Chamera-I: In 150th OCC meeting, NHPC representative had stated that on the basis of meter data it was clear that Chamera-I was not over generating (as appearing from SCADA data). Chamera-I MW figure available at NRLDC is higher than actual and hence giving wrong perception to the system operator. In 151st OCC, NHPC representative stated that there was problem in RTU at Chamera-I. It was also informed that a communication has been sent to POWERGRID by Chamera-I to attend the issue of RTU who are taking up the issue with M/s Synergy.

6. Frequent forced outages of transmission elements

NRLDC representative highlighted that the following transmission elements were under frequent forced outages during the month of **Aug'18**:

S. NO.	Element Name	No. of forced outages	Utility/SLDC
1	400kV Bareilly(UP)-Unnao(UP) ckt -2	4	UP
2	220kV Kishenpur(PG)-Ramban(JK)	4	POWERGRID/J&K
3	400kV Bikaner(Raj)-Didwana(Raj) ckt-1	3	Rajasthan
4	765kV Fatehabad(UP)-Lalitpur TPS(UP) ckt-1	3	UP
5	400kV FSC (50%) of Koteshwar(PG)-1 at Meerut(PG)	3	POWERGRID
6	400/220 kV 500 MVA ICT-3 G.Noida	3	UP
7	800kV HVDC Champa(PG) - Kurukshetra(PG) ckt-1	3	POWERGRID
8	400/220kV 200 MVA ICT-1 Roza	3	UP

The complete details were attached at *Annexure-1 NRLDC* of Agenda. The frequent outages of such elements affect the reliability and security of the grid. Hence, Utilities were requested to look into such frequent outages and share the remedial measures taken/being taken in this respect.

The following were the discussion on the trippings:

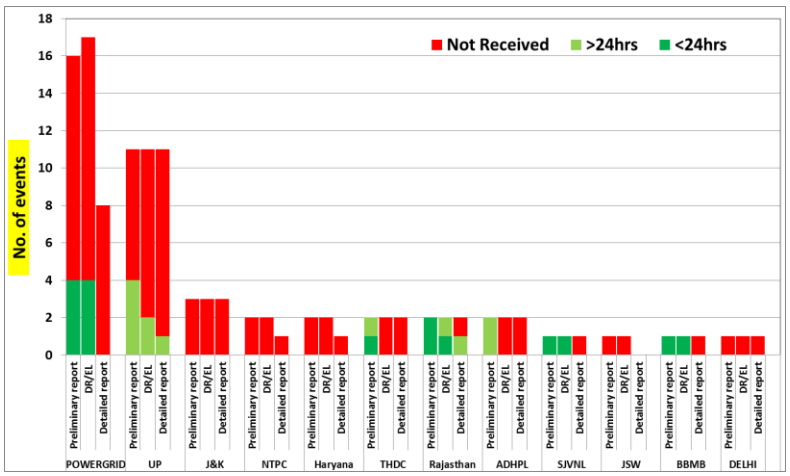
- 800kV HVDC Champa(PG) -Kurukshetra(PG) ckt-1: POWERGRID representative stated that few of the issues may get resolved by new software

update. MS, NRPC appreciated the fact that the tripping of HVDC Champa-Kurukshetra has reduced recently. However, He stated that few information and actions decided in 25-May-18 meeting held at Kurukshetra are still pending. He requested POWERGRID to provide the details and take pending actions at the earliest. SE (operation), NRPC also requested POWERGRID to compile a list of forced outages of HVDC Champa-Kurukshetra based on the reason of tripping and to look into the issue which are still pending.

- 400kV Bikaner(Raj)-Didwana(Raj) ckt-1: Rajasthan representative stated that on 07, 16-Aug-18, bus at Bikaner was under shutdown and testing of 400kV Bikaner-Suratgarh SCTPS was being carried out. During testing, spurious signal got generated and also sent to Didwana end resulted in tripping of line. NRLDC representative requested Rajasthan to look into to the tripping occurred on 19-Aug-18 as well and avoid such trippings in future.
- 400kV Bareilly(UP)-Unnao(UP) ckt -2: UP representative stated that protection audit of Barielly(UP) and Unnao(UP) is planned to be carried out in view of number of tripping events occurring at these stations.
- 400kV FSC (50%) of Koteshwar(PG)-1 at Meerut(PG): POWERGRID representative stated that capacitor damaged and replaced in all tripping incidents.

7. Multiple element tripping events in Northern region in the month of Aug'18:

NRLDC representative stated that a total of **27** grid events occurred in the month of Aug-2018 of which **19** are of GD-1 category. The preliminary report of all the events have been issued from NRLDC. A list of all these events along with the status of details received by 04-Sep-18 was attached at *Annexure-2 NRLDC* of Agenda.



Further, despite persistent discussions/follow-up in various OCC/PCC meetings, the compliance of the regulations is still much below to the desired level. In **12** out of 27 events, no detail has been received at all till 04-Sep-18.

Maximum Fault Duration is **9520 ms** in the event of multiple element tipping at Rosa substation on 04th Aug 2018 at 12:01hrs.

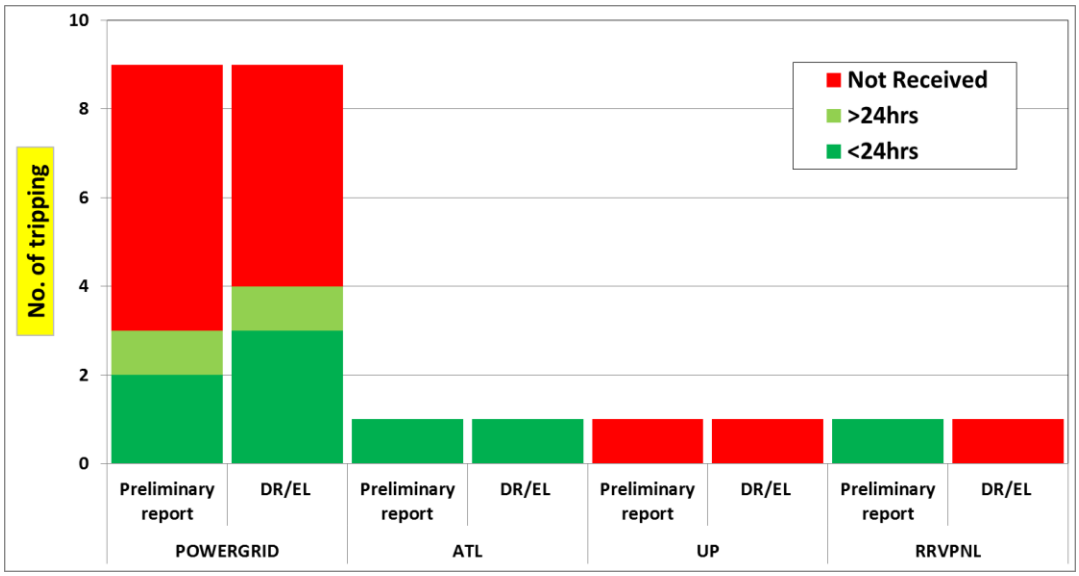
Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **9** events out of 21 events in the month.

Members were requested to take expeditious actions to avoid such tripping in future. Moreover, utilities were requested to impress upon all concerned for providing the Preliminary Report, DR/EL & Detailed Report of the events in line with the regulations.

8. Details of tripping of Inter-Regional lines from Northern Region for Aug'18:

NRLDC representative highlighted that a total of **12** inter-regional lines tripping occurred in the month of Aug'18. The list was attached at *Annexure-3 NRLDC* of Agenda. The status of receipt of preliminary reports, DR/EL within 24hrs of the event and fault clearing time as per PMU data has also been mentioned in the table. The non-receipt of DR/EL & preliminary report within 24hrs of the event is in violation of various regulations. As per regulations, all the utilities shall furnish the DR/EL, flag details & preliminary report to RLDC/RPC within 24hrs of the event. They shall also furnish the detailed investigation report within 7 days of the event if fault clearance time is higher than mandated by CEA (Grid Standard) Regulations.

It could be observed from attached table and plot below that not all information regarding the tripping is received from the utilities.



Concerned members were requested to provide the tripping details timely and take remedial measures to avoid such tripping in future.

9. Frequency response characteristic:

A total of four FRC based events have occurred in the month of Aug-2018. Description of the events is as given below:

S. No.	Event Date	Time (in hrs)	Event Description	Starting Frequency (in Hz)	End Frequency (in Hz)	Δf
1	06-Aug-18	13:06hrs	Tripping occurred at 400kV Chakan & 400kV Lonikhand S/S due to operation of busbar protection, Load loss of around 1000 MW occurred as per NLDC SCADA Data.	50.088	50.133	0.045
2	07-Aug-18	14:17hrs	KSK unit #2 & unit #4 tripped on operation of reverse power relay as reported by WRLDC. Total Generation loss is around 890 MW.	49.878	49.841	-0.037
3	12-Aug-18	05:31hrs	400 KV Rangpo – Binaguri II tripped on B-N phase fault, SPS–I operated and resulted into tripping of all running units of Teesta 3 (Except Unit one Unit) , one unit each of Jorethang, Tashiding, Chujachen and both unit of Dikchu (though it was supposed to trip only one unit). Total Generation loss at this point of time coming out to be 852 MW.	50.044	50.008	-0.036
4	29-Aug-18	04:02hrs	400kV Rampur-Nalagarh-1 auto-reclosed successfully and 400kV Rampur-Nalagarh-2 tripped on B-N fault. Consequently, the incident led to SPS operation at NJPC and Rampur Hydro stations causing tripping of 2 nos. units each, causing generation loss of 500 MW and 130 MW respectively. Further, at Karcham Wangtoo, Units-2 and 4 went into NLNE mode (No Load Not Excited) causing generation reduction of around 500 MW. Total Generation Loss reported was around 1230 MW.	50.005	49.940	-0.065

The CERC approved procedure has already been shared with all concerned during previous OCC meetings. FRC observed for each state control area for the events was attached at Annexure-4 of agenda of the 151st OCC meeting.

NRLDC representative stated that the time and date of the FRC events were e-mailed to respective utilities. The FRC calculations for any or both of the above events have been received from **Punjab, Rajasthan, NHPC, Adani-Kawai (12, 29-Aug-18), THDC (06, 07-Aug-18), UP (06,07-Aug-18), Delhi (12, 29-Aug-18)**.

The following were discussed:

- A few good responses observed in case of Dadri Stage-2 TPS, Sewa-II HEP, Jhajjar TPS, Karcham HEP, Goindwal Sahib TPS, Harduaganj TPS among others.
- In case of Jhajjar, the generator response is getting ramped back quickly. The same issue occurred earlier also which seems to get resolved afterwards. APCPL was requested to look into this recurring issue of unsustainable frequency response observed in case of Jhajjar generator.
- Delayed response was observed in case of Rajasthan control area generators viz. Kota TPS, Suratgarh TPS, Kalisindh TPS. Rajasthan requested to look into the issue.
- The delayed response is observed in Chamera-1 HEP also for 06-Aug-18 event. NHPC requested to look into this.

Constituents requested to impress upon the generators to provide adequate frequency response in line with IEGC and submit the FRC of their control areas for the events and reason of poor response, if observed.

10. RGMO/FGMO status

It was discussed and decided in 138th OCC meeting that all the utilities shall map RGMO/FGMO status in the SCADA system and do the cabling and other work on their own expense. Further RGMO/FGMO status mapping in SCADA was also approved in 37th TCC/40th NRPC meeting.

NRLDC representative informed that the RGMO/FGMO status is **yet to be mapped** in SCADA for the following plants:

- NHPC*: Bairasiul, Salal, Tanakpur, Chamera-2, Uri-1, 2, Dulhasti, Parbati-3
- BBMB: All BBMB plants
- THDC: Koteshwar
- Shree Cement
- JSW: Karcham
- Greenko: Budhil
- Everest Power: Malana-2
- AD Hydro

*Mapping not present in plants exempted from governor response as per IEGC.

NRLDC representative stated that among the states, Punjab, Rajasthan, Haryana and UP have mapped the RGMO/FGMO status for most of their control area generating stations.

In 150th OCC meeting, Koteshwar HEP representative stated that OEM is referred to provide the spare data points in protocol converter. NRLDC representative requested Koteshwar HEP to give a tentative time by which the mapping of RGMO/FGMO signal would be done.

Constituents were requested to expedite the availability of RGMO/FGMO SCADA status to respective SLDCs and NRLDC.

1. Mapping of UFR, df/dt relay details in SCADA

NRLDC representative presented the following present status of UFR &df/dt mapping:

States	UFR	df/dt	Improvement from status in 146th OCC meeting	Remarks	Data availability
J&K	No	No			
UP	Yes	Yes	Following are provided since last status: • Feeder wise planned load relief in df/dt. • Alternate feeder details in UFR display. • Total planned relief in df/dt display.	Following yet to be provided: • Feeder-wise planned load relief of UFR. • Telemetry of feeders (Partial details available). • Alternate feeder details in df/dt display (Partial details available for UFR). • Total planned relief in UFR display. (Stage wise) • Total actual relief. (Stage Wise)	Very Poor
Haryana	Yes	Yes	Following are provided since last status: • Stage-2, 3 of df/dt included in display. • Feeder wise planned load relief. • Alternate feeder details. • Total actual relief in UFR.	Following yet to be provided: • Telemetry of feeders (Partial details available). • Telemetry of alternate feeders not available. • Calculation of total actual relief in df/dt seems incorrect.	Poor
Delhi	Yes	Yes		Following yet to be provided: • Total of actual analog data of MW and alternate feeders. • Data suspected for most of the digital and Analog value at NRLDC display but available at SLDC display.	Poor

HP	Yes	Yes	Following are provided since last status: • Segregation of stage wise load. • Alternate feeder details include for most of the feeders. • Partial telemetry of feeders.	Following yet to be provided: • Telemetry of feeders (Partial data available). • Alternate feeder details in UFR (a few not available).	Poor
Uttara-khand	No	No			
Punjab	Yes	Yes		Following yet to be provided: • Complete telemetry of feeders. • Alternate feeders details. • Digital Status of all the feeders	Poor
Rajasthan	Yes	Yes	Following are provided since last status: • UFR display provided.	Following yet to be provided: • Analog value and digital data not available in UFR display (only alternate feeder details provided)	Very Poor

The UFR and df/dt mapping is mandatory as per CERC regulation. The issue has been discussed in various OCC, NRPC-TCC meetings. However, it could be seen that the Status of UFR, df/dt displays are not exactly as per the approved format.
In 136th OCC meeting it was discussed that in addition to the SCADA mapping, states should provide the following information regarding the UFR, df/dt relays installed at their respective substations:

- Source of frequency measurement for UFR, df/dt relay viz. positive sequence, phase-to-neutral, phase-to-phase.
- Computational time for measurement of frequency, rate of change of frequency in UFR, df/dt relays respectively.

In 137th OCC meeting, MS NRPC once again reiterated that mapping of UFR has to be done in the SCADA of SLDC & NRLDC for better visibility of relay status and feeder load relief and emphasized upon the importance of digital breaker status of feeders in such defense schemes.

In 140th, 143th and 146th OCC meeting, all the state utilities were requested to correct the SCADA UFR, df/dt displays as per the comments. In addition, utilities were asked to submit the information based on the discussion points came afore in Video conference with state utilities. A few improvements have been seen in this respect as mentioned in above table.

The defense schemes are extremely important schemes and can avert any major contingency. Hence, State utilities shall make all possible efforts to strengthen the same.

State utilities were requested to submit the progress on details tabulated above at the earliest and correct, provide the SCADA UFR, df/dt displays as per the comments.

11. Mock black start exercise in NR:

As per Indian Electricity Grid Code (IEGC) clause 5.8(b) "Mock trial runs of the procedure for different sub-systems shall be carried out by the Users/ CTU/ STU at least once every six months under intimation to the RLDC".

Mock Black-start exercise of power stations are, therefore, needs to be carried out in-order to ensure healthiness of black start facility. The winter months are off peak hydro period and therefore good time to carry out such exercises.

Therefore, the schedule of mock exercise dates for different hydro & gas power station was proposed. The power stations were requested to confirm and inform to all the concerned persons of control centre/ substations to facilitate the exercises.

The summary/schedule of mock black start exercise of ISGS hydro stations carried out in previous season is tabulated below:

S. No.	Proposed Date	Revised Date	Generating station	Remarks
1	24-Oct-17		Koldam	Carried out successfully.
2	31-Oct-17	28-Mar-18	Nathpa Jhakri & Rampur	Partially successful. Blackstart could not be extended due to repeated tripping of 400kV Nalagarh-Rampur line on over voltage while charging.
3	3-Nov-17	08-Mar-18	Dhauliganga	Carried out successfully. However, plant was not able to synchronize the island with grid. The same was carried out at Bareilly.
4	**7-Nov-17**		**Salal**	**Deferred due to pending consent from SLDC-J&K.**
5	10-Nov-17	3-Nov-17	Sewa-2	Carried out successfully.
6	**14-Nov-17**		**Budhil**	
7	**17-Nov-17**		**Malana-2**	**Deferred by Plant**
8	21-Nov-17		Parbati-3	Carried out successfully. Island collapsed while carving out.
9	24-Nov-17	04-Dec-17	Chamera-3	Carried out successfully.
10	**30-Nov-17**		**Uri-I, II HEP, Lower Jhelum HEP, Pampore GT's & Upper Sindh**	**Deferred due to pending consent from SLDC-J&K.**

11	5-Dec-17	1-Dec-17	Chamera-2	Carried out successfully. Island collapsed during stage-1.
12	8-Dec-17	1-Dec-17	Chamera-1	
13	20-Dec-17		Bairasiul	Carried out successfully. Unit tripped after island synchronization with grid.
14	4-Jan-18		Koteshwar	Carried out successfully.
15	9-Jan-18	07-Mar-18	AD Hydro	Carried out successfully. However, plant was not able to synchronize the island with grid. The same was carried out at Nalagarh.
16	16-Jan-18		Karcham Wangtoo	Carried out successfully.
17	23-Jan-18		Tehri	Partially successful. Initial Island collapsed due to tripping of 400kV Koteshwar-Meerut ckt.

NRLDC representative stated that out of 17 planned exercises 13 were carried out. The exercises which could not be done are highlighted in the above table. Out of 13 exercises carried out, there was change in scheduled date in 7 of them. Thus, in more than half of the exercises carried out, the schedule was not maintained due to reasons like load not being available, plant personnel not ready, coordination problem. In 144th OCC meeting, constituents were requested to adhere to the finalised schedule of mock exercises during the season.

The proposed schedule for the Mock Black start exercise was presented as follows:

Hydro Power Stations:

Date	Name of stations
18-Oct-18	*Kishanganga (new plant)
24-Oct-18	*Malana-2
26-Oct-18	Dhauliganga
02-Nov-18	*Salal
13-Nov-18	Nathpa Jhakri & Rampur
16-Nov-18	*Uri-I, II HEP, Lower Jhelum HEP, Pampore GT's & Upper Sindh
19-Nov-18	*Budhil
28-Nov-18	Chamera-3
30-Nov-18	Sewa-2

03-Dec-18	Chamera-1 & Chamera-2
11-Dec-18	Parbati-3
14-Dec-18	Bairasiul
19-Dec-18	Koteshwar
28-Dec-18	AD Hydro
04-Jan-19	Tehri
08-Jan-19	Karcham Wangtoo
11-Jan-19	Koldam

** Mock black-Start exercise not carried out during Year 2017-18.*

NRLDC representative also stated that mock black-Start procedure circulated during last exercise/ previous year may be used. The unit selection may be changed from the one taken during last year exercise.

UP representative stated that for Tehri HEP the load may be taken at Gajraula instead of Shatabdinagar.

Gas Power Stations:

Date	Name of stations
09-Oct-18	*Auraiya GPS
12-Oct-18	Dadri GPS
30-Oct-18	*Anta GPS

** Mock black-Start exercise not carried out during Year 2017-18, procedure to be developed.*

As informed by Bawana GPS, it does not have black start capability.

SLDC's were also requested to carry out mock black-start of station in their respective control area & inform the tentative dates to the OCC as well as outcome of these exercises. The proposed Hydro Power Stations to undergo the exercise are as follows:

S. NO.	Utility	Hydro Power Station	Installed Capacity(MW)
1	J&K	Baglihar	3x150
2		Baglihar stage-2	3x150
3		Lower Jhelum	3x35
4		Upper Sindh	2x11+3x35
5	HP	Sainj	2x50
6		Larji	3x42
7		Bhabha	3x40

8		Malana -I	2x43
9		Baspa	3x100
10	Punjab	Anandpur Sahib	4x33.5
11		Ranjit Sagar	4x150
12	Rajasthan	Mahi-I&II	2x25+2x45
13		Rana Pratap Sagar	4x43
14		Jawahar Sagar	3x33
15		Gandhi Sagar	5x23
16		Dholpur GPS	3x110
17		Ramgarh GPS	1x35.5+2x37.5+1x110
18	UP	Rihand	6x50
19		Obra	3x33
20		Vishnuprayag	4x100
21		Srinagar (Alaknanda)	4x82.5
22	Uttarakhand	Gamma Infra	2x76+1x73
23		Shravanti	6x75
24		Ramganga	3x66
25		Chibro	4x60
26		Khodri	4x30
27		Chilla	4x36
28		Maneri Bhali-I&II	3x30+4x76
29	Delhi	IP Extn GTs	6x30+3x30
30		Pragati GPS	2x104.6+1x121.2
31		Rithala	3x36
32	Haryana	Faridabad GPS	2x137.75+1x156.07

During last winter, SLDCs had been requested to carry out mock drills and share their experiences. However, the information was received **only** from HP (Sainj, Baspa) and Rajasthan (only schedule of exercises). SLDCs were requested the following:

- Share the information and report on blackstart exercises carried out in their respective control area last season.
- Share the program for this year's mock black start exercises.
- They may also identify additional generating stations/unit for black start exercise.

It was requested to the constituents to adhere to the finalized schedule. Any changes in the schedule were requested to be informed by 05th October 2018.

12. EHV lines tripping due to fog during winter:

In order to avoid tripping of EHV line during foggy (Smog) weather in winter, preventive actions like cleaning/washing of insulator, replacement to insulators with polymer one etc. have been recommended and being done. In order to have proper information about the lines wherein such actions have been taken, it had been repeatedly agreed in OCC/TCC meetings, to update line wise data for insulator replacement and cleaning. The lines details as well as format had been shared last year during winter but complete detail in desired format is yet to be received from the utilities. Format is as below:

Status of replacement of Porcelain insulators with Polymer insulators												As on-		
S.No.	Name of Line/voltage / S/C or D/C	Voltage Level (in kV)	Line details			Insulators to be replaced by Polymer (Target for this year)			Progress (Work already completed)			Schedule for completion of Replacement		Remarks *(If only partial location of the line has planned then may please indicate the location numbers or part kMs of line which have been planned)*
			Total Length of line (in kM)	Total Towers location (Nos)	Total Insulator Strings (Nos)	Length (kM)	Total Towers Locations (Nos)	Total Insulators Strings (Nos)	Length (in kM)	Total Towers Locations (Nos)	Total Insulators Strings (Nos)	Start Date	End Date	
1	2		3	4	5	6	7	8		9		11	12	13

Note: 1. Line constructed with Polymer Insulator may please also be indicated in the table

2. Similar separate table shall be formulated for Anti-fog insulators line as well for line which would be cleaned

3. Lines for whom there is no planning of cleaning or replacement may please also be given in the table but with '--' in planning as well as progress columns

Compiled 400 kV line information (polymer replacement status) available with NRLDC was attached at *Annexure-5 NRLDC* of agenda**.**

Utilities requested to identify and submit the transmission lines for insulator replacement and insulator cleaning for year 2018-19 in the appropriate format.

All the members were requested to check the list attached at Annexure-5 of the agenda of the 151st OCC meeting and submit the current status of polymer insulator replacement in the lines.

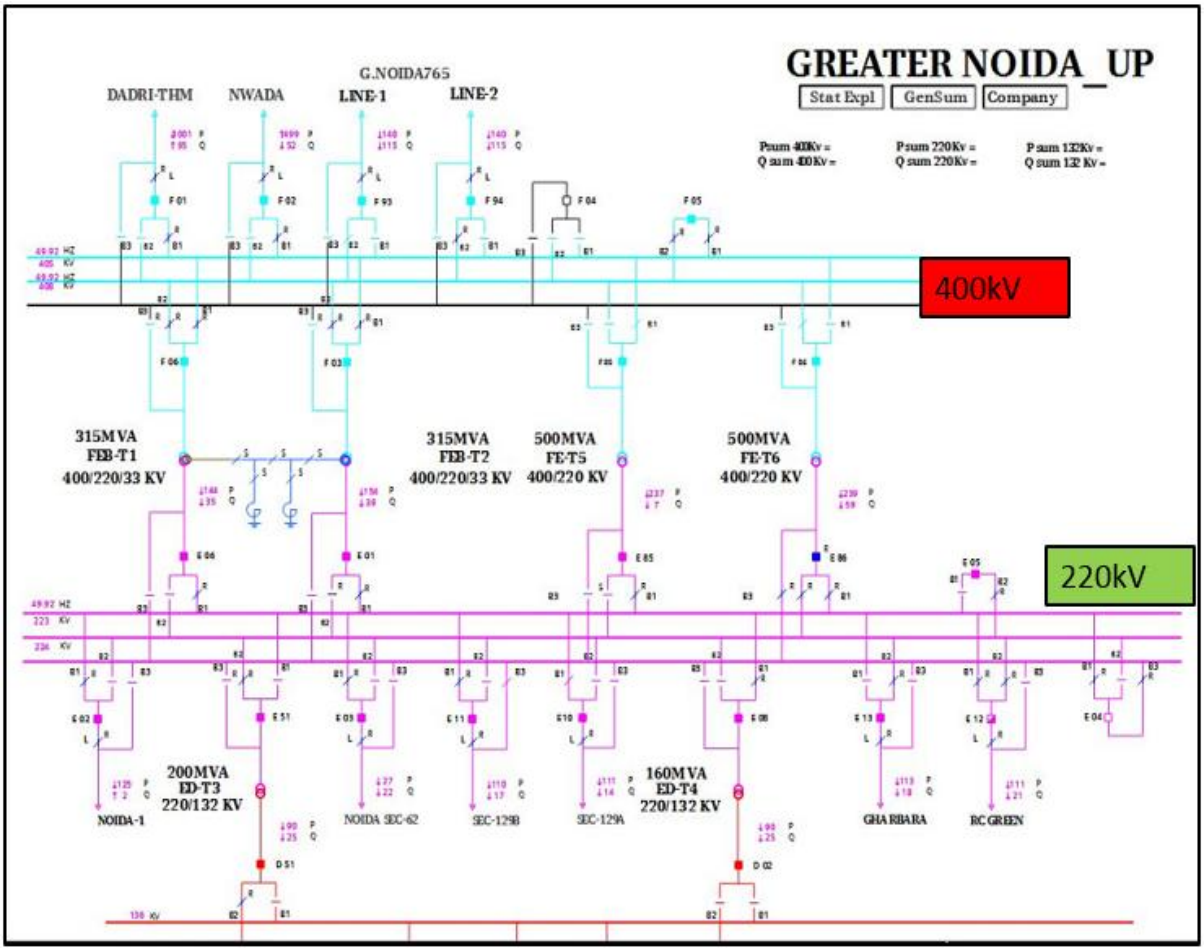
13. Complete outage of 400/220 kV G. Noida (UP) on 6th November, 2018 at 22:40 hrs:

UP SLDC reported that conductor of R-phase 400 kV Bus-A snapped at 400/220 kV G. Noida leading to 400 kV bus fault at 400/220 kV G. Noida (UP). 400 kV bus protection did not operate at 400/220 kV G. Noida (UP). It was found that none of the breaker opened from 400 kV G. Noida (UP) end.

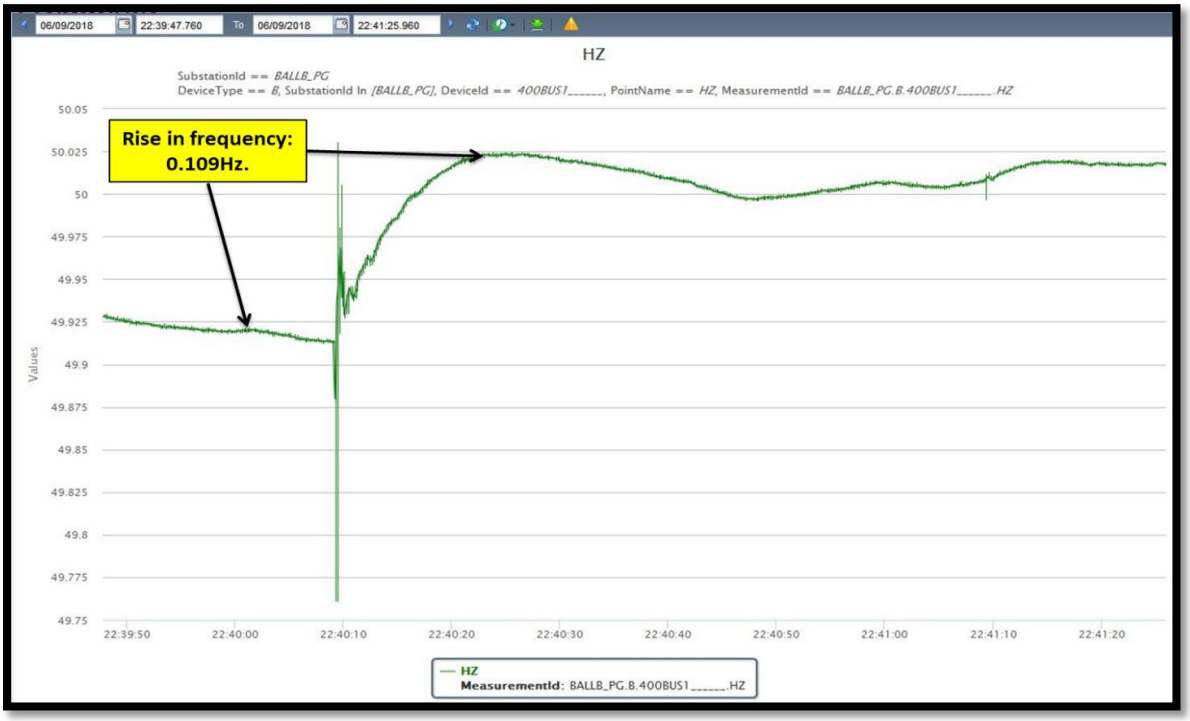
All the 400 kV connected lines from 400/220 kV G. Noida (UP) lines tripped from remote end. This resulted in loss of approx. 800-900 MW and frequency increasing from approx. 49.915 Hz to 50.025 Hz (thus a jump of ~0.11 Hz). After the tripping, line loadings on remaining lines remained within limits.

As reported by NTPC Dadri, vibration > 200 microns also sensed in Dadri stage-2 units.

400/220 kV G. Noida (UP) station is an important load feeding station in Delhi NCR with 1630 MVA (2*315 MVA+2*500 MVA) capacity. Connectivity Diagram is as below:

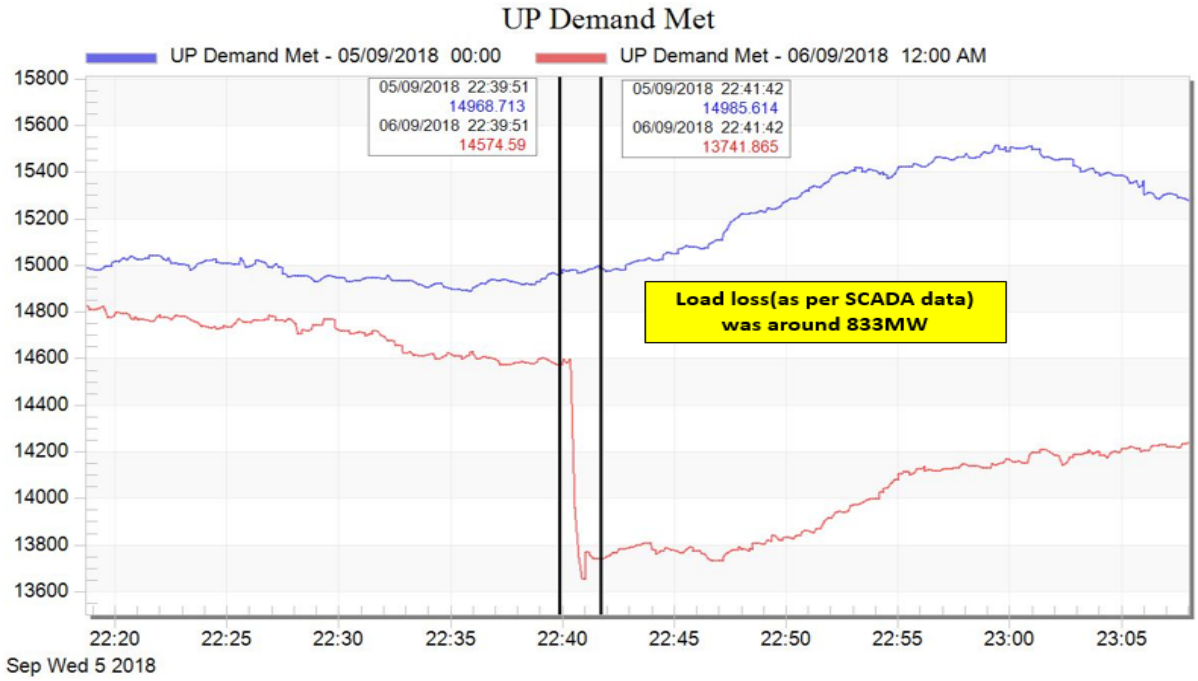


As per BLB PMU data maximum dip in R-phase voltage was ~85 kV and fault clearance time was ~400 ms. **Delayed clearance of fault as per PMU data**. PMU plot of phase voltages of BLB (PG) is as below:



AS per PMU plot of frequency, it seems load loss occurred in the system.

As per SCADA data, load loss of around 830 MW observed in UP demand met. As informed by UP, Sector-62 Noida is further connected in the Grid through 400 kV Indirapuram. All other 220 kV feeders and downward ICTs at 400/220kV G. Noida feed the radial load. SCADA data plot is as below:



As per SCADA SoE:

- 400 kV Dadri-G. Noida ckt tripped immediately from Dadri (NTPC) end. No breaker opened at 400/220 kV G. Noida end.
- Tripping also occurred at 400 kV G. Noida (765/400 kV)-G. Noida (400kV) ckt-1 & 2 from 400 kV G. Noida (765/400 kV) end. 765/400 kV 1500 MVA ICT-1 also tripped at 765/400 kV G. Noida (UP).
- It seems time synchronization error in the reporting of SoE of 765/400 kV G. Noida (UP) and 400 kV Nawada (Haryana)

Time	S/S name	Voltage Level (in kV)	Element Name	Element Type	Status	Remarks	Comment
22:20:48,354	NAWADA	400kV	4GNODA1	Circuit Breaker	Open	Time Synch error	Main CB of 400kV Nawada(end)-Greater Noida opens
22:40:09,160	As per PMU data						
22:40:09,165	DADRI (Thermal)	400kV	20GN1MA2	Circuit Breaker	Open		Tie CB of 400kV Dadri(end)-Greater Noida & 400kV Dadri(end)-Mandola ckt-2 opens
22:40:09,212	DADRI (Thermal)	400kV	21GNODA1	Circuit Breaker	Open		Main CB of 400kV Dadri(end)-Greater Noida opens
22:40:37,000	GNOD7_U	400kV	403T1	Circuit Breaker	Open	Time Synch error	400kV side main CB of 1500 MVA ICT 1 765kV Greater Noida opens
22:40:37,000	GNOD7_U	765kV	701T1	Circuit Breaker	Open		765kV side main CB of 1500 MVA ICT 1 765kV Greater Noida opens
22:40:37,000	GNOD7_U	400kV	402T1T3	Circuit Breaker	Open		400kV side tie CB of 1500 MVA ICT 1 765kV Greater
22:40:37,000	GNOD7_U	765kV	702AGRT1	Circuit Breaker	Open		765kV side tie CB of 1500 MVA ICT 1 765kV Greater
22:40:37,000	GNOD7_U	400kV	415GNDA2	Circuit Breaker	Open		Main CB of 400kV Greater Noida(765kV)(end)-Greater noida(400kV) ckt-2 opens
22:40:37,000	GNOD7_U	400kV	418GNDA1	Circuit Breaker	Open		Main CB of 400kV Greater Noida(765kV)(end)-Greater noida(400kV) ckt-1 opens
22:40:37,000	GNOD7_U	400kV	414SPGD2	Circuit Breaker	Open		Tie CB of 400kV Greater Noida(765kV)(end)-Greater noida(400kV) ckt-2 opens
22:40:37,000	GNOD7_U	400kV	417SPGD1	Circuit Breaker	Open		Tie CB of 400kV Greater Noida(765kV)(end)-Greater noida(400kV) ckt-1 opens

UPPTCL representative informed that R-phase pantograph isolator assembly of 400 kV G. Noida (end)-Dadri ckt got snapped and fell down causing 400 kV bus fault at 400 kV G. Noida (UP) station. 400 kV bus protection was not operated and all the 400 kV connected elements tripped from remote end in Z-2 distance protection operation. It was also reported that out of two 220 V DC source, one source was already under outage which was not known at that time and second 220 V DC for bus protection panel got out due to fuse failure, resulting in failure of 400 kV bus protection operation.

Remedial Measures (As per UPPTCL report):

- In order to avoid any such incident in future both 400 kV and 220 kV bus protection relays have been fed with double DC source from DCDB independently along with DC supervision relay for both the DC supply of the bus protection relays. Both the DC supply to the bus protection relays and its DC supervision relays have been tested and found in order. Later bus protection put back into service.
- Testing of 400 kV bus protection at 400 kV G. Noida (UP) to be done.
- Testing of protection of 1500 MVA ICT-I at 765 kV G. Noida S/S.

NRLDC representative also raised the concern of outage of entire substation in 400 kV Delhi ring being a serious operational issue and any further tripping could have resulted into disturbance propagating to larger area.

MS, NRPC also raised concern for non-operation of bus protection due to outage of DC source at important station of 400 kV G. Noida (UP) near Delhi control area. It appears to be an example of carelessness and human error and suggested for further detailed investigation of the incident and asked UP to submit the report of the incident and why there is a human error. It would be forwarded to the Secretary (Power), UP. He also suggested that the operators need to be educated about the annunciation and intactness of the protection system hardware. He also asked NTPC to submit a report on the vibration sensed at Dadri St-II units.

Action Points:

- Outage of entire substation in 400 kV Delhi ring is a serious operational issue and any further tripping could result into disturbance propagating to larger area and therefore, safeguards by way of protection system improvement need to be expedited.
- Healthiness of 400 kV bus protection at 400/220 kV G. Noida (UP) station needs to be ensured. 400 kV bus protection shall be tested within 7 days and submit the report to NRPC/NRLDC. (**Action**: Uttar Pradesh; **Time Frame**: 7 days)
- DC supply supervision relay and its alarm to be wired in control room and shall be visible to the control room operator. If DC supply failure alarm came into the system the same needs to be attended on top priority basis.

- Instantaneous tripping of 400 kV Dadri-G. Noida ckt from Dadri end needs to be looked into as fault was in Z-2 from Dadri end. (**Action**: NTPC; **Time Frame**: 7 days)
- Vibrations sensed Dadri ST-II units during the incident needs to be investigated by the NTPC and its report is to be submitted to the NRPC/NRLDC. (**Action**: NTPC; **Time Frame**: 15 days)
- Tripping of 1500 MVA 765/400 kV ICT-1 at 765/400 kV G. Noida (UP) needs to be checked and corrected. Protection Co-ordination of 1500 MVA ICT with 400 kV G. Noida (765/400kV)-G. Noida (400/220kV) ckts also to be checked. (**Action**: Uttar Pradesh; **Time Frame**: 15 days)
- Time synchronization of SCADA SoE of 765/400 kV G. Noida (UP) and Nawada (Haryana) to be checked and corrected. (**Action**: Haryana and UP; **Time Frame**: 15 days)

UPPTCL/ Haryana/ NTPC requested to submit the detailed report comprising the reply on above points.

14. Oscillations observed in the grid on 25th & 29th July 2018 due to tripping of one of the evacuation line from 220 kV Dhauliganga HEP:

This Agenda point was already discussed in 150th OCC meeting, in which oscillation details were shown and discussed. Following points were suggested to NHPC:

- Proper tuning/ retuning of PSS/AVR of the units at Dhauliganga HEP.
- SPS with the following logic shall be implemented at Dhauliganga HEP:
    - Probable logic of SPS could be: *Trip two units at Dhauliganga HEP in case of tripping of one of the 220 kV outgoing lines from Dhauliganga HEP or power flow on any of the outgoing line become zero*

Decision in 150th OCC meeting:

- NHPC representative stated that SPS logic has been prepared on the basis of power flow on lines and would be shared and approved in upcoming OCC/PSC meeting.
- NRLDC representative requested that PSS tuning shall be extensively carried out and report to be shared. Further, the dynamic machine parameters are important to assess the dynamic behavior of the system and shall be shared by NHPC and other constituents as well.
- OCC requested constituents to provide the respective details.

Issue of PSS tuning was again discussed in the **151st OCC meeting** and NHPC informed that PSS tuning has been done. Power Station has performed the test on functionality of PSS on all the four units (by the OEM) on 20th Apr 2018 to ensure its proper operation. It has been concluded in the report that:

- Based on step response test PSS behavior is normal and is damping the disturbance (+2% variation in stator voltage).

- When total load for one line goes above 185 MW with PSS ON, then overall system become unstable.
- During line fault conditions fluctuations are undamped in nature and it became so large that in the end it may trip all the running machines.

NHPC representative shared the following SPS logic during meeting:

- The O/C Stage-I of Line protection relays of both lines shall be configured corresponding to 180 MW i.e. 525A with zero time delay.
- If current flow in all phases of any one of the 220 KV lines exceeds 525 Amp, it will give trip command to only Bus Coupler CB.
- An alarm/event namely "SPS Operated" would be created in Plant SCADA.
- The "SPS OFF" shall also be configured in SCADA by taking feedback from manual switch.

NRPC representative suggested following to the NHPC:

- To share the last PSS tuning report (detailed report) to the RPC forum.
- To submit the SPS logic in PSC meeting to be held on 19th Sep 2018 for further discussion and approval.

15. Observance of Oscillations in the grid on 08th Aug 2018 due to tripping of one of the evacuation line from 400 kV Tehri-Koteshwar complex (N-1 contingency of line outage):

This Agenda point was already discussed in 150th OCC meeting, in which oscillation details were shown and discussed. Following action points were approved during the meeting:

- At Tehri HEP, the setting of unit #1 dead fault to be checked. Further, the sensitivity of Unit #1 as compared to other units also needs to be checked.
- Full SPS including the functional logic needs to be checked at Koteshwar (PG)/ Tehri HEP.
- In SPS logic, tripping of two units at Tehri HEP could also be thought of.
- In view of several fault incidents in recent past, strengthening of 400 kV Tehri-Koteshwar-Meerut transmission lines to be looked into.
- Setting of df/dt relay operated in Punjab to be checked and shared.
- Any UFR, df/dt relay operation in any other state to be checked and confirmed.
- Long outage of FSC of 400 kV Meerut-Koteshwar ckt-2 to be looked into and revival of FSC shall be expedited.
- AVR/ PSS tuning needs to be looked into for better tuning at Tehri and Koteshwar HEP.
- Reason of outage of FSC of 400 kV Meerut-Koteshwar ckt-1 (01 Aug to 08 Aug 2018) without informing to NRLDC, to be submitted and in future such actions to be avoided.
- Auto reclosure issue of tie CB of 400 kV Meerut (end)-Koteshwar Pool ckt-2 to be checked and corrected.

THDC further submitted the reply of the following points:

- **At Tehri HEP, the setting of unit #1 dead fault to be checked. Further, the sensitivity of Unit #1 as compared to other units also needs to be checked:**
    - Dead machine protection setting for all Units of Tehri HEP is set at V< 70% & I>100% (100 ms time delay) in line with the recommendation of OEM.
    - After the event occurred on 08.08.2018, protection relay of Unit#1 was tested and the operation of dead machine protection function was found in order as per the set criteria. The disturbance recorder of both the incidents and testing revealed the correct operation of dead machine protection as per set criterion.
    - Although, during severe power oscillations that occurred on 08.08.2018 & 20.08.2018, Unit#1 alone should not have tripped on dead machine protection as the same criteria is set in other three Units also. Hence, to study & check the response of Unit#1 AVR during system dynamic conditions, OEM has been called for necessary functional checking likely to be done in **November'2018**.
    - Further, the electrical parameters of all other units with respect to Unit#1 was checked and verified under normal operating conditions at maximum load and found to be in order.
    - In view of the above, present settings and sensitivity in respect of protection system is found to be in order

- **Full SPS including the functional logic needs to be checked at Koteshwar (PG)/ Tehri HEP.**
    - As per the recommendations, SPS logic has been implemented at Tehri end and tested satisfactorily on 16.01.2017 by extending SPS trip signal from KPS end. Thereafter, the scheme was always kept in service at Tehri end. Due to non-operation of SPS at KPS end during the recent incident, the SPS logic implemented at Tehri HEP was again tested by extending the SPS trip signal from KPS end and reported to NRLDC vide email dated 14.08.2018. However, the simulation of functional logic implemented at KPS end needs to be verified by PGCIL for correct operation. KPS-PGCIL has been requested in this matter for arranging necessary test facility and finalization of date with NRLDC for comprehensive testing. THDCIL, Tehri is ready for testing of SPS scheme as and when required.

- **AVR/ PSS tuning needs to be looked into for better tuning at Tehri and Koteshwar HEP:**
    - Last PSS tuning was conducted in Decemeber, 2015 and to comply the guidelines issued in 34th NRPC and 30th TCC, the process for engaging M/s BHEL expert for PSS Tuning/Step response test of Excitation Systems (4×250 MW) of Tehri HPP has already been initiated and the work shall be completed tentatively by November'2018.

- **In SPS logic, tripping of two units at Tehri HEP could also be thought of.**
    - In the present scenario, tripping of one unit i.e. 250 MW of Tehri HEP in the event of outage of one KPS-Meerut transmission line with the sealing of 1100 MW has been implemented. Tehri HEP is reservoir

based project and the out flow from Tehri Units shall equally be released for generation from Koteshwar HEP.

- In the event of tripping two machines from Tehri HEP the total generation loss during peak period shall be around 536 MW and subsequently outflow from Tehri HEP would also reduce resulting in generation back down of approximately 200 MW from Koteshwar HEP after certain time interval due to long outage of KPS-Meerut Ckt. Also, huge inflow from catchment area during monsoon period (from July to Sep.) the generation from Tehri HEP is almost round the clock to maintain maximum reservoir level. Under such a situation, the possibility of spillage of water from Tehri HEP could not be ruled out due to above limitations/restrictions.
- Considering the above, tripping of two Units from Tehri HEP may not be feasible and economical. Hence, alternative possibilities for strengthening the transmission corridor may be emphasized by ensuring continuous service of FSC and extensive maintenance of transmission network. As an alternative possibility, tripping of one unit of Koteshwar along with tripping of one Unit from Tehri HEP may be explored which would be equivalent to back down 368 MW of total generation from Tehri complex and sufficient to bring the system near to sealing limit i.e. 1100 MW

Details from POWERGRID for suggested points is still awaited. POWERGRID representative informed that SPS testing would be done by 1st week of **October, 2018.**

Following are the further action points decided in 151st OCC meeting:

- Tripping of one unit each at Tehri and Koteshwar (THDC) has been approved and requested THDC to implement the tripping at Koteshwar (THDC) also.
- Full SPS including the functional logic needs to be checked at Koteshwar (PG)/ Tehri HEP as soon as possible as sever oscillation observed in the grid due to non-operation of SPS in the past events.
- Long outage of FSC of 400 kV Meerut-Koteshwar ckt-2 to be looked into and revival of FSC shall be expedited.
- POWERGRID shall submit the detailed report considering the points raised in the 150th OCC meeting and same is mentioned in the 151st OCC agenda also.

16. Tripping in Jhakri-Karcham-Rampur complex due to SPS operation:

NRLDC representative stated the following:

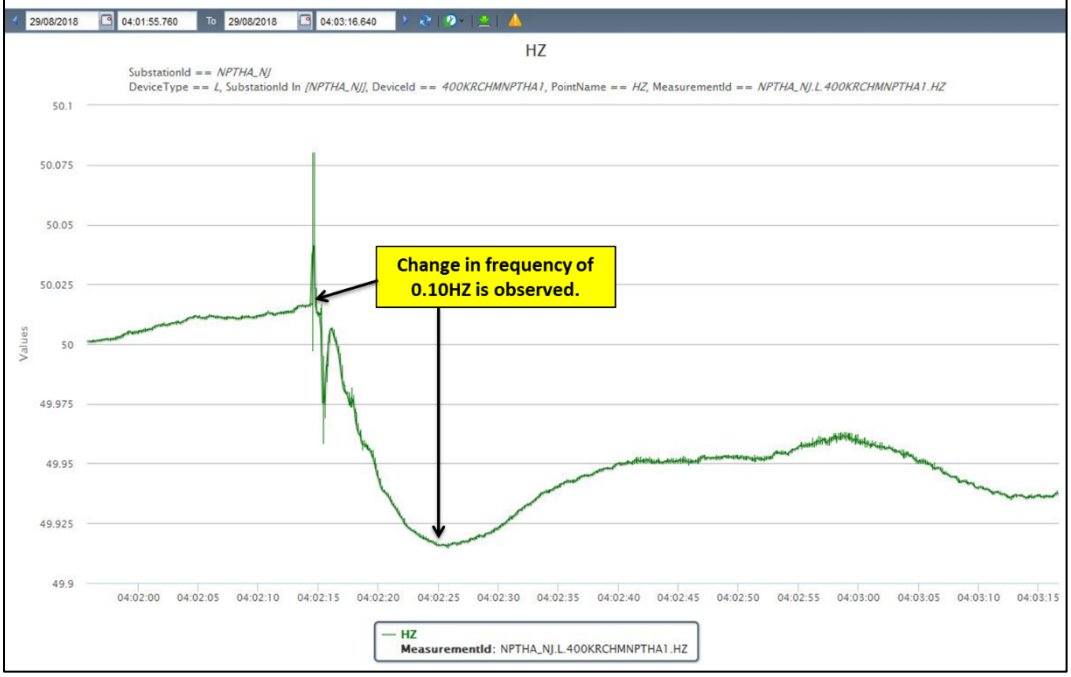
At 04:02 hrs of 29 August, 2018, B-N fault (94 km from Rampur end) occurred in both 400 kV Rampur–Nallagarh ckts. The Ckt-1 was successfully auto reclosed from both the ends. However, ckt-2 was auto reclosed successfully only at Nallagarh (PG) and CB failed to close at Rampur end, resulting in tripping of all CBs at Rampur on pole discrepancy.

Due to the above incident, SPS operated at Nathpa Jhakri and Rampur causing tripping of 2 units each at Rampur & Nathpa Jhakri hydro station. Due to SPS operation at Karcham, units-2 & 4 went into NLNE mode (No load Not Excited).

The PMU plot and DR received w.r.t. the incident are shown below:

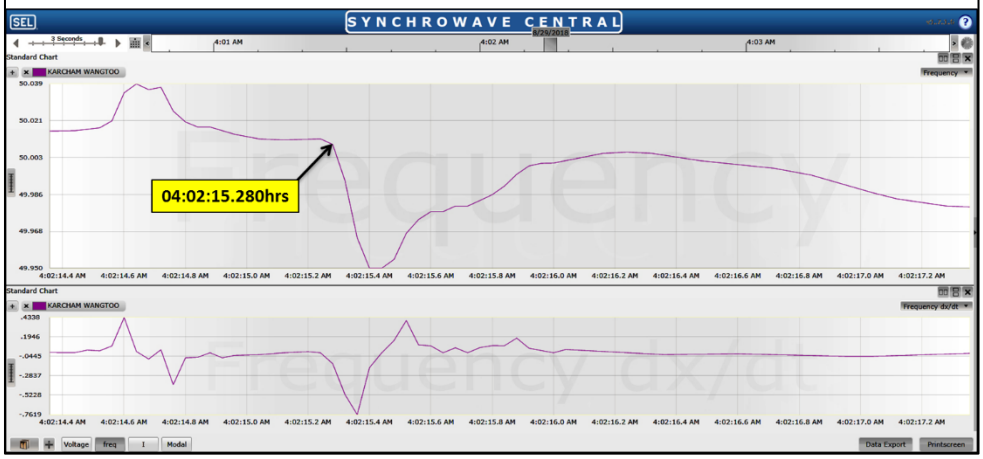
PMU Plot of frequency at Nathpa Jhakri(NJPC)

04:02hrs/29-Aug-18



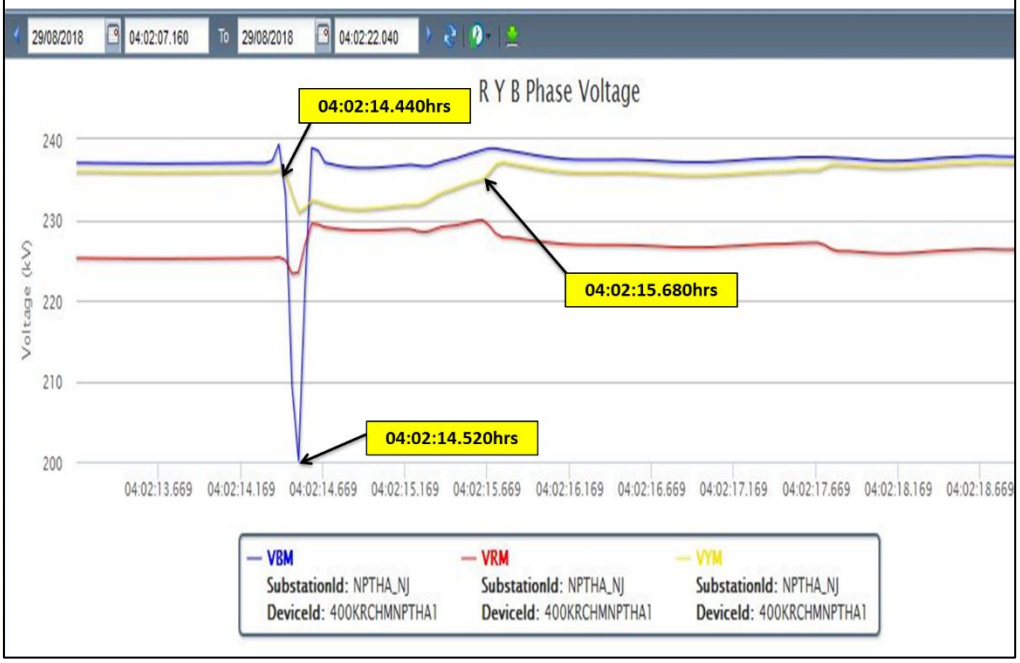
PMU Plot of frequency at Karcham

04:02hrs/29-Aug-18

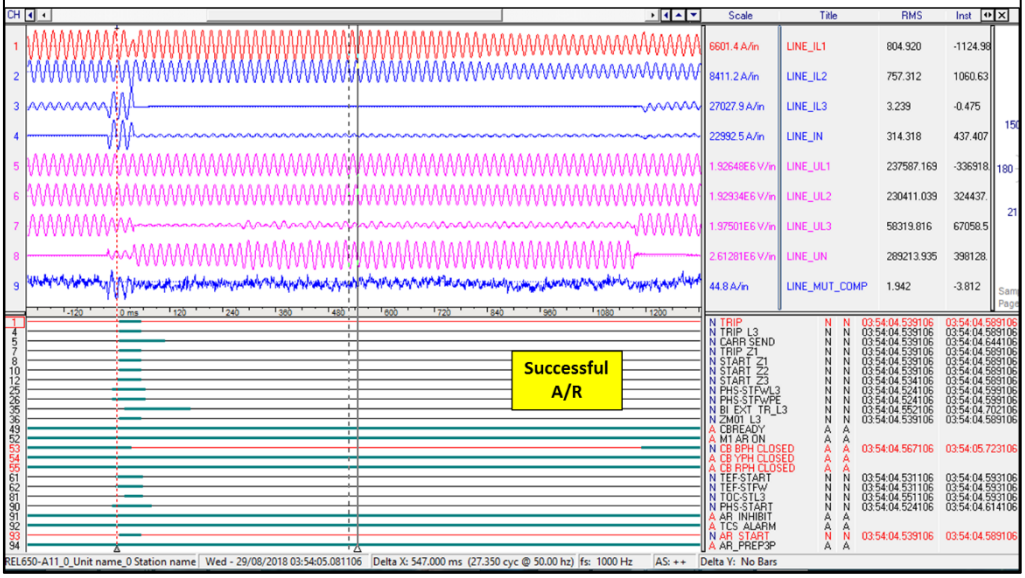


PMU Plot of phase voltage magnitude at Nathpa Jhakri(PG)

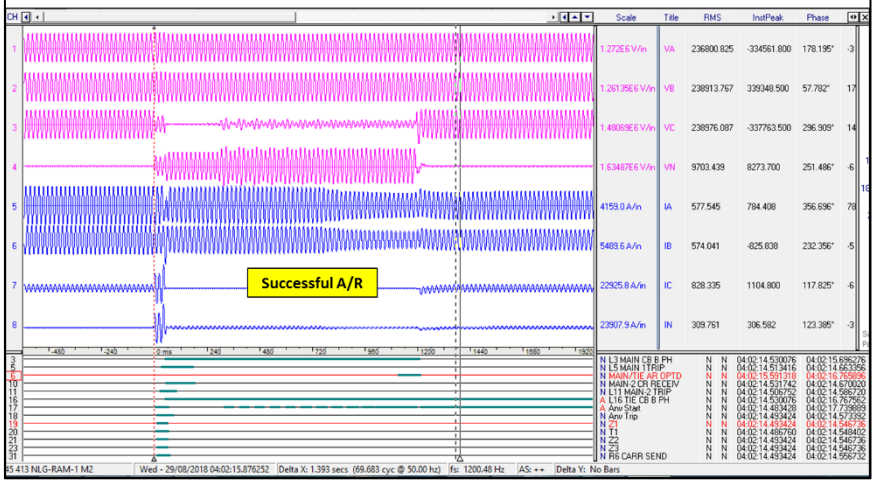
04:02hrs/29-Aug-18



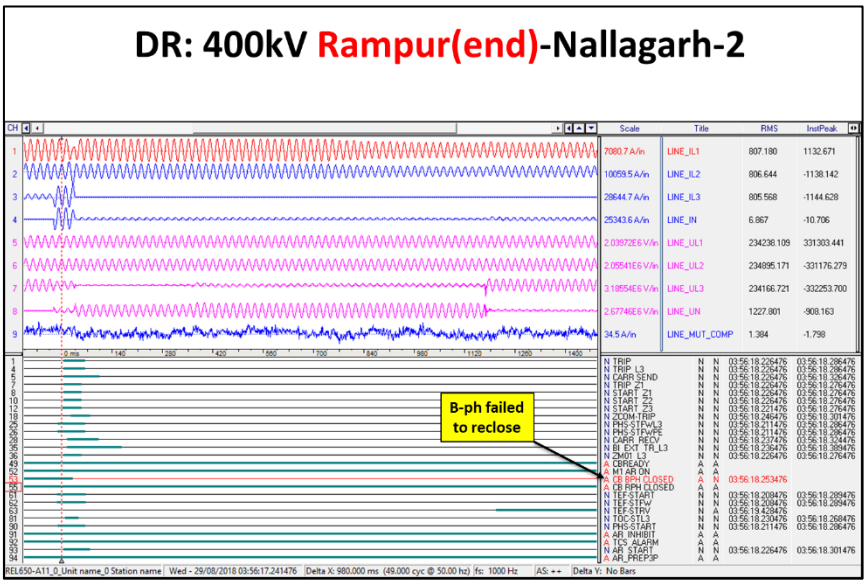
DR: 400kV Rampur(end)-Nallagarh-1



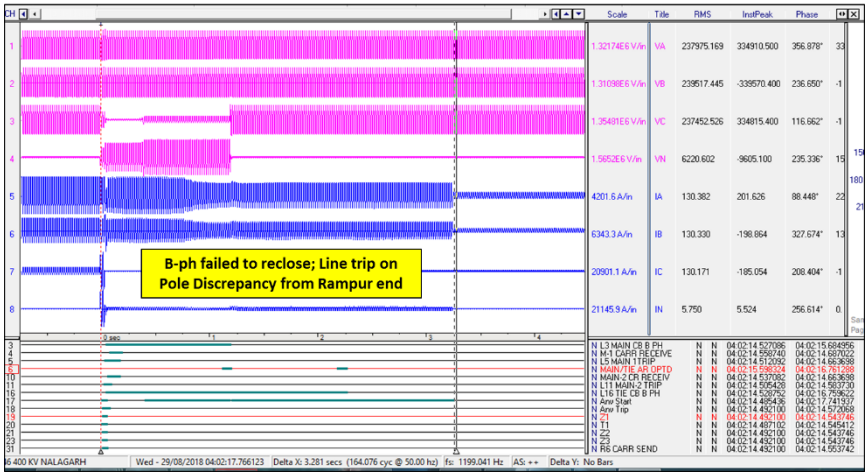
DR: 400kV Rampur-Nallagarh(end)-1



DR: 400kV Rampur(end)-Nallagarh-2



DR: 400kV Rampur-Nallagarh(end)-2



The SCADA SoE reported at NRLDC are as follows:

Time	Station	Voltage	Element	Device	Status
04:00:00,000	KARCHAM	400kV	G2H02	Circuit Breaker	Open
04:00:00,000	KARCHAM	400kV	G4H04	Circuit Breaker	Open
04:00:00,000	KARCHAM	400kV	G2H02	Circuit Breaker	Close
04:00:00,000	KARCHAM	400kV	G4H04	Circuit Breaker	Close
04:01:41,743	RAMPUR	400kV	02G2	Protection Trip	App
04:06:43,652	RAMPUR	400kV	01G1	Protection Trip	App
04:08:49,863	RAMPUR	400kV	01G1	Protection Trip	Disp
04:09:12,782	RAMPUR	400kV	02G2	Protection Trip	Disp

SJVNL, JSW (Karcham), POWERGRID requested to look into the following points:

- Non-closing of B-phase CB of 400 kV Nalagarh-Rampur-2 at Rampur.
- Tripping of two units each at Karcham, Jhakri and Rampur is as per the case-2 of SPS logic i.e. tripping of any two lines from Jhakri or Rampur. However, only one ckt (400kV Rampur-Nallagarh-2) tripped. Therefore, SPS logic needs to be checked.
- It seems from PMU frequency data that generating units tripped before auto-reclosing attempt of lines. The following needs to be shared w.r.t. SPS:
- Logic calculation time.
    - Time in which tripping command sent to units after meeting the condition for SPS.
    - Logic for various SPS conditions checking.
    - The reporting of SCADA SoE at NRLDC and its time synchronization to be looked into and resolved.
- The SPS operation on event held on 07th Sep'18 at 16:20 hrs may also be checked along with the above event and report of the same may also be sent to NRLDC/NRPC.

SJVNL representative stated that the SPS is being checked and report of the same would be submitted.

NRLDC representative stated that the possibility of tripping of both lines simultaneously may also be assessed through available data in view of whether the location of fault is same or different or any other issue. He further stated while referring the recent non-operation of SPS in case of Tehri-Koteshwar HEP tripping that the few information w.r.t. SPS viz. SPS logic, time of operation, details of mock testing of SPS must be maintained with the constituents and shared with NRPC/NRLDC.

MS, NRPC also stated that all utilities shall check the SPS under them and submit the report.

Annex- I

List of participants in the 151th OCC meeting held on 13.09.2018, New Delhi

BBMB

Name	Designation	Contact No.	Email
Amandeep Singh	PC, BBMB Chd	9478200223	powerc@bbmb.nic.in
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Er Kapoor Singh	Assistant Engineer E-Eqfer	9418468345	kaporsingh7355@gmail.com.
Er Rakesh Kumar	Junior Engineer -do-	9418328426	

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A.J. Siddiqui	SE, UPSLDC UPPTCL	9415609363	sesc@upsldc.org@gmail.com
Ram sharan singh	EE UPSLDC	8004921990	eeoutage@ upsldc.org

PTCUL

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AD Hydro Power Ltd.

Name	Designation-Org.	Contact No.	Email

TSPL

Name	Designation-Org.	Contact No.	Email

TPDDL

Name	Designation-Org.	Contact No.	Email
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IPGCL-PPCL, DELHI

Name	Designation-Org.	Contact No.	Email
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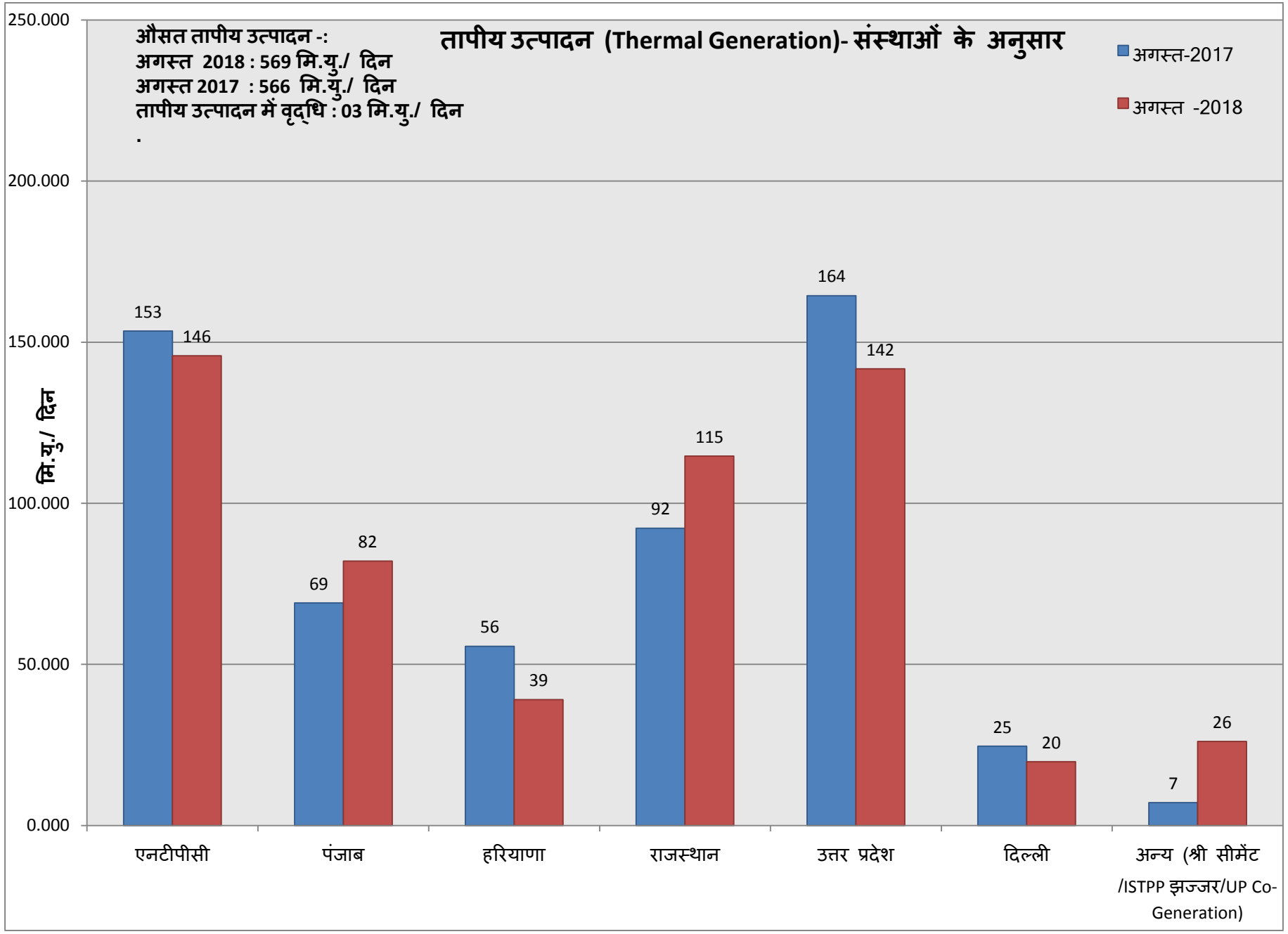
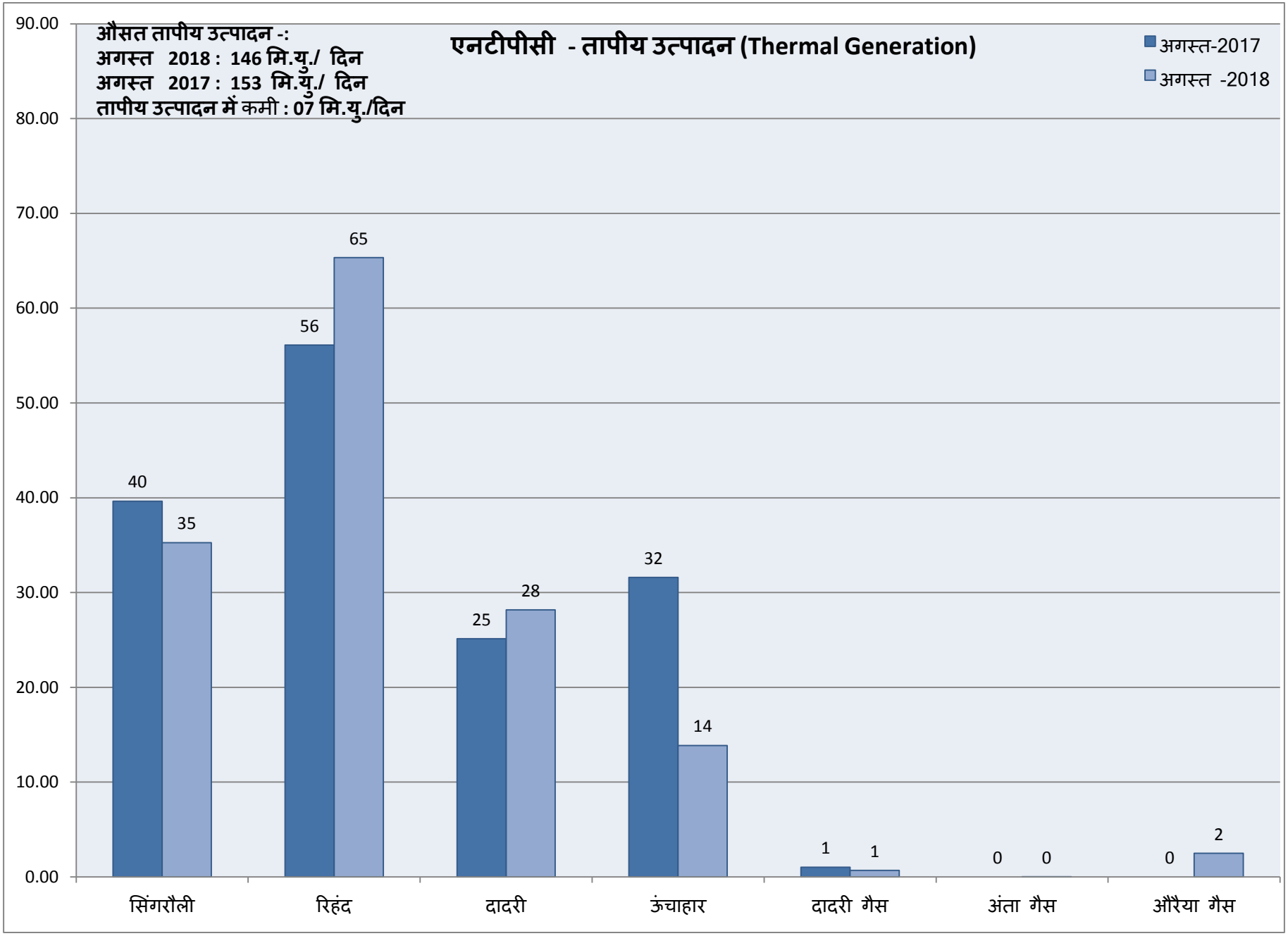
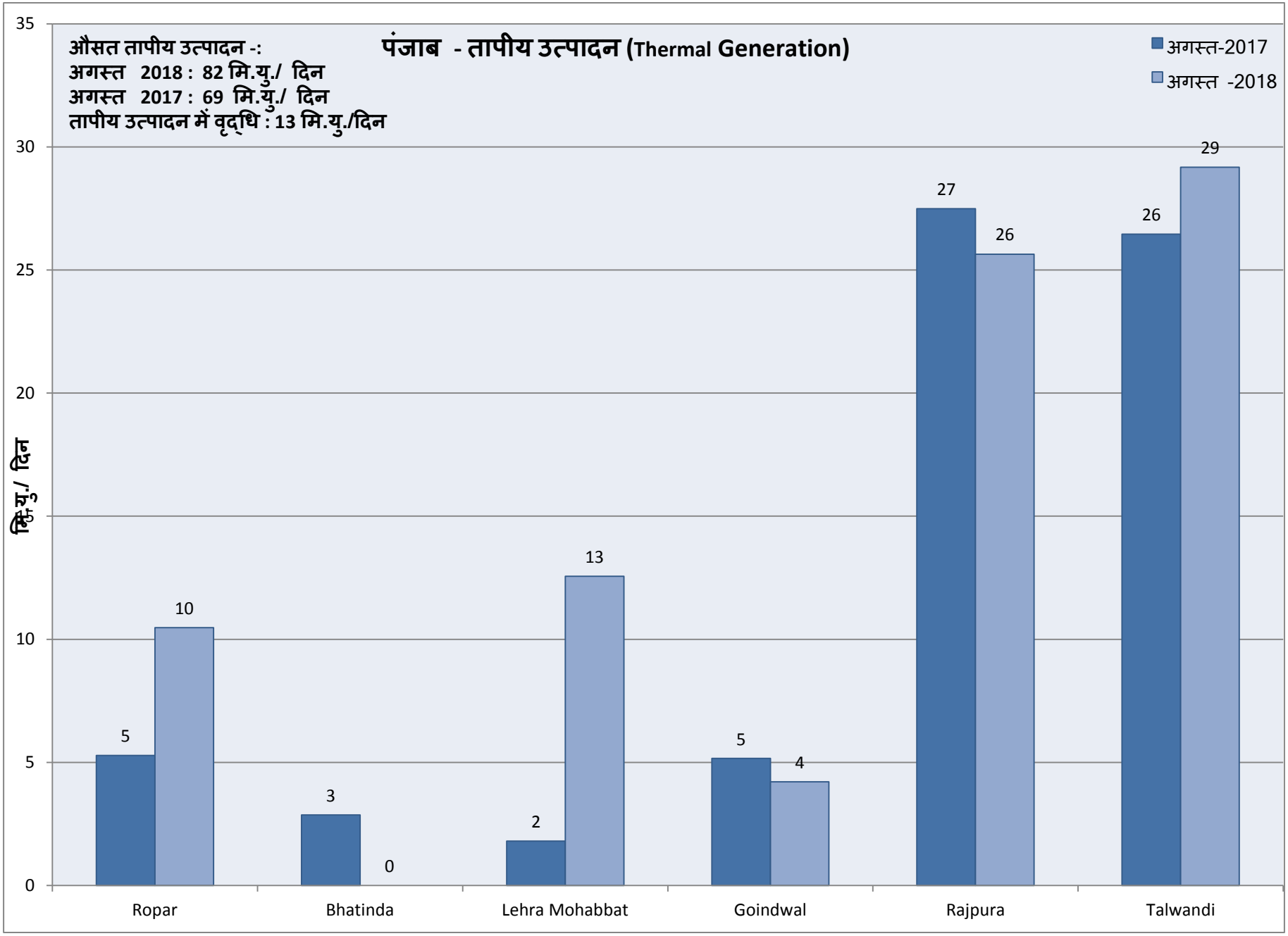
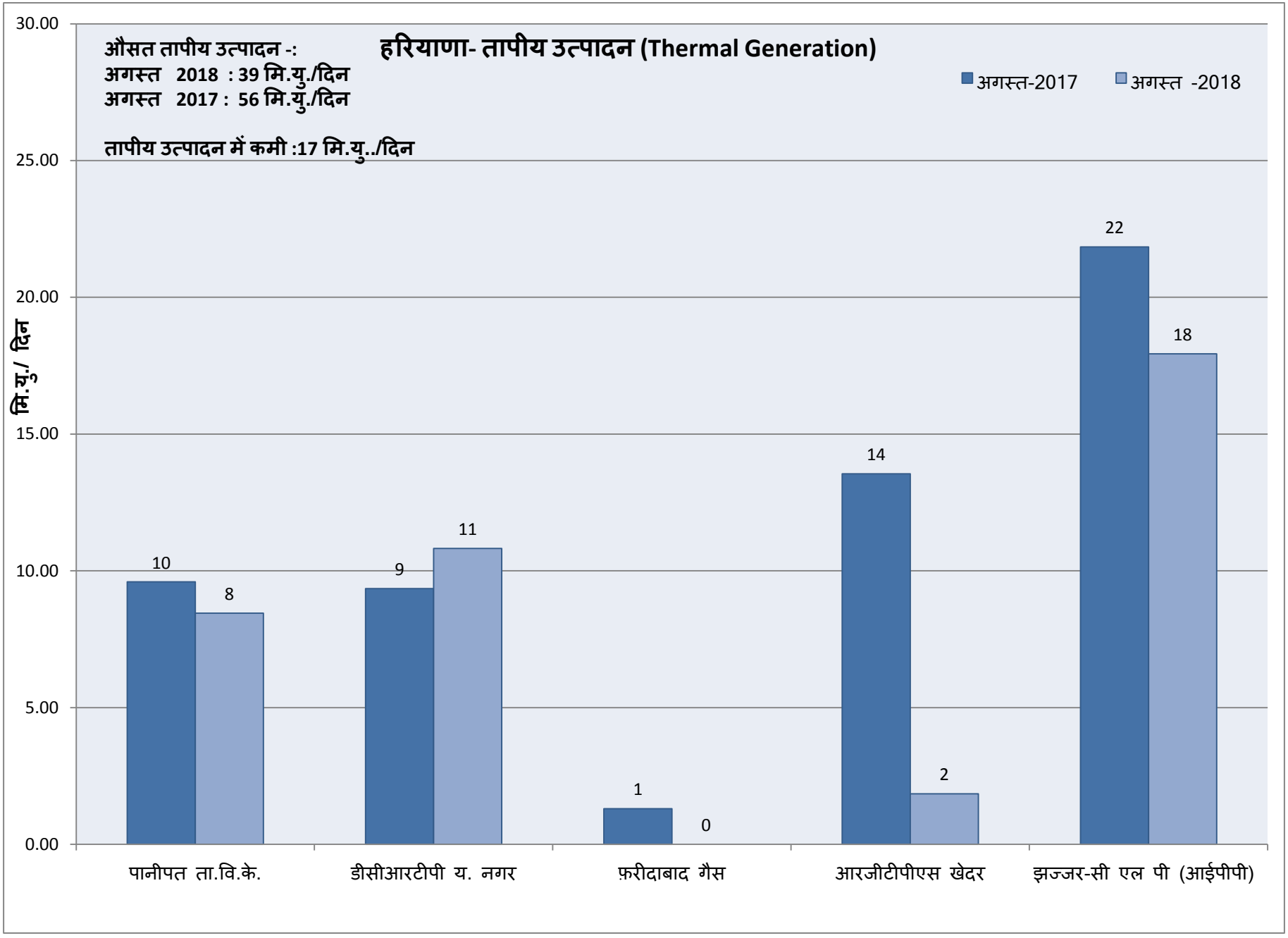
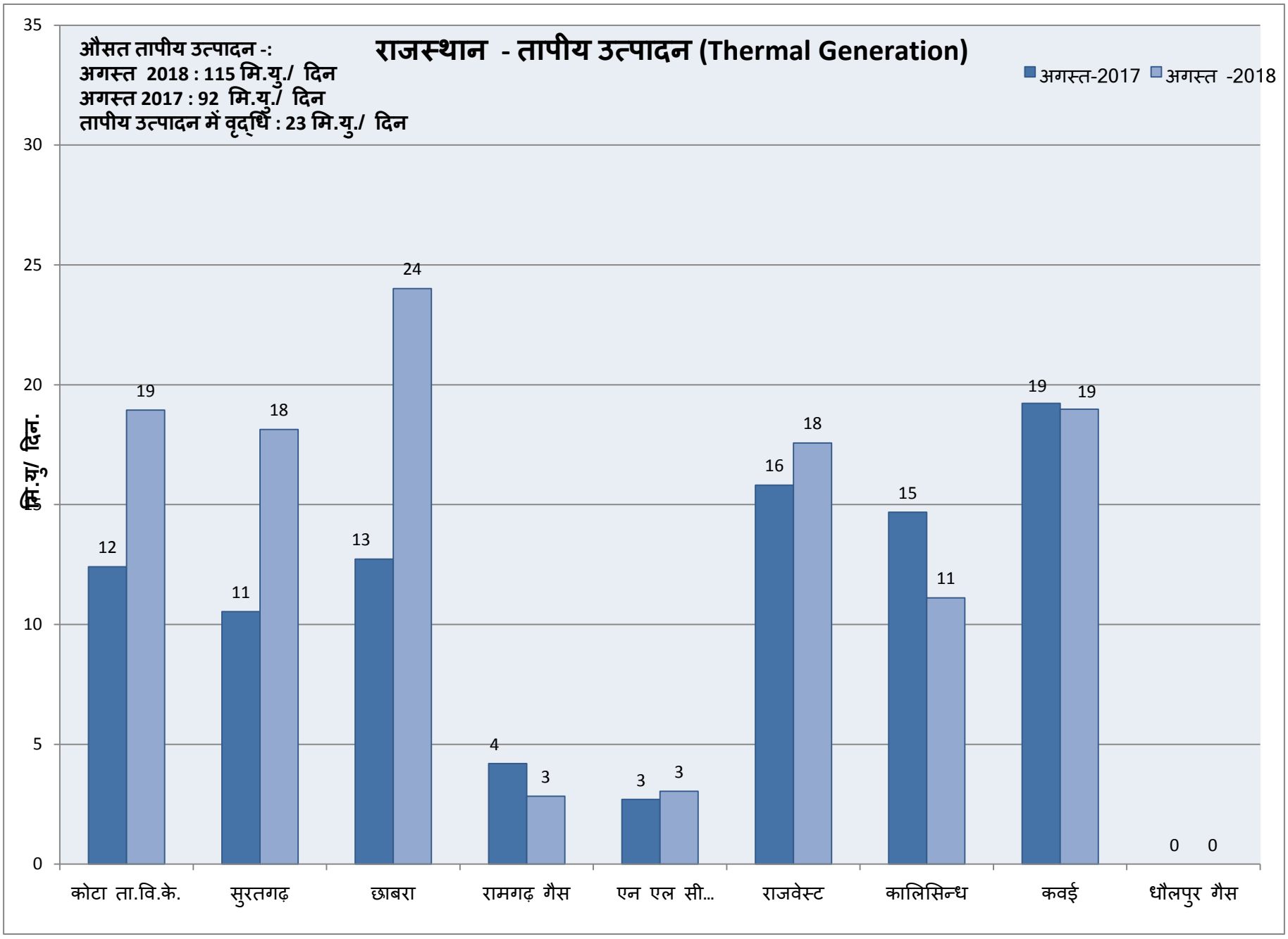

औसत तापीय उत्पादन -:
अगस्त 2018 : 569 मि.यु./ दिन
अगस्त 2017 : 566 मि.यु./ दिन
तापीय उत्पादन में वृद्धि : 03 मि.यु./ दिन
.
तापीय उत्पादन (Thermal Generation)- संस्थाओं के अनुसार
अगस्त-2017
अगस्त -2018
मि.यु./ दिन
250.000
200.000
150.000
100.000
50.000
0.000
153
146
69
82
56
39
92
115
164
142
25
20
7
26
एनटीपीसी
पंजाब
हरियाणा
राजस्थान
उत्तर प्रदेश
दिल्ली
अन्य (श्री सीमेंट /ISTPP झज्जर/UP Co-Generation)

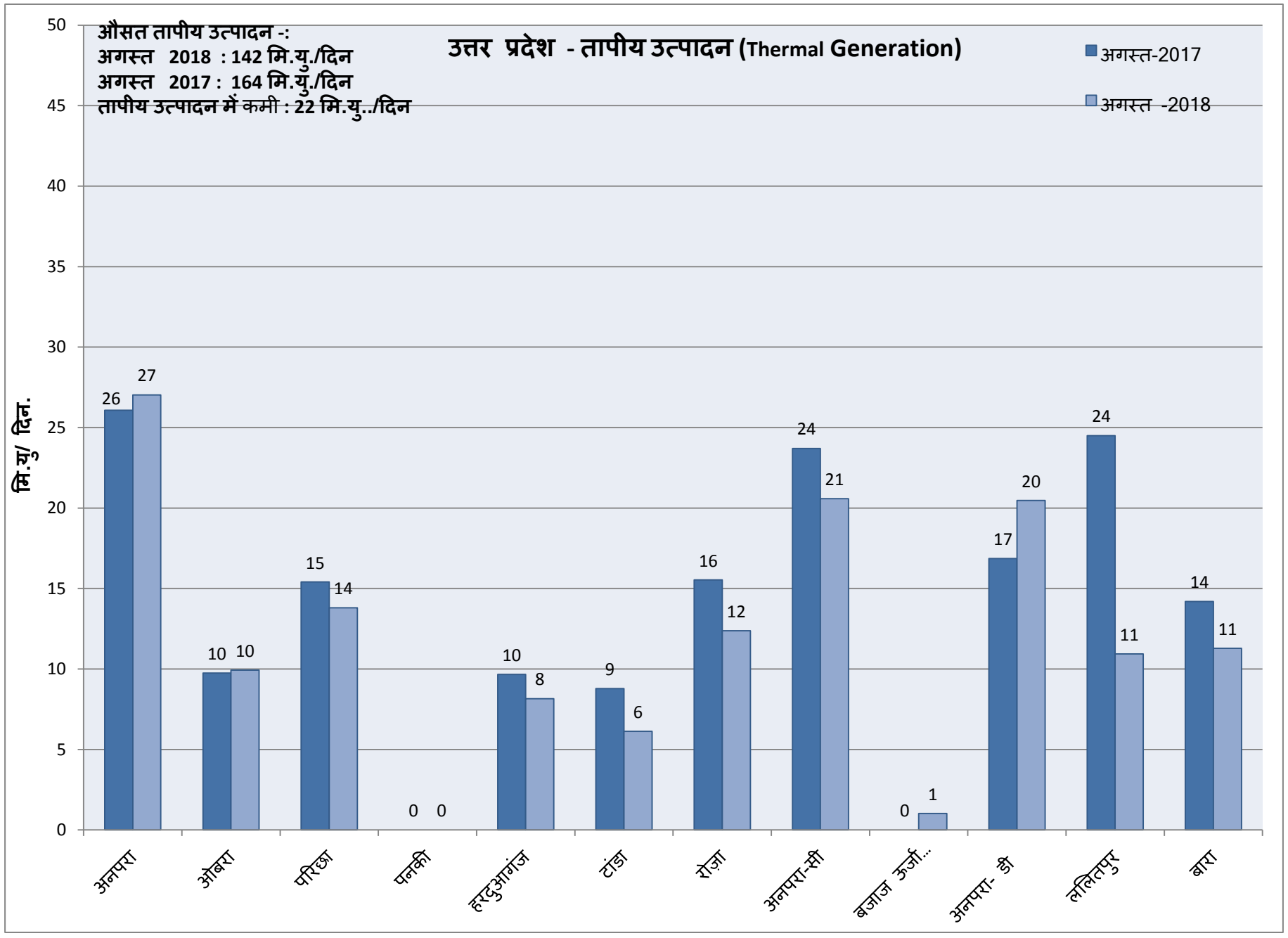
औसत तापीय उत्पादन -:
अगस्त 2018 : 146 मि.यु./ दिन
अगस्त 2017 : 153 मि.यु./ दिन
तापीय उत्पादन में कमी : 07 मि.यु./दिन



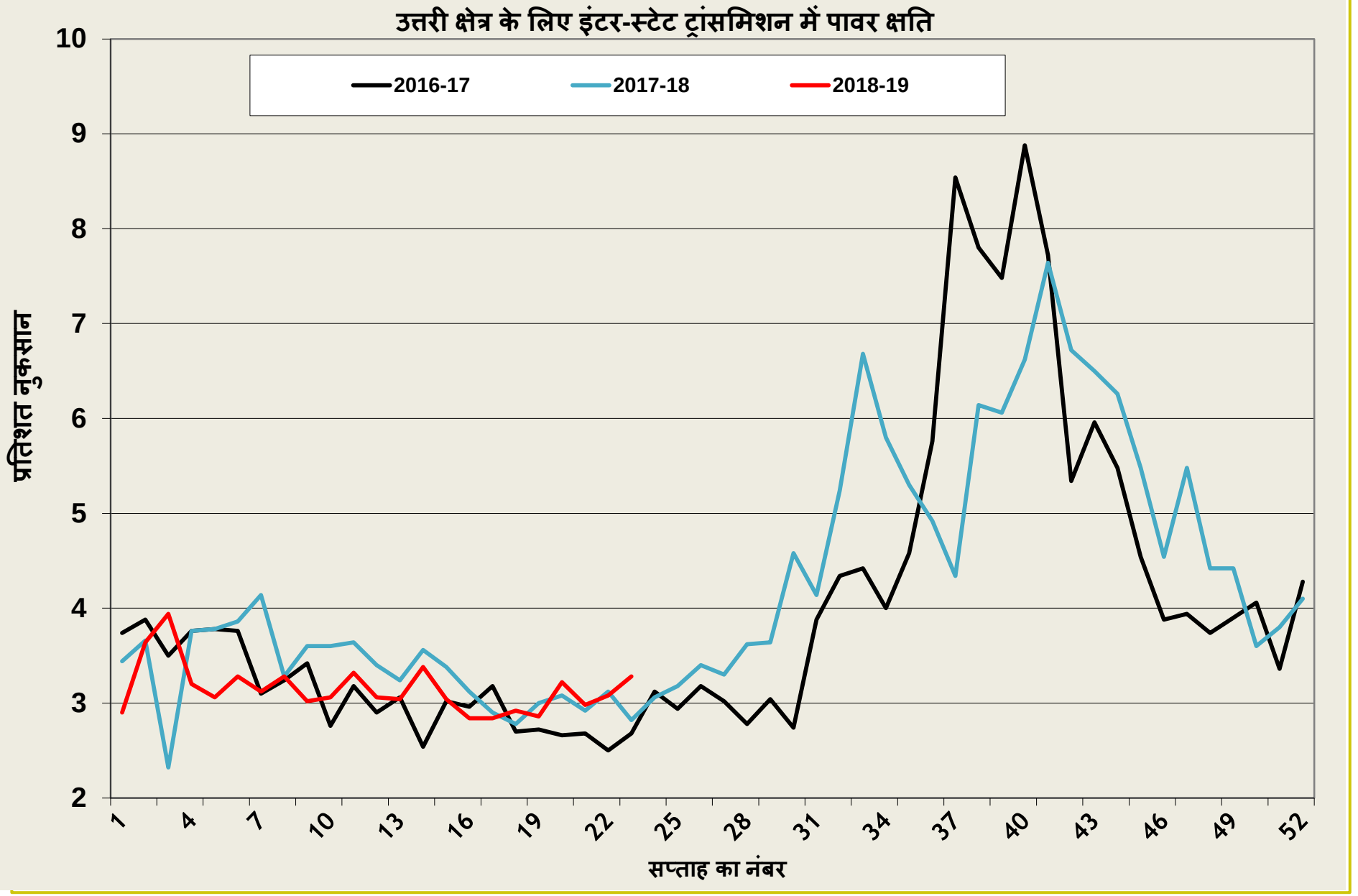

औसत तापीय उत्पादन -:
अगस्त 2018 : 82 मि.यु./ दिन
अगस्त 2017 : 69 मि.यु./ दिन
तापीय उत्पादन में वृद्धि : 13 मि.यु./दिन
पंजाब - तापीय उत्पादन (Thermal Generation)
अगस्त-2017
अगस्त -2018
मि.यु./ दिन
35
30
25
20
15
10
5
0
5
10
3
0
2
13
5
4
27
26
26
29
Ropar
Bhatinda
Lehra Mohabbat
Goindwal
Rajpura
Talwandi


हरियाणा- तापीय उत्पादन (Thermal Generation)
औसत तापीय उत्पादन -:
अगस्त 2018 : 39 मि.यु./दिन
अगस्त 2017 : 56 मि.यु./दिन
तापीय उत्पादन में कमी :17 मि.यु../दिन
अगस्त-2017
अगस्त -2018
मि.यु./ दिन
30.00
25.00
20.00
15.00
10.00
5.00
0.00
10
8
9
11
1
0
14
2
22
18
पानीपत ता.वि.के.
डीसीआरटीपी य. नगर
फ़रीदाबाद गैस
आरजीटीपीएस खेदर
झज्जर-सी एल पी (आईपीपी)


औसत तापीय उत्पादन -:
अगस्त 2018 : 115 मि.यु./ दिन
अगस्त 2017 : 92 मि.यु./ दिन
तापीय उत्पादन में वृद्धि : 23 मि.यु./ दिन
राजस्थान - तापीय उत्पादन (Thermal Generation)
अगस्त-2017
अगस्त -2018
मि.यु./ दिन.
35
30
25
20
15
10
5
0
12
19
11
18
13
24
4
3
3
3
16
18
15
11
19
19
0
0
कोटा ता.वि.के.
सुरतगढ़
छाबरा
रामगढ़ गैस
एन एल सी...
राजवेस्ट
कालिसिन्ध
कवई
धौलपुर गैस


औसत तापीय उत्पादन -:
अगस्त 2018 : 142 मि.यु./दिन
अगस्त 2017 : 164 मि.यु./दिन
तापीय उत्पादन में कमी : 22 मि.यु../दिन
उत्तर प्रदेश - तापीय उत्पादन (Thermal Generation)
अगस्त-2017
अगस्त -2018
मि.यु/ दिन.
50
45
40
35
30
25
20
15
10
5
0
26
27
10
10
15
14
0
0
10
8
9
6
16
12
24
21
0
1
17
20
24
11
14
11
अनपरा
ओबरा
परिछा
पनकी
हरदुआगंज
टांडा
रोज़ा
अनपरा-सी
बजाज ऊर्जा...
अनपरा- डी
ललितपुर
बारा

ट्रांसमिशन में पावर क्षति



1. CATEGORISED ON THE BASIS OF 'TRANSACTION TYPE'		
No. of Applications Processed		
	17-Aug	18-Aug
Contingency	300	348
Day Ahead	766	811
FCFS	29	36
Advance	37	77
TOTAL	1132	1272

Energy Scheduled (MUs)		
	17-Aug	18-Aug
Contingency	112.05	226.6052
Day Ahead	535.71	793.7982
FCFS	873.88	655.4901
Advance	1522.34	16386.5
TOTAL	3043.98	18062.3935

2. CATEGORISED ON THE BASIS OF INTRA/INTER REGIONAL TRANSACTIONS		
No. of Applications Processed		
	17-Aug	18-Aug
Inter-Regional	268	700
Intra-Regional	864	572
TOTAL	1132	1272

Energy Scheduled (MUs)		
	17-Aug	18-Aug
Inter-Regional	1913.74	9914.495
Intra-Regional	1129.74	8149.682
TOTAL	3043.48	18064.177

SL. No	Element Name	Type	Voltage Level	Owner	Outage		Expected Revival Date	Reason / Remarks
					Date	Time		
1	FSC of Pampore-1 at Kishnpr	FSC	220 kV	PGCIL	30-10-2012	12:00		Line length has reduced after LILO work completion
2	FSC of Pampore-2 at Kishnpr	FSC	220 kV	PGCIL	30-10-2012	12:00		Line length has reduced after LILO work completion
3	Vindhyachal HVDC BtB Block 2	HVDV Station	500 kV HVDC	PGCIL	26-11-2017	14:55		Differential protection operated.
4	Panki 240 MVA ICT 2	ICT	400/220 kV	UPPTCL	17-06-2018	18:13		ICT-2 burnt.
5	Akal 500 MVA ICT 4	ICT	400/220 kV	RRVPNL	5/8/2018	16:00		ICT burnt
6	Akal 315 MVA ICT 2	ICT	400/220 kV	RRVPNL	22-08-2018	22:55		ICT burnt.
7	FACT at BLB in Knp-BLB Line	FACTS	400 kV	PGCIL	2/7/2016	10:20		Y-Phase current imbalance
8	FSC (50%) of Koteshwar Pool -2 at Meerut (PG)	FSC	400 kV	PGCIL	14-07-2017	19:22		Fire in Y-ph unit
9	FSC of Balia-I at Lucknow	FSC	400 kV	PGCIL	29-11-2017	13:30		E/SD due to Hot Spot at Isolator
10	FSC (40%) of Fatehpur-II at Mainpurl(PG)	FSC	400 kV	PGCIL	5/8/2018	0:10		Minimum oil protection operated. Presently out due to Low current.
11	FSC (40%) of Kanpur-II at Ballabgarh(PG)	FSC	400 kV	PGCIL	9/8/2018	13:16		Manually taken out for system study with respect to Dadri-G Noida.
12	FSC (40%) of Kanpur-III at Ballabgarh(PG)	FSC	400 kV	PGCIL	9/8/2018	13:17		Manually taken out for system study with respect to Dadri-G Noida.
13	Allahabad(PG)-Naini Railway(Railway) 1	Line	220 kV	RLY	30-07-2018	1:55		Phase to earth fault B-N Fault
14	Dehar P.H.(BBMB)-Ganguwal(BBMB) 1	Line	220 kV	BBMB	30-08-2018	21:25		Due to heavy landsliding near tower no. 107, one leg of D/C tower is exposed. Line is manually opened, to provide temporary stay & anchoring.
15	Dehar P.H.(BBMB)-Ganguwal(BBMB) 2	Line	220 kV	BBMB	30-08-2018	21:26		Due to heavy landsliding near tower no. 107, one leg of D/C tower is exposed. Line is manually opened, to provide temporary stay & anchoring.
16	Dadri(NTPC)-Mandola(PG) 1	Line	400 kV	PGCIL	28-08-2018	10:43		For erection and commissioning of series line reactor and associated GIS bays at Mandola PG SS of Dadri ckt 1.

Central Sector reserve shutdown (2849 MW)

SL. No	Station	Location	Owner	Unit No	Capacity	Reason(s)	Outage		Expected Revival Date
							Date	Time	
1	Faridabad GPS	HARYANA	NTPC	3	156	Reserve Shutdown	8/5/2018	0:17	
2	Faridabad GPS	HARYANA	NTPC	1	137.75	Reserve Shutdown	8/5/2018	0:24	
3	Anta GPS	RAJASTHAN	NTPC	2	88.71	Reserve Shutdown	27-06-2018	10:24	
4	Faridabad GPS	HARYANA	NTPC	2	137.75	Reserve Shutdown	6/7/2018	22:51	
5	Anta GPS	RAJASTHAN	NTPC	3	88.71	Reserve Shutdown	7/7/2018	12:10	
6	Anta GPS	RAJASTHAN	NTPC	4	153.2	Reserve Shutdown	7/7/2018	12:16	
7	Anta GPS	RAJASTHAN	NTPC	1	88.71	Reserve Shutdown	7/7/2018	12:46	
8	Auraiya GPS	UP	NTPC	1	111.19	Reserve Shutdown	10/8/2018	6:08	
9	Auraiya GPS	UP	NTPC	5	109.3	Reserve Shutdown	10/8/2018	12:08	
10	Auraiya GPS	UP	NTPC	2	111.19	Reserve Shutdown	10/8/2018	12:14	
11	Auraiya GPS	UP	NTPC	4	111.19	Reserve Shutdown	24-08-2018	15:21	
12	Auraiya GPS	UP	NTPC	6	109.3	Reserve Shutdown	24-08-2018	15:52	
13	Auraiya GPS	UP	NTPC	3	111.19	Reserve Shutdown	24-08-2018	16:00	
14	Dadri-I TPS	UP	NTPC	4	210	Reserve Shutdown As per requested by DTL	26-08-2018	0:15	
15	Dadri-I TPS	UP	NTPC	1	210	Reserve Shutdown	1/9/2018	9:43	
16	ISTPP (Jhajjar)	HARYANA	NTPC	3	500	Reserve Shutdown As per requested on Haryana	2/9/2018	10:15	
17	Dadri GPS	UP	NTPC	2	130.19	Reserve Shut down	5/9/2018	0:04	
18	Dadri GPS	UP	NTPC	5	154.51	Reserve Shutdown	5/9/2018	1:45	
19	Dadri GPS	UP	NTPC	1	130.19	Reserve Shutdown	5/9/2018	1:54	

State Sector reserve shutdown/Coal shortage (4885 MW)

SL. No	Station	Location	Owner	Unit No	Capacity	Reason(s)	Outage		Expected Revival Date
							Date	Time	
1	Panipat TPS	HARYANA	HPGCL	5	210	Reserve Shutdown	13-07-2018	16:55	
2	RGTPP(Khedar)	HARYANA	HPGCL	1	600	Reserve Shutdown	21-07-2018	16:53	
3	Harduaganj-C TPS	UP	UPRVUNL	7	105	Reserve Shutdown	26-07-2018	10:45	
4	Panipat TPS	HARYANA	HPGCL	6	210	Reserve Shutdown	4/8/2018	20:26	
5	Guru Gobind Singh TPS (Ropar)	PUNJAB	PSEB	4	210	Reserve Shutdown	15-08-2018	8:35	
6	Suratgarh TPS	RAJASTHAN	RRVUNL	3	250	Reserve Shutdown	22-08-2018	13:09	
7	Lalitpur TPS	UP	LPGCL	2	660	Reserve Shutdown	27-08-2018	8:15	
8	Guru Hargobind Singh TPS (Lehra Mohabbat)	PUNJAB	PSEB	2	210	Reserve Shutdown	30-08-2018	7:40	
9	Panipat TPS	HARYANA	HPGCL	7	250	Reserve Shutdown	2/9/2018	8:59	
10	DCRTPP (Yamuna Nagar)	HARYANA	HPGCL	2	300	Reserve Shutdown	2/9/2018	10:10	
11	Suratgarh TPS	RAJASTHAN	RRVUNL	1	250	Reserve Shutdown	2/9/2018	12:56	
12	Suratgarh TPS	RAJASTHAN	RRVUNL	5	250	Reserve Shutdown	2/9/2018	14:46	
13	Guru Gobind Singh TPS (Ropar)	PUNJAB	PSEB	3	210	Less Demand	2/9/2018	18:45	
14	Guru Hargobind Singh TPS (Lehra Mohabbat)	PUNJAB	PSEB	3	250	Less Demand	2/9/2018	22:53	
15	Guru Gobind Singh TPS (Ropar)	PUNJAB	PSEB	6	210	Less Demand	3/9/2018	9:00	
16	Guru Hargobind Singh TPS (Lehra Mohabbat)	PUNJAB	PSEB	1	210	Less Demand	3/9/2018	11:20	
17	Suratgarh TPS	RAJASTHAN	RRVUNL	4	250	Reserve Shutdown	8/9/2018	21:57	
18	Suratgarh TPS	RAJASTHAN	RRVUNL	6	250	Reserve Shutdown	9/9/2018	11:31	

Transmission Lines

(400kV- 689 ckt. km)

S. No.	Name of element	Voltage Level (in kV)	Line Length (In kM)	Conductor Type	Owner	Remarks	Actual date & time of charging(Synchronized)	
							Date	Time
1	400kV Samba-Amargarh(401)-1 along with 50 MVAR non-switchable line reactor at both ends	400	273.4	Twin Moose	NRSS XXIX	samba end LR ownership is with PGCIL	31.08.2018	20:12
2	400kV Samba-Amargarh(404)-2 along with 50 MVAR non-switchable line reactor at both ends.	400	273.4	Twin Moose	NRSS XXIX		21.08.2018	21:59
3	400kV Anta-Chhabra along with associated bays no 402 (Anta) & 406(Chhabra end)	400	91.052	ACSR Twin Moose	RRVPNL	From Anta end	21.08.2018	21:59
4	400kV DC Chhabra-Bhilwara-2	400	49.43	ACSR Twin Moose	RRVPNL		10.08.2018	17:20
5	400kV Suratgarh-Suratgarh super critical interconnector-2 and associated bays X-13 (Suratgarh), Y-2(Suratgarh super critical)	400	2	Quad Moose	RUVNL		17.08.2018	19:58

LILO of Transmission Lines
(220kV- 7 ckt. Km & 132kV 4.49 Km)

S. No.	Name of element	Voltage Level (in kV)	Line Length (In kM)	Conductor Type	LILO Length (In Km)	Owner	Remarks	Actual date & time of charging (Synchronized)	
								Date	Time
1	220kV Khodri-Sarsawa-1 { LILO of 220kV Saharanpur-Khodri-1 at Sarsawa}	220	83.517	Single Zebra LILO Portion & Original Deer	7.187	UPPTCL		02.08.2018	19:26
2	400kV Paricha-Orai-2 { LILO of 400kV Paricha-Mainpuri-2 at Orai}	400	111	Twin Moose	it was originally planned like this only.	UPPTCL		12.08.2018	16:53
3	400kV Mainpuri-Orai-2 { LILO of 400kV Paricha-Mainpuri-2 at Orai}	400	178	Twin Moose		UPPTCL		13.08.2018	15:36
4	132kV Kalagarh-Sherkote { LILO of 132kV Kalagarh-Dhampur at Sherkot}	132	42.97	single panther	4.49	UPPTCL	From Sherkot end only	23.08.2018	12:56

Bus Reactor
(Capacity Addition - 176 MVAR)

S. No.	Name of element	Voltage Level (kV)	Transformation Capacity (in MVAr)	New/ replacement /augmentation	Make	Agency/ Owner	Remarks	Actual date & time of charging	
								Date	Time
1	3*42 MVAR Bus Reactor-1 at Chamera-1	400	126	New	BHEL	NHPC		25.08.2018	13:42
2	50 MVAR Bus Reactor along with associated bay no 452 A at Bhilwara	400	50	New	CGL	RRVPNL		14.08.2018	18:36

Line Reactor
(Capacity Addition - 250 MVAR)

1	50 MVAR Non switchable line Reactor of Samba-1 at Amargarh	400	50	New	GE T&D	PGCIL		08.08.2018	14:25
2	50 MVAR Non switchable line Reactor of Samba-2 at Amargarh	400	50	New	GE T&D	PGCIL		09.08.2018	17:47
3	50 MVAR Non switchable line Reactor of Singrauli-3 at Allahabad	400	50	New	ALSTOM	PGCIL		25.08.2018	13:38
4	50 MVAR Non switchable line Reactor of Amargarh-1	400	50	New	CGL	PGCIL		21.08.2018	20:59
5	50 MVAR Non switchable line Reactor of	400	50	New	CGL	PGCIL		21.08.2018	21:59

Amended Annexure-4

		MU	MW
State		Oct-18	Oct-18
Chandigarh	Availability	125	335
	Requirement	125	280
	Surplus/Shortfall (MU)	0	55
	Surplus/Shortfall (%)	0.0%	19.6%
Delhi	Availability	3440	5610
	Requirement	2790	**5070**
	Surplus/Shortfall (MU)	650	610
	Surplus/Shortfall (%)	23.3%	12.2%
Haryana	Availability	5620	8430
	Requirement	4550	9433
	Surplus/Shortfall (MU)	1070	-1003
	Surplus/Shortfall (%)	23.5%	-10.6%
Himachal Pradesh	Availability	1050	2150
	Requirement	850	1500
	Surplus/Shortfall (MU)	200	650
	Surplus/Shortfall (%)	23.5%	43.3%
Jammu & Kashmir	Availability	890	1900
	Requirement	1570	2630
	Surplus/Shortfall (MU)	-680	-730
	Surplus/Shortfall (%)	-43.3%	-27.8%
Punjab	Availability	5876	9810
	Requirement	4900	9470
	Surplus/Shortfall (MU)	976	340
	Surplus/Shortfall (%)	19.9%	3.6%
Rajasthan	Availability	7786	11072
	Requirement	6869	11090
	Surplus/Shortfall (MU)	917	-19
	Surplus/Shortfall (%)	13.3%	-0.2%
Uttar Pradesh	Availability	11160	16070
	Requirement	11470	**17500**
	Surplus/Shortfall (MU)	-310	-430
	Surplus/Shortfall (%)	-2.7%	-2.6%

Uttarakhand	Availability	1090	2020
	Requirement	1180	2050
	Surplus/Shortfall (MU)	-90	-30
	Surplus/Shortfall (%)	-7.6%	-1.5%
Total NR	Availability	37037	55377
	Requirement	34304	53700
	Surplus/Shortfall (MU)	2733	1677
	Surplus/Shortfall (%)	8.0%	3.1%

Follow up issues from previous OCCMs **ANNEXURE 9**

SNO	Description of Agenda point	Details	UPDATED STATUS
1	**Monitoring of schemes funded from PSDF (Agenda by NPC)**	The latest status of the schemes for which grant has been sanctioned from PSDF for the schemes in Northern Region. Utilities are requested to expedite implementation of the schemes and submit information of physical as well as financial progress in the prescribed format by first week of every month on regular basis to Member Convener, PSDF Project Monitoring Group (AGM, NLDC and POSOCO) with a copy to NPC Division **The updated status available was attached as Annexure 9/1 of the Agenda of the 151st OCC meeting.**	**The updated status was received from Punjab, Rajasthan, Delhi & UP.**
2	**Sub-stations likely to be commissioned in next 6 months.**	All the concerned states were requested to submit the details of the downstream network associated SPECIFICALLY with THESE POWERGRID substations along with the action plan of their proposed/approved networks.	**The details of the substations of Power Grid and their required downstream network as updated in the meeting is enclosed *as* Annexure 9/2.** **All concerned utilities were requested to ensure proper utilization of the available bays on the POWERGRID SUBSTATION.**
3	**Progress of installing new capacitors and repair of defective capacitors**	. The available up to date status of installation of new capacitors and revival of defective capacitor by the State constituents is enclosed as ***ANNEXURE 10/3OF THE AGENDA OF THE 146TH OCC MEETING.*** ***150th OCC meeting:*** UPPTCL submitted the information as per the required format .All other utilities were requested to update similarly. It was stated that in the similar format all utilities should submit the information in the similar format.	**UP & RAJASTHAN have submitted the data as per prescribed format (Annexure9/3) All other utilities were requested to update regularly.**

4.	**Healthiness of defence mechanism: Self- certification**	Report of Mock exercise for healthiness of UFRs carried out by utilities themselves on quarterly basis is to be submitted to NRPC Secretariat and NRLDC. All utilities were advised to certify specifically, in the report that "***All the UFRs are checked and found functional"***. Reports ending march 2018 stands received from all states. ***150th OCC meeting:*** All utilities were requested to submit reports of testing in every quarter. The reports stands submitted for period ending June 2018 by all the states. MS NRPC stated that the information should be submitted regularly. The soft copy may please be submitted	**All utilities are requested to submit reports of testing in every quarter in soft copy. All the states were requested that the reports for period ending September 2018 by all the states should be submitted positively by First week of October.**
5.	**UFR REPLACEMENT** . In PTCUL the static type UFRs were still installed on Transformers/feeders emanating from 132KV Majra and Jwalapur Substations and 220KV Ramnagar, Roorkee and Rishikesh Substations	PTCUL representative intimated that the order for numeric relays procurement has been placed and he assured that efforts would be made to get the relays replaced by 31.12.2017 **150th OCC meeting*:*** **PTCUL representative stated that all UFR relays are numeric in their state. MS NRPC stated that a confirmation regarding that the requested to update that the static relays have been changed on the Substations mentioned.**	**PTCUL updated as per the UFR data of the state that the relays stands replaced on the locations detailed.**
6.	**Strengthening of Intra-State transmission system**	Also all SLDCs are requested to give half yearly feedback ending 6/2018 in the month of 7/2018 to STU regarding bottlenecks, constraints and overloading in the State transmission network for proper transmission planning **150th OCC meeting:** Information from Punjab along with the comments of Planning wing stands submitted. Information from Rajasthan vide which SLDC has intimated the bottlenecks, constraints and overloading in the State transmission network to their planning wing stands submitted MS NRPC stated that this information should be submitted	**PTCUL & Rajasthan have submitted the data regarding the constraints / bottlenecks observed in the system to their STU.** **Punjab & & PTCUL were requested to update.** **All states were again requested by SE(O) to update regularly as this information is very crucial for better planning of the grid.**

		regularly as it is very important for future panning & grid of the system. All states were requested by SE(O) to update regularly as this information is end to the planning wing of CEA for discussion in the Standing Committee. .	
7	**Mapping of Feeders in SCADA**	In the 141st OCC meeting members were informed about the "Compendium of SPS in NR" (*Annexure-_9 of the MOM_)* which was released in the 40th NRPC meeting. All the utilities were requested to go through the compendium and identify feeders concerning their state and map the same in SCADA. **150th OCC meeting:** PSTCL submitted information all other MS NRPC stated that as per the Compendium of SPS in NR" which was released in the 40th NRPC meeting. All the utilities are requested to go through the compendium and identify feeders concerning their state and map the same in SCADA. This document is available on NRLDC & NRPC website. NRLDC representative added that it is very important that the feeders should be mapped in SCADA. It was stated that this issue will be discussed in the Test committee meeting also.	**All states except Punjab were again requested to update.**

ANNEXURE 9/2				
S. No.	**Substation**	**Downstream network requirement**	**Schedule**	**Planned system and Implementation Status**
1	400/220 kV, 3x315 MVA Samba	2 nos. bays utilized under ISTS. Balance 4 Nos to be utilized	Commissioned	LILO of 220kV Bishnha – Hiranagar D/c line : under tendering (PMDP) (status as available with CEA) Status as updated by J&KPDD in 38th TCC/ 41st NRPC: LoA has been issued and Material has reached the site. Anticipated – Nov'19 Targeted Completion is required to be updated by J&KPDD
2	400/220kV, 2x315 MVA New Wanpoh	6 Nos. of 220 kV bays to be utilized	Commissioned	220kV New Wanpoh –Mirbazar D/c line: under tendering (PMDP) 220 kV Alusteng- New Wanpoh line Anticipated – Nov'19 Targeted Completion is required to be updated by J&KPDD
3	400/220kV, 2x315 MVA Parbati Pooling Station	2 Nos. of 220 kV bays to be utilized.	Commissioned	220kV Charor- Banala D/c line (18km) : under construction Target completion -December 2018 as intimated by HPPTCL
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	8 nos. of 220 kV bays to be utilized	Commissioned	LILO of one circuit of Kaul-Pehowa 220kV D/c line LILO of one circuit of Kaul-Bastara 220kV D/c line Work awarded. Contractual Completion period upto 31.10.2019 HVPNL WAS REQUESTED TO UPDATE FURTHER PROGRESS
5	400/220kV, 2x500 MVA Bagpat GIS	3 nos. of 220 kV d/s lines to Shamli, Muradnagar and Bagpat commissioned. Balance 5 Nos. of bays to be utilized	Commissioned	Bagpat- Baraut - energised(D/C) Bhagpat-Shamli- energised(S/C) LILO of 220kV Muradnagar II -Baghpat (PG) at Baghpat UP Bagpat(PG)-Modipuram New 220kV D/c- is under planning stage
6	400/220kV, 2x315 MVA Dehradun	Out of 6 bays, only two bays used. Balance 4 bays to be utilised.	Commissioned	02 bays for Yamuna Basin (Mori substation) 2 bays for proposed S/s at Selakui PTCUL was requested to update.
7	400/220 kV, 2x315 MVA Sohawal	6 Nos 220 kV bays to be utilized.	Commissioned	Sohawal-Sohawal (UP) D/C line energised Sohawal-Barabanki D/C line energised. 2 nos of bay of utilized for 220kV New Tanda-Sohawal line .There is a litigation process on & expected to be completed by November 2018 .

ANNEXURE 9/2				
S. No.	**Substation**	**Downstream network requirement**	**Schedule**	**Planned system and Implementation Status**
				Sohawal-Behraich and Sohawal-Gonda lines are under construction and expected to be completed by January, 2019. PGCIL requested to provide the estimate for construction of Bays at PGCIL end
8	Shahjahanpur , 2x315 MVA 400/220 kV	Partially utilized. Balance 5 Nos. of 220 kV bays to be utilized.	Commissioned	Shajahnapur-Hardoi commissioned Shajahnapur-Azimpur D/C line is planned, land of substation identified.
9	Moga	Partially utilized. Balance 2 nos. of 220kV bays to be utilized.	Commissioned	Moga–Mehalkalan 220kV D/c line Work completed. Approval from NGT for tree cutting is awaited for balance work to commission line. NGT clearance received and by 31.12.2018 work will be completed.
10	Hamirpur 400/220 kV 2x 315 MVA Sub-station (Augmentation by 3x105 MVA ICT)	04 nos. 220 kV downstream lines commissioned under ISTS. Balance two bays to be utilised by HPSEBL	August 2020	2x220 kV bays to be utilized for connecting 220/132kV Kangoo substation of HPSEBL by 220 kV Kangoo-Hamirpur D/c line. HPPTCL was requested to update.
11	Kaithal 400/220 kV 1x 315 MVA Sub-station	July 2017 (Shifting of Transformer from Ballabhgarh).	Commissioned	220kV Kaithal(PG)- Neemwala D/c line - Work awarded on 13.7.2018. Tentative completion date 31.12.2019. 220kV S/s Neemwala-Tenders opened on 30.3.2018 & awarded on 13.7.2018. HVPNL WAS REQUESTED TO UPDATE FURTHER PROGRESS.

UPPTCL

Progresss of Installation of HT Shunt Capacitors (rated 33 KV and above) in Northern Region **As on 01.09.18**

State	HT Shunt Capacitors (rated 11 KV level and above) installed upto till 31.03.18 (MVAR)	New capacitors required during 2018-19	Capacitors added during Aug-18	Capacitor added in Year 18-19	Balance capacitors to be added during 2018-19	Total Capacitors installed in the state as on 01.08.18
	A	B	C	D = C+D(Previous)	E = B D	F = A+D
UPPTCL	7984	4531	**304**	**1030**	3501	9014

Progresss of revival of defective HT Shunt Capacitors (rated 33 KV and above) in Northern Region **As on 01.09.18**

State	Defective Capacitors as on 31.03.18 (MVAR)	Defective during Aug-2018	Defective Capacitors as on 01.08.2018	Defective Capacitors revived during Aug-2018	Net Defective Capacitors at the end of Aug-2018
	A	B	C=E (Previous)	D	E=C+B-D
UPPTCL	2166	191	***1776***	***20***	***1605***

Aug-18

Progress of installation of HT Shunt Capacitors(rated 11 KV and above) in Northern Region

ALL FIG. IN MVAR

Constituent	HT Shunt Capacitors (rated11 KV level and above) installed upto 31-03-18	Total Capacitors required during 2018-19 (Balance of 2017-18)	Capacitors added upto AUG-18	Balance capacitors to be added during 2017-18	Total capacitors dismentalled during 2017-18 upto AUG-18	Total capacitors installed in the State as on 31.08.2018
	1	2	3	4=2-3		6=1+3-5
Rajasthan	5728.784	21.720	21.720	0.000	10.080	5740.424

Progress of Revival of defective HT Shunt Capacitors (Rated 11 KV and above) in Northern Region

ALL FIG. IN MVAR

Constituent	Defective Capacitors as on 31.07.2018	Defective during AUG-18	Defective Capacitors as	Defective Capacitors	Net Defective Capacitors need revival
	1	2	3=1+2	4	5=3-4
Rajasthan	345.47	24.01	369.48	68.100	301.38

Name of Project	Sector	State	Unit No	Total Capacity	DT-of COMMISSIONING	Revised Phasing Plan (Shutdown)	Status of FGD installation
PANIPAT TPS	State Sector	Haryana	6	210	31-03-01	March-April 2021	
PANIPAT TPS	State Sector	Haryana	7	250	28-09-04	Jan-Feb 2021	
PANIPAT TPS	State Sector	Haryana	8	250	28-01-05	Nov-Dec 2020	
RAJIV GANDHI TPS	State Sector	Haryana	1	600	31-03-10	March-April 2022	
RAJIV GANDHI TPS	State Sector	Haryana	2	600	01-10-10	Jan-Feb 2022	
YAMUNA NAGAR TPS	State Sector	Haryana	1	300	01-11-07	Nov-Dec 2021	
YAMUNA NAGAR TPS	State Sector	Haryana	2	300	29-03-08	Sept-Oct 2021	
INDIRA GANDHI STPP	Central Sector	CS Haryana	1	500	31-10-10	Sept-Oct 2020	Award in Spetember, 2018
INDIRA GANDHI STPP	Central Sector	CS Haryana	2	500	05-11-11	March-April 2020	Award in Spetember, 2018
INDIRA GANDHI STPP	Central Sector	CS Haryana	3	500	07-11-12	Jan-Feb 2020	Award in Spetember, 2018
GOINDWAL SAHIB	Private Sector	Punjab	1	270	14-02-16	March-April 2020	
GOINDWAL SAHIB	Private Sector	Punjab	2	270	15-03-16	Jan-Feb 2020	
Nabha TPP (Rajpura TPP)	Private Sector	Punjab	1	700	24-01-14	March-April 2021	Awaiting approval from PSERC for grant of in-principle approval under change in law
Nabha TPP (Rajpura TPP)	Private Sector	Punjab	2	700	06-07-14	Jan-Feb 2021	Awaiting approval from PSERC for grant of in-principle approval under change in law
GH TPS (LEH.MOH.)	State Sector	Punjab	1	210	29-12-97	March-April 2022	
GH TPS (LEH.MOH.)	State Sector	Punjab	2	210	16-10-98	March-April 2022	
GH TPS (LEH.MOH.)	State Sector	Punjab	3	250	03-01-08	Jan-Feb 2022	
GH TPS (LEH.MOH.)	State Sector	Punjab	4	250	31-07-08	Jan-Feb 2022	
TALWANDI SABO TPP	Private Sector	Punjab	1	660	17-06-14	Jan-Feb 2021	Initiated tendering process with publishing EOI on 05th June, 2018. Tender to be opnede tentatively on 16.08.2018
TALWANDI SABO TPP	Private Sector	Punjab	2	660	25-10-15	Nov-Dec 2020	Initiated tendering process with publishing EOI on 05th June, 2018. Tender to be opnede tentatively on 16.08.2018
TALWANDI SABO TPP	Private Sector	Punjab	3	660	29-03-16	Sept-Oct 2020	Initiated tendering process with publishing EOI on 05th June, 2018. Tender to be opnede tentatively on 16.08.2018
KAWAI TPS	Private Sector	Rajasthan	1	660	28-05-13	July-Aug 2020	Consultancy services to assess the feasibility in commissioned/ likely to be commissioned Units for implementation of revised emission norms in Power Stations of RVUNare being provided by M/s Fichtner Consulting Engineers (India) Pvt. Lts, Chennai vide order dated 01.02.2018. Draft DPR for implementation of revised emission norms in these power Plants has been received and final DPR submission is expected in July - 2018
KAWAI TPS	Private Sector	Rajasthan	2	660	24-12-13	May-June 2020	-do--
CHHABRA TPP	State Sector	Rajasthan	1	250	30-10-09	Nov-Dec 2021	-do--
CHHABRA TPP	State Sector	Rajasthan	2	250	04-05-10	Sept-Oct 2021	-do--
CHHABRA TPP	State Sector	Rajasthan	3	250	14-09-13	July-Aug 2021	-do--
CHHABRA TPP	State Sector	Rajasthan	4	250	30-06-14	July-Aug 2021	-do--
CHHABRA TPP	State Sector	Rajasthan	5	660	04-04-17	March-April 2020	-do--
KALISINDH TPS	State Sector	Rajasthan	1	600	02-05-14	May-June 2021	-do--
KALISINDH TPS	State Sector	Rajasthan	2	600	06-06-15	March-April 2021	-do--
KOTA TPS		Rajasthan	5	210	26-03-94	Nov-Dec 2022	-do--
KOTA TPS	State Sector	Rajasthan	6	195	30-07-03	Nov-Dec 2022	-do--
KOTA TPS	State Sector	Rajasthan	7	195	30-08-09	Sept-Oct 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	1	250	10-05-98	Nov-Dec 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	2	250	28-03-00	Sept-Oct 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	3	250	29-10-01	July-Aug 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	4	250	25-03-02	May-June 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	5	250	30-06-03	March-April 2022	-do--
SURATGARH TPS	State Sector	Rajasthan	6	250	29-08-09	Jan-Feb 2022	-do--
LALITPUR TPS	Private Sector	Uttar Pardesh	2	660	08-01-16	Jan-Feb 2021	
LALITPUR TPS	Private Sector	Uttar Pardesh	3	660	01-04-16	Sept-Oct 2020	
LALITPUR TPS	Private Sector	Uttar Pardesh	1	660	26-03-16	Nov-Dec 2020	
ANPARA C TPS	Private Sector	Uttar Pardesh	1	600	12-10-11	July-Aug 2022	
ANPARA C TPS	Private Sector	Uttar Pardesh	2	600	18-01-12	May-June 2022	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	1	210	21-12-91	Nov-Dec 2020	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	2	210	18-12-92	Sept-Oct 2020	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	3	210	23-03-93	July-Aug 2020	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	4	210	24-03-94	May-June 2020	
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	5	490	25-01-10	March-April 2020	Awarded in June,18
DADRI (NCTPP)	Central Sector	CS Uttar Pardesh	6	490	16-07-10	Jan-Feb 2020	Awarded in June,18
RIHAND STPS	Central Sector	CS Uttar Pardesh	1	500	31-03-88	Jan-Feb 2021	Combustion tuning after overhaul

RIHAND STPS	Central Sector	CS Uttar Pardesh	2	500	**05-07-89**	Nov-Dec 2021	Combustion tuning after overhaul
RIHAND STPS	Central Sector	CS Uttar Pardesh	3	500	**31-01-05**	Sept-Oct 2021	NIT in Sept,18
RIHAND STPS	Central Sector	CS Uttar Pardesh	4	500	**24-09-05**	March-April 2021	NIT in Sept,18
RIHAND STPS	Central Sector	CS Uttar Pardesh	5	500	**25-05-12**	Jan-Feb 2021	NIT in Sept,18
RIHAND STPS	Central Sector	CS Uttar Pardesh	6	500	**17-10-13**	Nov-Dec 2020	NIT in Sept,18
SINGRAULI STPS	Central Sector	CS Uttar Pardesh	1	200	**14-02-82**	Nov-Dec 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pardesh	2	200	**25-11-82**	Nov-Dec 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pardesh	3	200	**28-03-83**	July-Aug 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pardesh	4	200	**02-11-83**	July-Aug 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pardesh	5	200	**26-02-84**	March-April 2021	
SINGRAULI STPS	Central Sector	CS Uttar Pardesh	6	500	**23-12-86**	Jan-Feb 2021	Combustion tuning after overhaul
SINGRAULI STPS	Central Sector	CS Uttar Pardesh	7	500	**24-11-87**	Nov-Dec 2020	Combustion tuning after overhaul
UNCHAHAR TPS	Central Sector	CS Uttar Pardesh	1	210	**21-11-88**	Nov-Dec 2022	
UNCHAHAR TPS	Central Sector	CS Uttar Pardesh	2	210	**22-03-89**	Nov-Dec 2022	
UNCHAHAR TPS	Central Sector	CS Uttar Pardesh	3	210	**27-01-99**	Sept-Oct 2022	
UNCHAHAR TPS	Central Sector	CS Uttar Pardesh	4	210	**22-10-99**	Sept-Oct 2022	
UNCHAHAR TPS	Central Sector	CS Uttar Pardesh	5	210	**28-09-06**	March-April 2022	
UNCHAHAR TPS	Central Sector	CS Uttar Pardesh	6	500	**31-03-17**	July-Aug 2020	
PRAYAGRAJ TPP	Private Sector	Uttar Pardesh	1	660	**25-12-16**	March-April 2020	
PRAYAGRAJ TPP	Private Sector	Uttar Pardesh	2	660	**06-09-15**	May-June 2020	
PRAYAGRAJ TPP	Private Sector	Uttar Pardesh	3	660	**22-05-17**	Jan-Feb 2020	
ROSA TPP Ph-I	Private Sector	Uttar Pardesh	1	300	**10-02-10**	Nov-Dec 2021	
ROSA TPP Ph-I	Private Sector	Uttar Pardesh	2	300	**26-06-10**	Nov-Dec 2021	
ROSA TPP Ph-I	Private Sector	Uttar Pardesh	3	300	**28-12-11**	Sept-Oct 2021	
ROSA TPP Ph-I	Private Sector	Uttar Pardesh	4	300	**28-03-12**	Sept-Oct 2021	
ANPARA TPS	State Sector	Uttar Pardesh	1	210	**24-03-86**	Sept-Oct 2022	
ANPARA TPS	State Sector	Uttar Pardesh	2	210	**28-02-87**	July-Aug 2022	
ANPARA TPS	State Sector	Uttar Pardesh	3	210	**12-03-88**	May-June 2022	
ANPARA TPS	State Sector	Uttar Pardesh	4	500	**19-07-93**	March-April 2022	
ANPARA TPS	State Sector	Uttar Pardesh	5	500	**04-07-94**	Jan-Feb 2022	
ANPARA TPS	State Sector	Uttar Pardesh	6	500	**08-06-15**	May-June 2021	E- tender invited on 20.07.2018 and opening of Techno-commercial bid on 20.09.2018
ANPARA TPS	State Sector	Uttar Pardesh	7	500	**06-03-16**	March-April 2021	E- tender invited on 20.07.2018 and opening of Techno-commercial bid on 20.09.2018
HARDUAGANJ TPS	State Sector	Uttar Pardesh	8	250	**27-09-11**	Nov-Dec2021	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
HARDUAGANJ TPS	State Sector	Uttar Pardesh	9	250	**25-05-12**	Sept-Oct 2021	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
OBRA TPS	State Sector	Uttar Pardesh	9	200	**26-10-80**	July-Aug 2022	
OBRA TPS	State Sector	Uttar Pardesh	10	200	**14-01-79**	Sept-Oct 2022	
OBRA TPS	State Sector	Uttar Pardesh	11	200	**31-12-77**	Nov-Dec 2022	
OBRA TPS	State Sector	Uttar Pardesh	12	200	**28-03-81**	May-June 2022	
OBRA TPS	State Sector	Uttar Pardesh	13	200	**21-07-82**	March-April 2022	
PARICHHA TPS	State Sector	Uttar Pardesh	3	210	**29-03-06**	March-April 2022	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
PARICHHA TPS	State Sector	Uttar Pardesh	4	210	**28-12-06**	March-April 2022	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
PARICHHA TPS	State Sector	Uttar Pardesh	5	250	**24-05-12**	Jan-Feb 2022	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
PARICHHA TPS	State Sector	Uttar Pardesh	6	250	**11-03-13**	Nov-Dec 2021	An order of Pre-award consultancy service has been placed to M/s NTPC vide letter dated 22.06.2018
MAHATMA GANDHI TPS	Private Sector	Haryana	1	660	**12-01-12**	Dec 18 -Jan 19	
MAHATMA GANDHI TPS	Private Sector	Haryana	2	660	**11-04-12**	Dec 18 -Jan 19	

Annexure-XII

RAJASTHAN RAJYA VIDYUT PRASARAN NIG LIMITED
(An ISO 9001:2008 Certified Company)
[Corporate Identity Number (CIN) L40109RJ2000SGC016485]
Office of the Superintending Engineer (Proc-I)
Gate #3, Old Power House Premises, Near Ram Mandir, Bampark, Jaipur-302006
Tel : 0141-2208916 Fax : 2208916/2208921 E Mail se.tipc@rvpn.co.in

No. RVPN /SE (PROC-I) / XEN (Comm.) / D. 1012 Date. 07.09.18

The Superintending Engineer (SO&LD),
RVPN, Heerapura, Jaipur.

Sub: Implementation of Automatic Load Shedding Scheme under System Protection Scheme (SPS) for Kawai- Kalisindh- Chhabra generation complex.

Ref.- Your e-mail dt. 05.09.2018

In reference to your e-mail on the subject matter it is intimated that Technical specification for implementation of Automatic Load Shedding Scheme under System Protection Scheme (SPS) for Kawai-Kalisindh-Chhabra generation complex had already been processed for approval from the competent authority. After receiving approval, case for Administrative & Financial sanction will be processed for necessary approval from the competent authority i.e. PC-WTD.

After getting the aforesaid approvals Bid document for supply of material, ETC and successful implementation of Automatic Load Shedding Scheme for Kawai-Kalisindh-Chhabra generation complex will be published. The whole procedure up to award of contract may be completed within a period of 4-5 months and complete implementation of above schememay take further at least 6-7 months.

It is also to intimate that lying of OPGW on the RVPN existing system network is being arranged by the SE(Automation) as such further progress may be collected from them.

7.9.18

(O. P. Bansal)
Superintending Engineer (Proc I)

Copy submitted to the following for information please:

1. The Chief Engineer (Proc), RVPN, Jaipur.
2. The Chief Engineer (LD), RVPN, Jaipur.
3. The Chief Engineer (PP&D), RVPN, Jaipur.
4. The Superintending Engineer (Automation),RVPN,Jaipur.

7.9.18

Superintending Engineer (Proc I)

उत्तरप्रदेशराज्य भारप्रेषणकेन्द्र
उ0प्र0पॉवरट्रांसमिशनकारपोरेशन लि0
(उत्तर प्रदेशसरकारका उपक्रम)
यू0पी0एस0एल0डी0सी0परिसर, विभूति खण्ड–II
गोमतीनगर, लखनऊ–226010
दूरभाष:
ई–मेल: system.uppcl@gmail.com

No: 4744 /SE(R&A)/EE-II

Dated: 12/09/2018

General Manager, NRLDC
18-A, SJSS Marg, Katwaria Sarai,
New Delhi – 110016

Sub: -Regarding commissioning of SPS of Lalitpur TPS.

Sir,

Kindly find enclosed herewith commissioning report of SPS of Lalitpur TPS received from 765KV Fatehabad Substation and Lalitpur TPS for your kind information and necessary action.

Encl: As above

Yours Sincerely

(Zahir Ahmad)
Superintending Engineer (R&A)

No: 4744 /SE /(R&A) /EE-II /

Dated: 12/09/2018

Copy forwarded for kind information and necessary action to the following:-

1. Director (SLDC), UPSLDC, Gomti Nagar, Lucknow.
2. Chief Engineer(C&S), UPSLDC, Gomti Nagar, Lucknow.
3. SE (Operations), NRPC, 18 – A SJSS Marg, Katwaria Sarai, New Delhi, 110016.

(Zahir Ahmad)
Superintending Engineer (R&A)

UPSLDC.ORG
Uttar Pradesh
State Load
Despatch Centre

Click here to enable desktop notifications for UP State Load Despatch Centre Mail. Learn more Hide

More

COMPOSE

Implementation of SPS at LPGCL

Inbox x

6:19 PM (37 minutes ag

Vikas Saksena <vsaksena@lpgcl.com>
to me, A, sesc, Bhikam, Alhad, Bedi, Kiran

Dear Sir,

This is to confirm that SPS logics have been implemented and are in service at our end for all of following contingencies:

1. Tripping of both 765kV lines.
2. Tripping of both ICTs at Fatehabad.
3. Tripping of one ICT at Fatehabad.
4. Loading of any 400kV line at Fatehabad going beyond 800MW

With regards,

Vikas Saksena
President - Power Systems
Lalitpur Power Generation Company Limited
Bajaj Bhawan, Jamnalal Bajaj Marg, B-10, Sector-3, Noida-201301, Uttar Pradesh
Tel.(O): +91-120-4045100/555, Extn. 338, Mobile: +91-9971200857
E-mail: vsaksena@lpgcl.com, Website: www.bajajgroup.org

Something's not right.

Learn more
Hangouts

Click here to Reply, Reply to all, or Forward

Last acco

0.81 GB (2%) of 30 GB used
Manage

Program Policies
Powered by

उ0प्र0 पावर ट्रान्समिशन कारपोरेशन लि0
UP Power Transmission Corporation Ltd.
(Government of UP Undertaking)
CIN –U40101UP2004SGC028687

Office Of the Executive Engineer
Electricity 765 KV Sub-Station
Division, Fatehabad, Agra
Email :- eee765ftd@gmail.com
Mob. No.7902115051

UPPTCL

कार्यालय अधिशासी अभियन्ता
765 के0वी0 विद्युत उपकेन्द्र खण्ड
फतेहाबाद, आगरा

****

No. 1115 /E765KVS/S D/Fatehabad/ Dt. 17/07/2018

Superintending Engineer
Electricity Transmission Circle
Agra.

Subject :-Regarding Commissioning of SPS at 765 KV Sub-Station Fatehabad, Agra

Kindly refer Chief Engineer (C&S) Lucknow letter No. 1718/CE/(C&S)/SPS/ Lalitpur dated 07.06.18 on the subject cited above. In this regard it is to inform you that System Protection Scheme has been commissioned at 765 KV Sub-Station Fatehabad on 13.07.18 for reliable & Safe evacuation of power from LPGCL Lalitpur. Signal details furnished below:-

Status/Signal Implemented	PLCC Channel used
(a) Both 1500 MVA ICT Trip	(a) 765K Lalitpur 1 channel 1
(b) Any 1500 MVA ICT Trip	(b) 765K Lalitpur 1 channel 2
(c) > 800 MW load at any 400 KV Feeder	(c) 765K Lalitpur 2 channel 1

Besides this testing of System Protection Scheme also carried out with LPGCL Engineer on 14.07.18 and found OK.

Copy of minutes enclosed

(Bhikam Singh)
Executive Engineer

No. 1115 /E765KVS/S D/Fatehabad/ Dt. 17/07/18

Copy forwarded to Chief Engineer (TSW), UPPTCL, Agra.for information and necessary action.

(Bhikam Singh)
Executive Engineer

STATE LOAD DESPATCH CENTRE (DELHI)

Office of Executive Director(SLDC)
SLDC Building, Minto Road, New Delhi-110002
Ph: 23221091, FAX No.23221069

No. F.DTL/207/ED(T)SLDC/2016-17/31 / 61

Date: 24.06.2016

Sh. S. Sen
ED (NTAMC.)/CISO
Power Grid Corpn. Of India Ltd.
PAL Complex, Village Gwalior,
Panchgaon, Taru Road,
Manesar, Distt. Gurgaon
Haryana- 122413

Sub: **Nomination of Chief Information Security Officer(CISO) for Power Transmission Utilities of the Country**

Dear Sir,

Please refer to your office letter No.C/CISO dated 15th June, 2016, regarding *nomination of Chief Information Security Officer (CISO) for Power Transmission Utilities of the Country.*

In this connection, please find attached the details of Nodal Officers nominated to be Chief Information Security Officer on behalf of Delhi Transco Limited.

Manager (Ert/B&H) for necessary consideration, pl.

24/06/2016

15.07.16 AM(T) to ED(T)

(HARJIWAN VYAS)
EXECUTIVE DIRECTOR(SLDC)

CC to: 1. MD(DTL)
2. Director(Opr.)
} For kind information please.

(A Govt. of NCT of Delhi Undertaking)
(Regd. Office Shakti Sadan, Kotla Road, New Delhi-110002) Corporate Identification Number(CIN)-U40103DL2001SGC111529
Website: www.dtl.gov.in

NOMINATION OF CHIEF INFORMATION SECURITY OFFICER

Name of Utility/Organization	Delhi Transco Limited
STATE	Delhi
Organization Category	State Government

Details of Nodal Officer nominated to be Chief Information Security Officer

	Main Officer	Alternate Officer
Name	Ms. Parul Kapadia	Sh. Bharat Rajak
Designation	Manager (Tech.)	Manager (Tech.)
Office Address	SCADA H/W Division, 2nd Floor, 33 KV S/Stn. Building, SLDC, Minto Road, New Delhi	ERP Centre, 2nd Floor, 33 KV S/Stn. Building, SLDC, Minto Road, New Delhi
Office email	pm.kapadia@dtl.gov.in	bharat.rajak@dtl.gov.in
Office Landline Phone	011-23237965	011-23239639
Mobile No.	9999533956	9999533941

If implemented, details of ISO-27001:2013 implementation status as on dare:

Authorised Signatory: Signature with Stamp

a. Appointment of organization-wise Chief Information Security Officers and its status.

DTL Status-- CISO nomination is done. (copy enclosed)

b. Identification of organization-wise Critical Infrastructure and its status.

DTL Status-- A cyber security committee is formed to take care of cyber security related issues

c. Preparation of organization-wise Crisis Management Plan and its status

DTL Status-- CIIs are to be identified , however to prevent any unauthorized access to the network of DTL, action plan has been made by cyber security committee.

d. Status of Cyber Security Mock Drill activity in coordination with CERT-In.

DTL Status-- Cyber security committee is making action plan for CERT guidelines. The same has been incorporated in IT policy, under approval.

e. Status of Training / Workshops on Cyber Security organized / participated by power sector entities.

DTL Status-- One day round the clock conference was attended ,organised by NCIIPC, where it was requested to NCIIPC officials to provide training to the CISO of DTL

f. Status of action taken on CERT-In / NCIIPC advisories.

DTL Status-- To work on CII,PGCIL CISO was asked to provide help by organising awareness training in DTL.

(Status as on: 17.07.2018

S.No	State	Status of CISO Nomination	Critical infra identified	Crisis management Plan Prepared	Status of CS mock drill	Status of Training/ Workshops organized/ Participated by utility	Action taken on CERT In/NCIIPC Advisories
1	Uttarakhand	Er. Sachin Rawat, SE, CISO (Main) Er. Jagbeer Singh, EE, CISO (Alternate)	Critical infra structure identification is under process. List of critical infra structure in PTCUL Data Centre and SCADA system is prepared and may be provided if NRPC directs. However at present it is considered confidential.	Under process	Under process	Under process	Advisories are immediately communicated to concerned officers and through them to AMC contractors and compliance report is taken from field officers and AMC contractors.

न्यूक्लियर पावर कारपोरेशन ऑफ इण्डिया लिमिटेड
NUCLEAR POWER CORPORATION OF INDIA LIMITED
(भारत सरकार का उद्यम) (A Government of India Enterprise)
रावतभाटा राजस्थान साइट Rawatbhata Rajasthan Site
डाकः अणुषक्ति, वायाः कोटा (राज.) PO: Anushakti–323303 Via: Kota (Raj.)
फोन : 01475-242309, फैक्स : 01475-242005, ईमेल : rdyadav@npcil.co.in

No. RR Site, Unit-3&4/STE(E&I)/2018/S/ 27 Date : 17/08/2018

Sub : Status of Cyber security compliance at NPCIL RAPS SITE.

Ref : Agenda of 150th OCC meeting.

The status of NRPC recommendation on cyber security at NPCIL RAPS SITE are as follows :

S.No	Description	Statues
1.	Appointment of organization-wise Chief Information Security officer (CISO) and its status.	CISO at NPCIL level and ISO at RAPS level have already been appointed.
2.	Identification of organization wise Critical Infrastructure and its status	Take force for instrumentation & control Security (TAFICS) has been constituted for the purpose at NPCIL level. Identification of Critical Infrastructure has been done.
3.	Preparation of organization wise Crisis Management Plan and its status	NPCIL level policy (HQI-4505) exists.
4.	Statues of Cyber security mock drill activity in coordination with CERT-In.	Cyber security audit is being done in accordance with CISAG (Computer Information Security Audit Group) of DAE and CERT-In guidelines.
5.	Statues of Training/ Workshop on Cyber Security organized/ participated by power sector entities	Training/ workshop on Cyber Security are being organized at NPCIL level.
6.	Status of action taken on CERT-In/ NCIIPC advisories	Being implemented

17/08/2018

R.D.Yadav
STE(E&I)

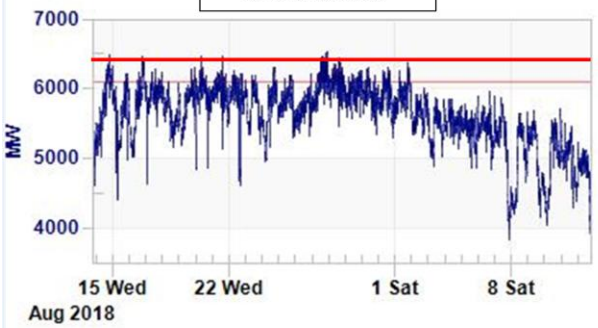
Sh. Upender Kumar
SE(Opr & Prot)
NRPC

Cc to : HQ
Sh. K.P. Singh,AD
Sh. S.Y.Sarwate, ACE

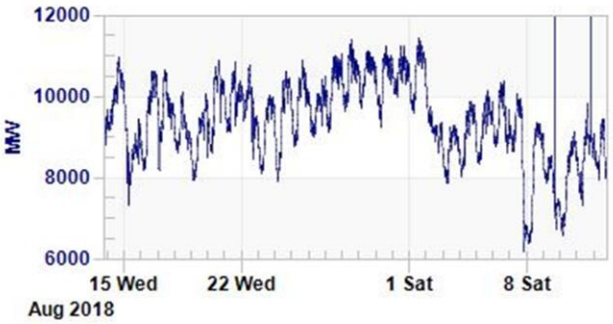
Site
SD/CS –for kind information pl
TSS
ACE (IT&C)
EIC(IT)

Punjab Import

ATC: 6400MW

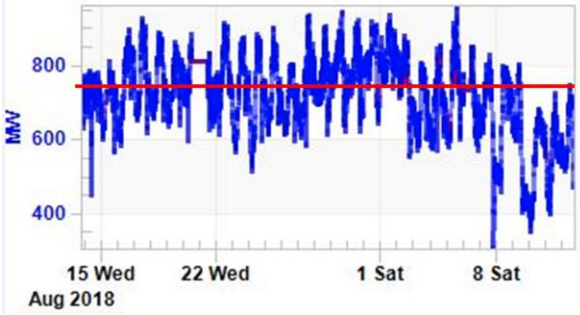


Punjab load



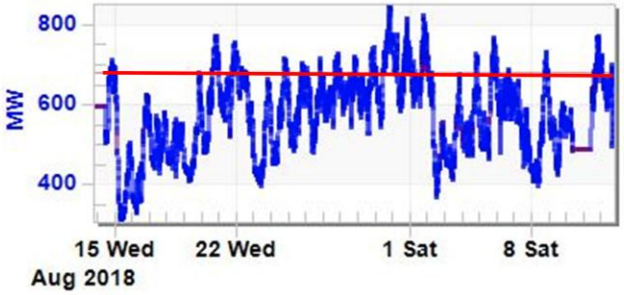
Amritsar ICT load

2*315+1*500 MVA



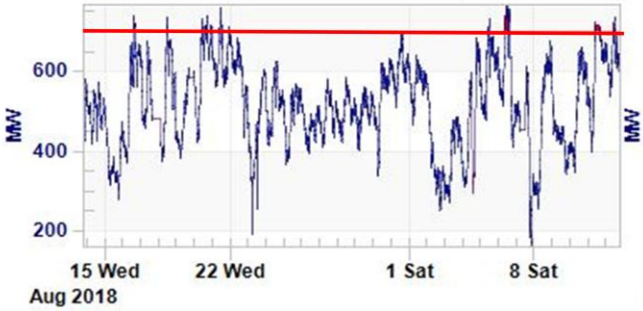
Dhuri ICT load

2*500 MVA



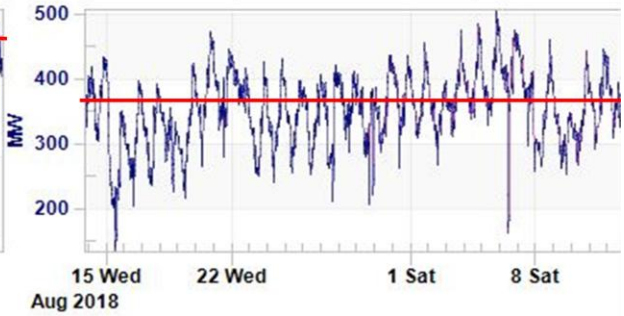
Rajpura ICT load

2*500 MVA



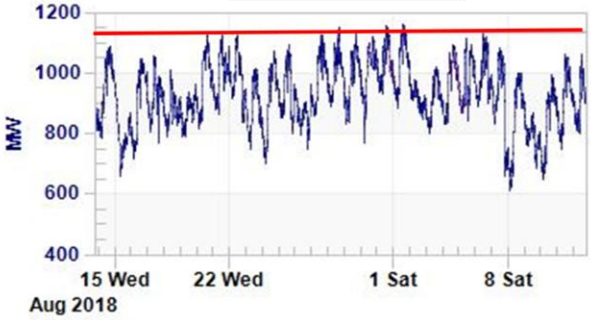
Muktsar ICT load

2*315 MVA



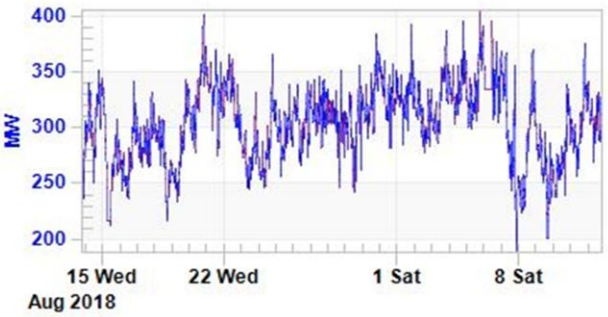
Ludhiana ICT load

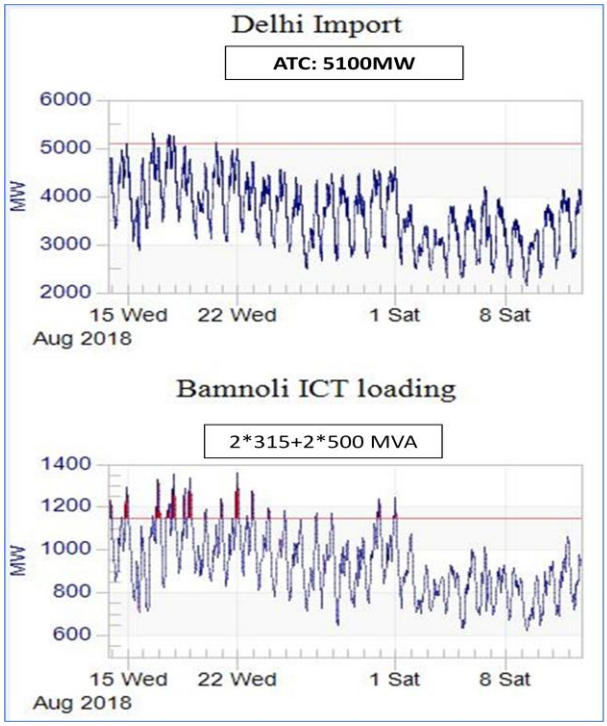
3*315+1*500 MVA

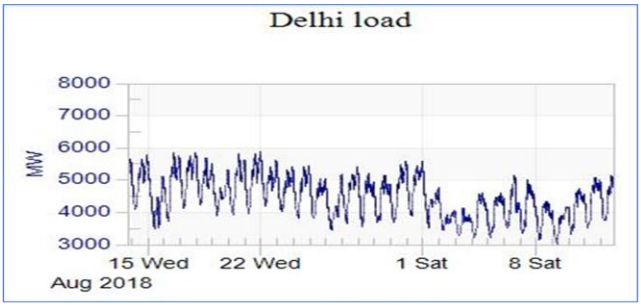


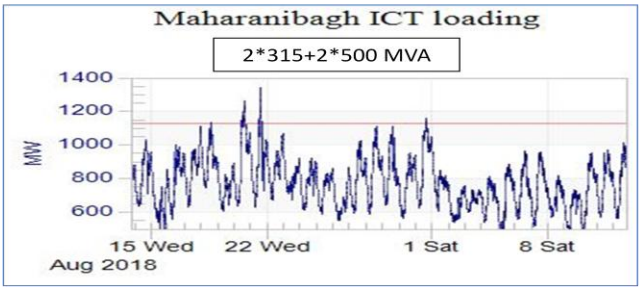
Makhu ICT load

2*315 MVA

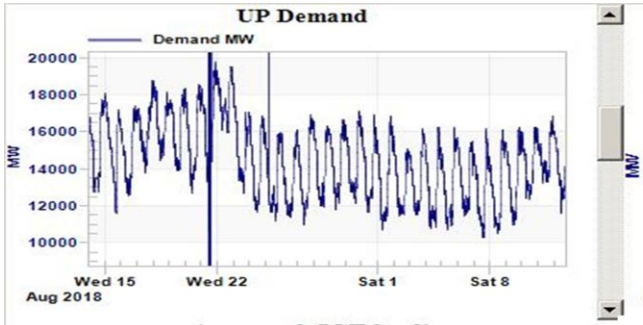


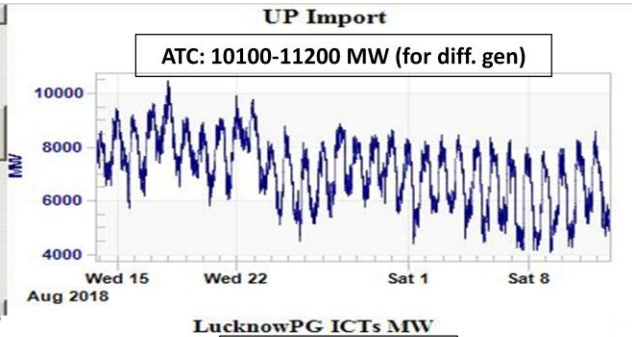


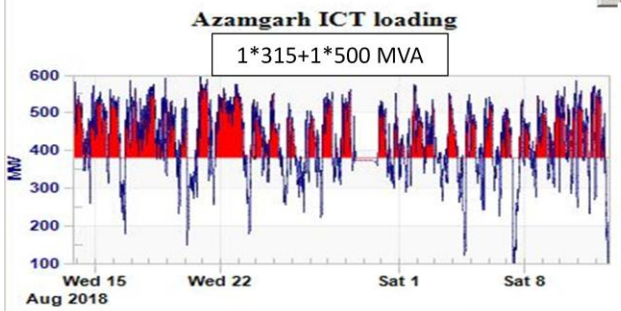


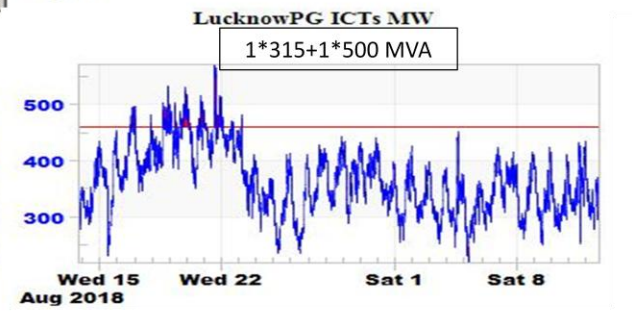


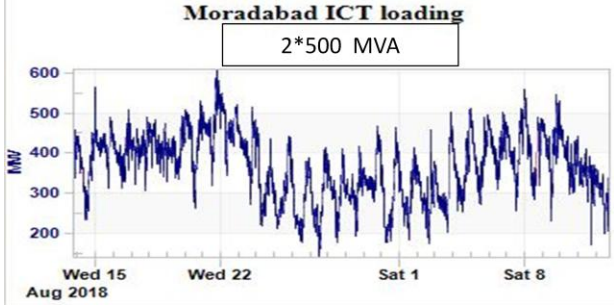
Closure of Badarpur TPS units u/s 31 (a) of the Air (Prevention & control of Pollution) act, 1981
Expedite Tughlakabad to relief loading of 220kV line loading near BTPS area

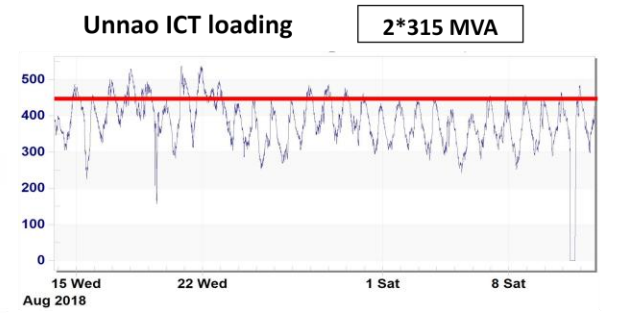


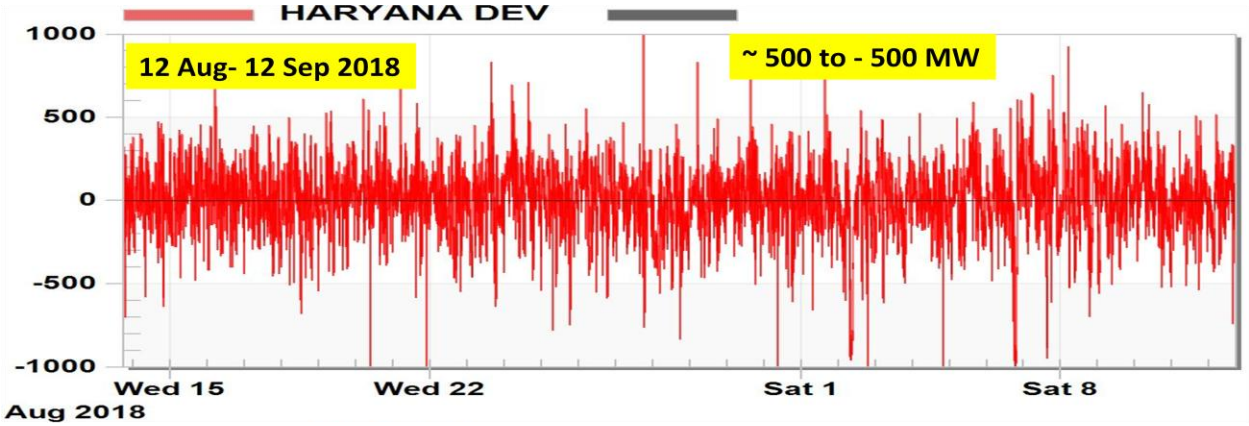


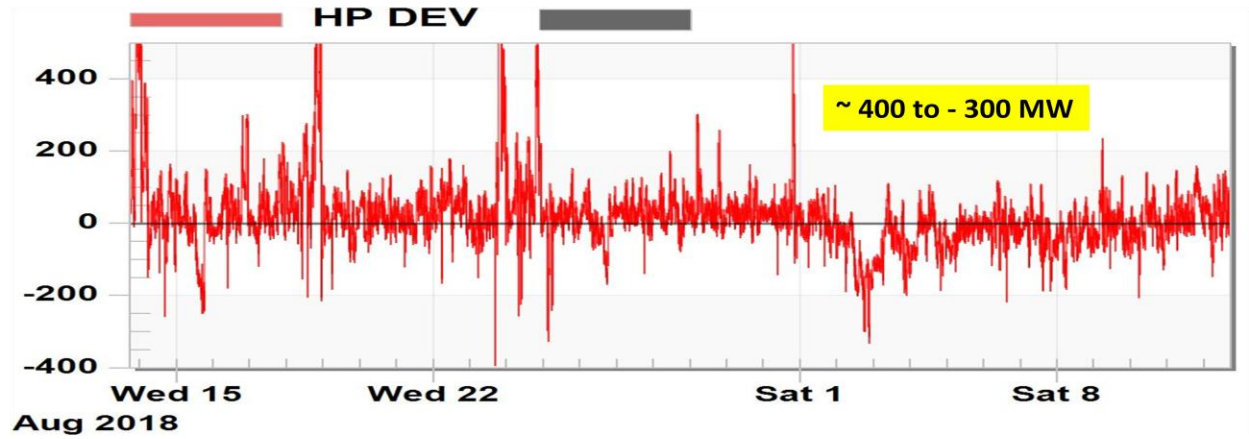


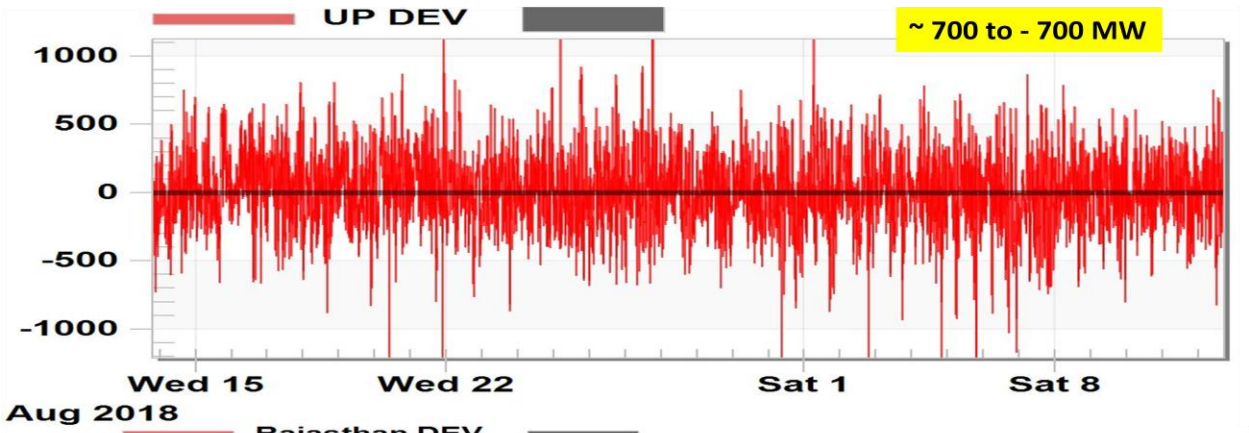


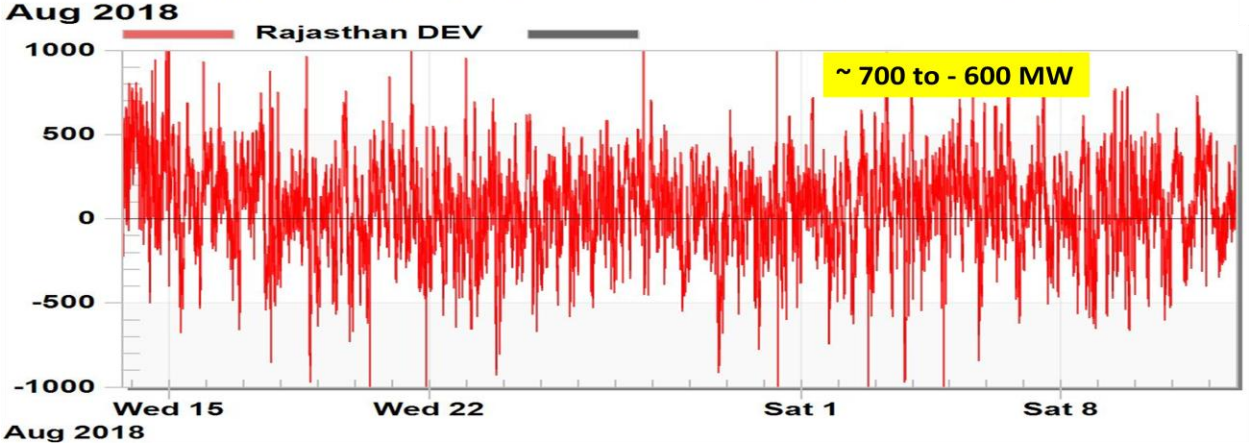


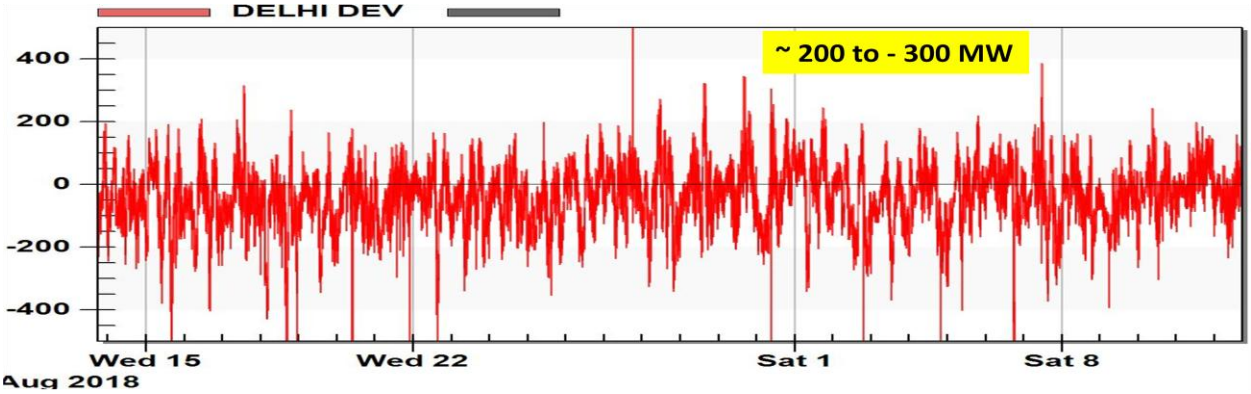


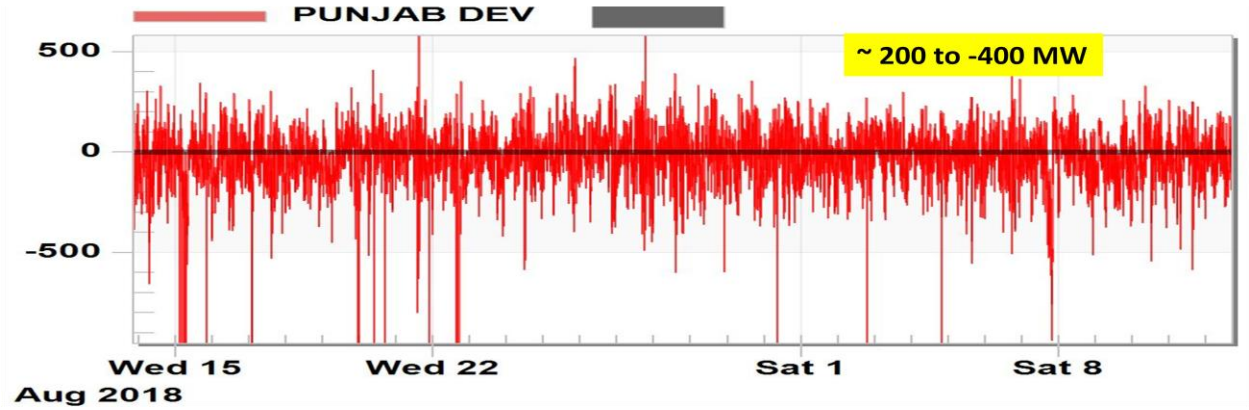

HARYANA DEV
12 Aug- 12 Sep 2018
~ 500 to - 500 MW
1000
500
0
-500
-1000
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

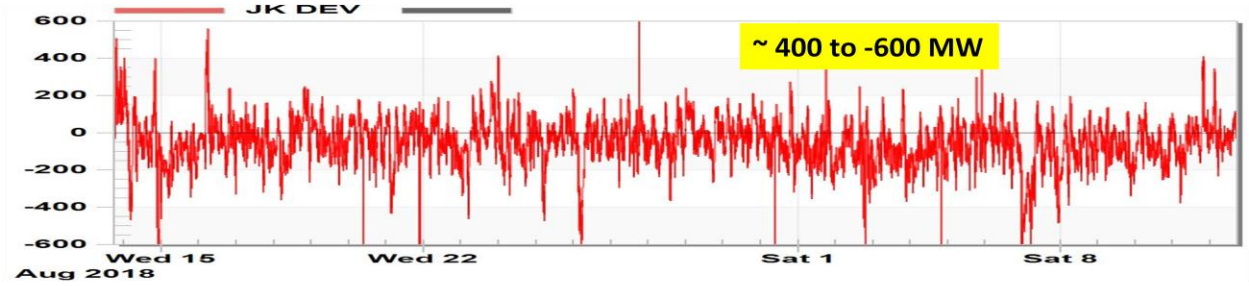

HP DEV
~ 400 to - 300 MW
400
200
0
-200
-400
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

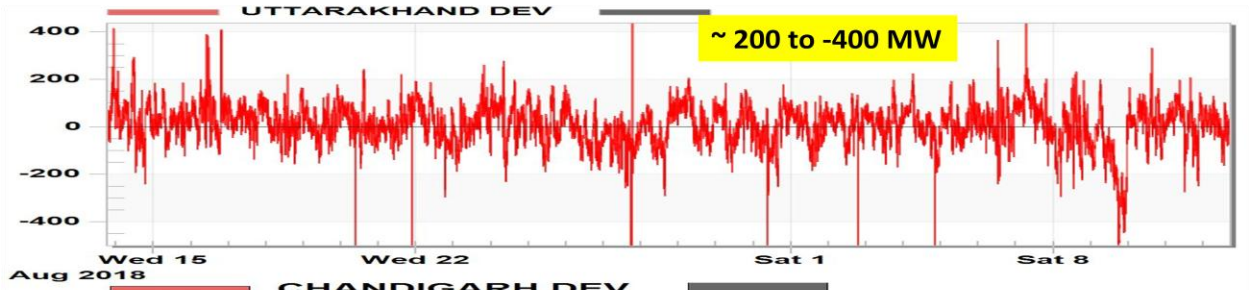

UP DEV
~ 700 to - 700 MW
1000
500
0
-500
-1000
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

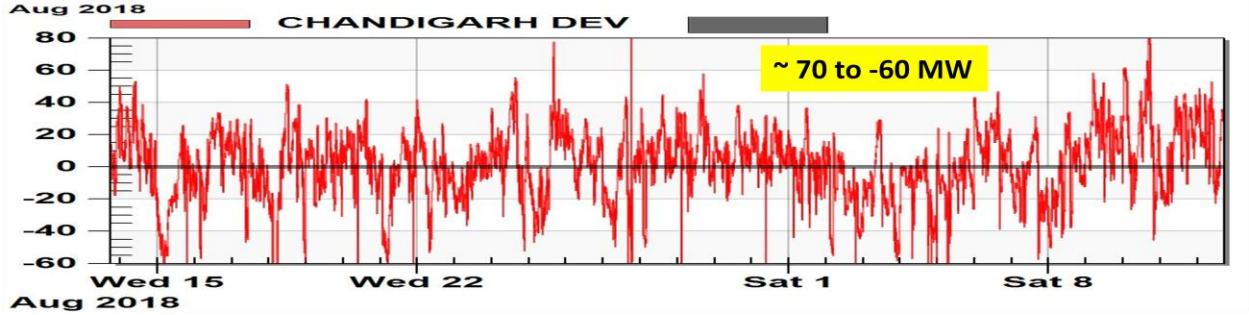

Rajasthan DEV
~ 700 to - 600 MW
1000
500
0
-500
-1000
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

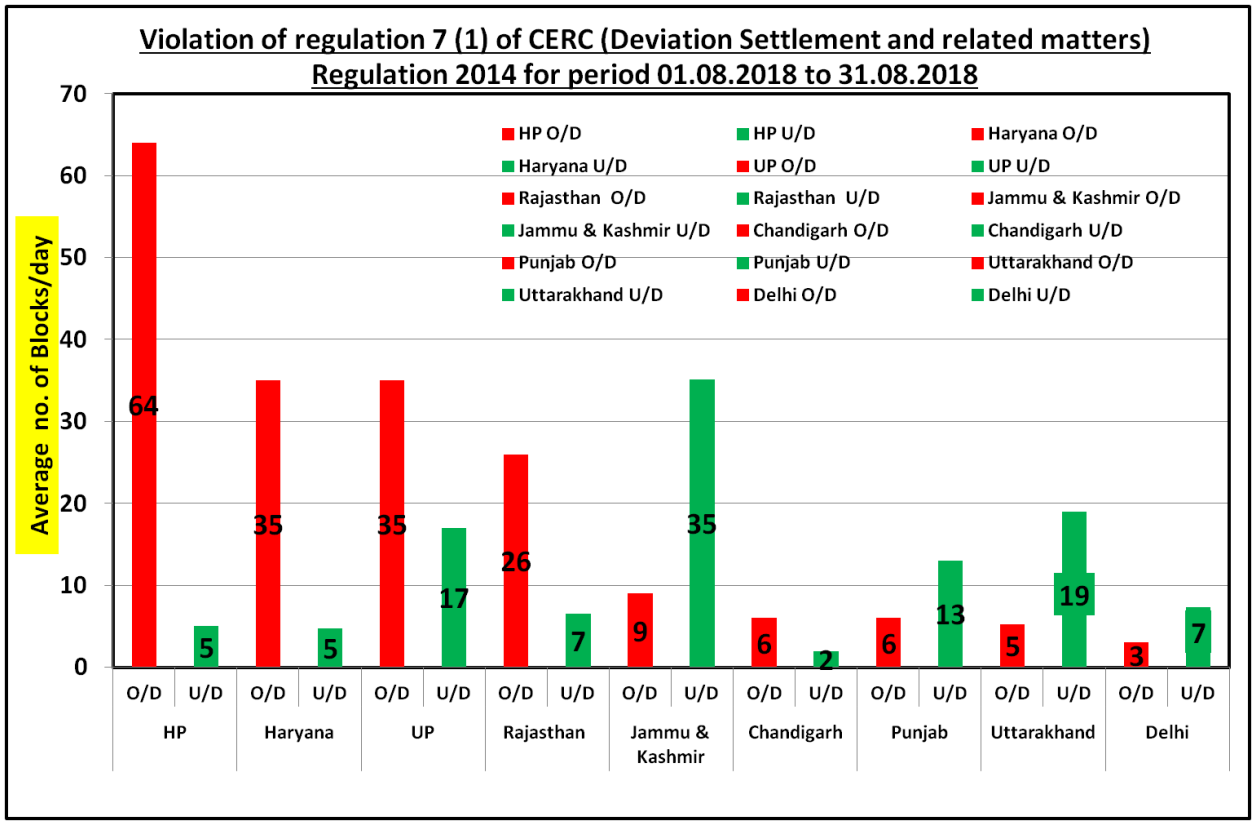

DELHI DEV
~ 200 to - 300 MW
400
200
0
-200
-400
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

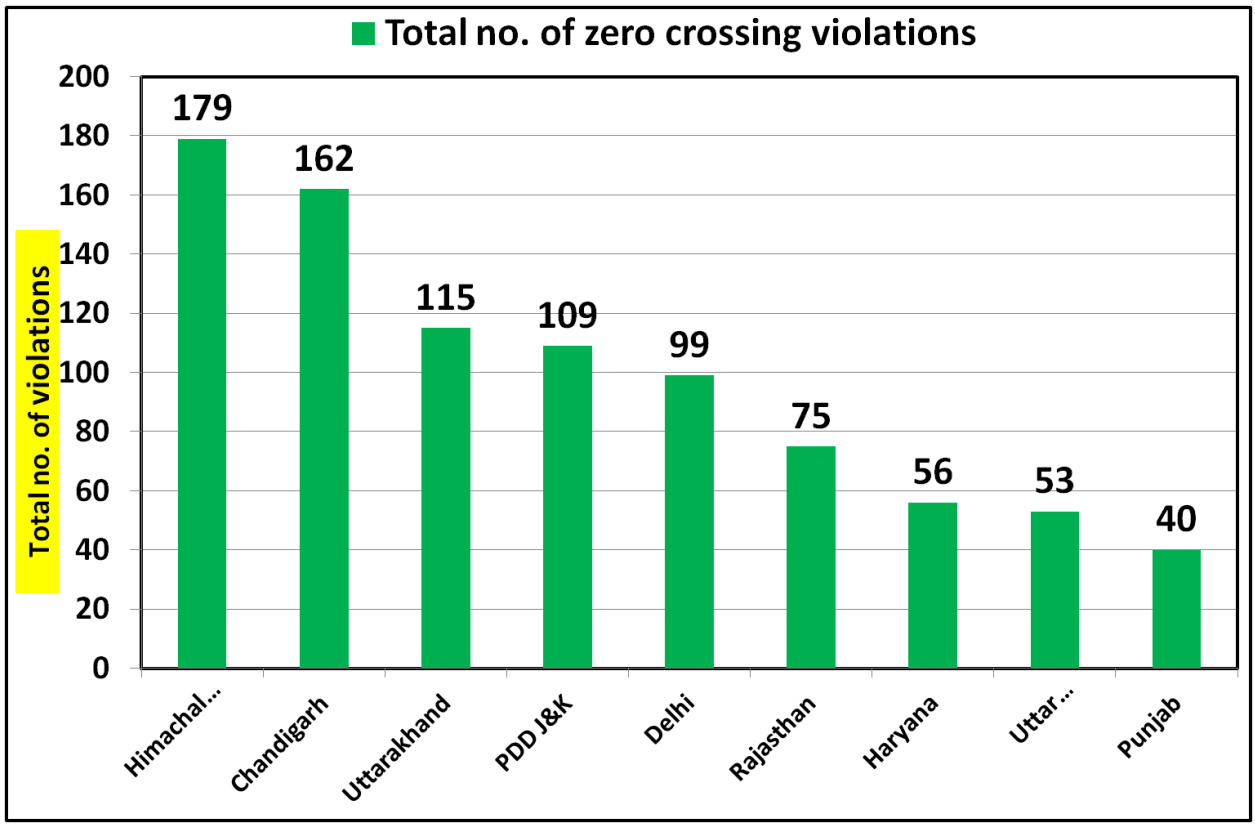

PUNJAB DEV
~ 200 to -400 MW
500
0
-500
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

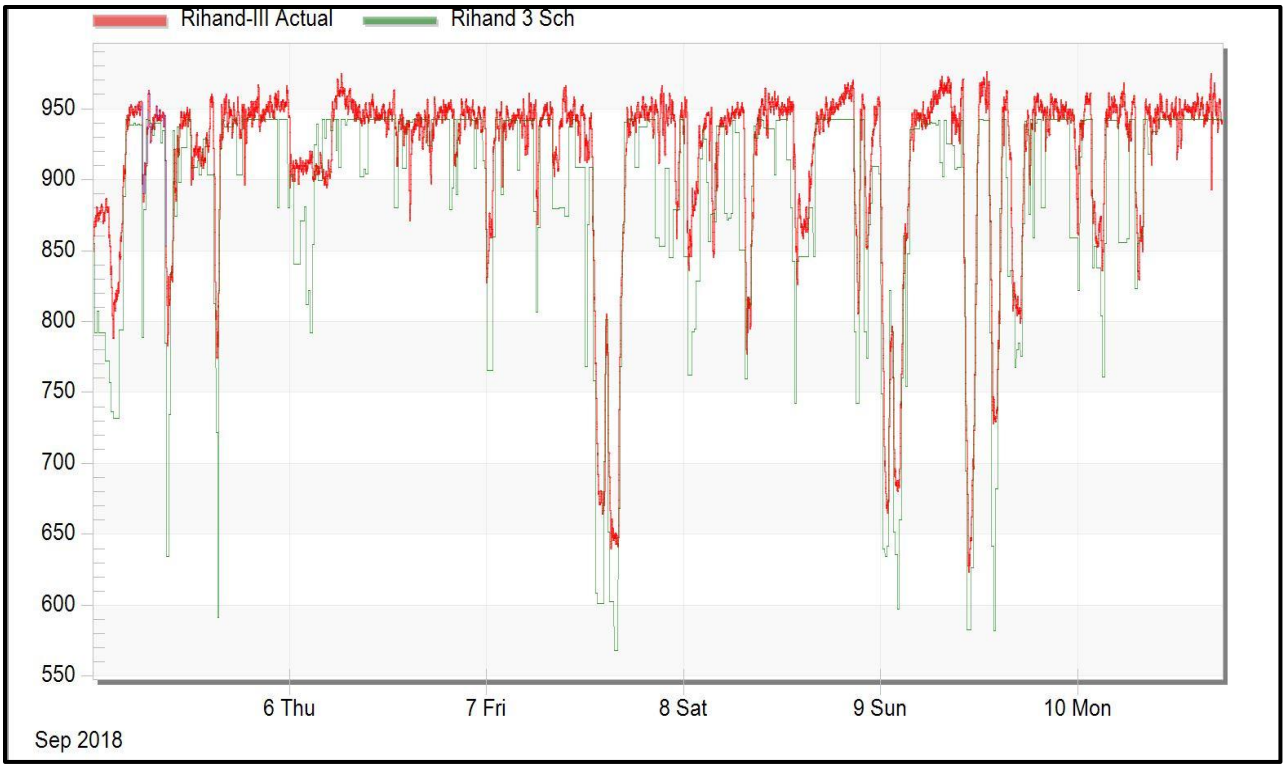

JK DEV
~ 400 to -600 MW
600
400
200
0
-200
-400
-600
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

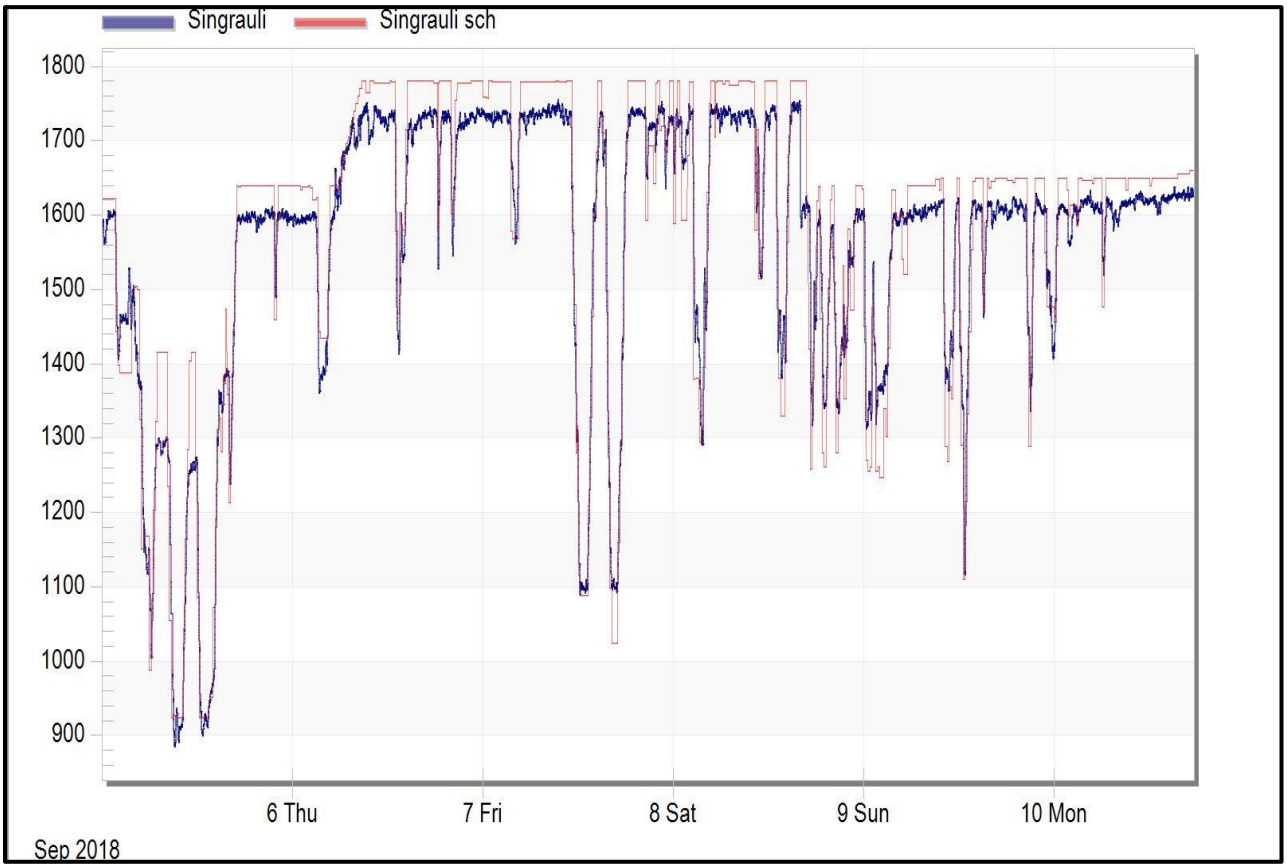

UTTARAKHAND DEV
~ 200 to -400 MW
400
200
0
-200
-400
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

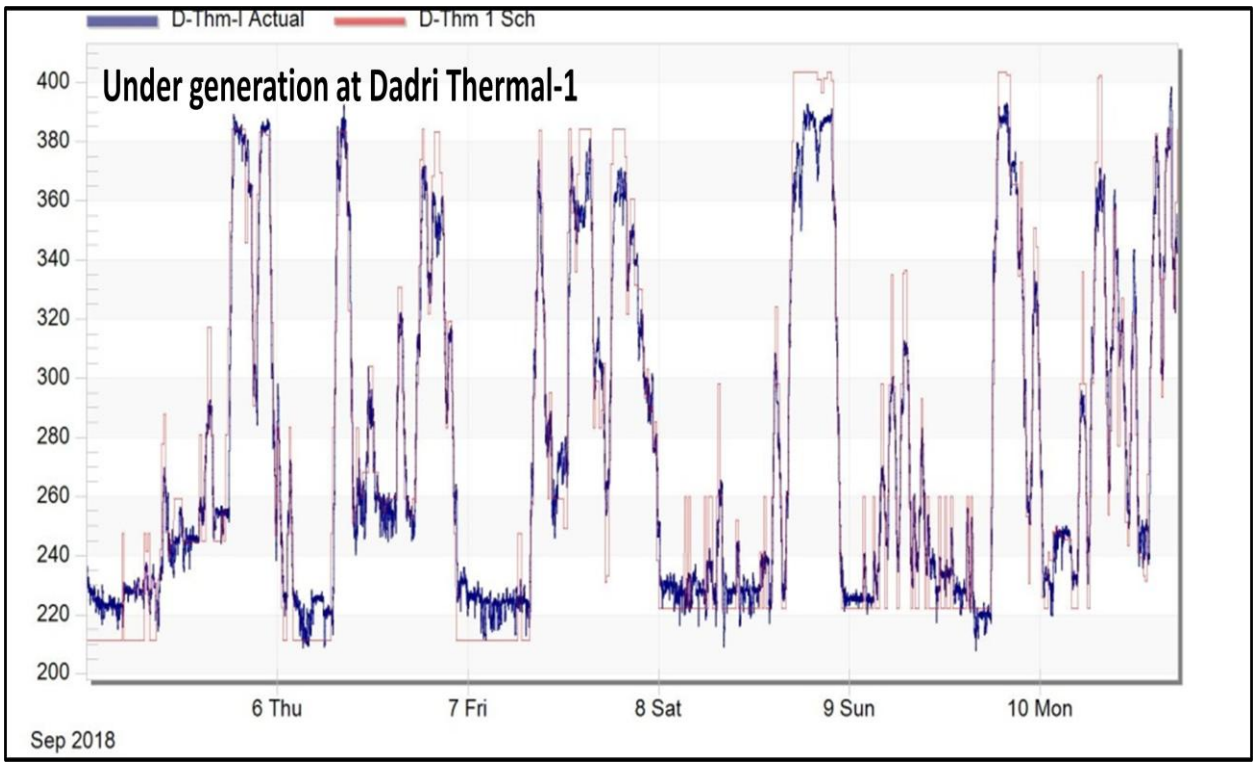

CHANDIGARH DEV
~ 70 to -60 MW
80
60
40
20
0
-20
-40
-60
Wed 15
Wed 22
Sat 1
Sat 8
Aug 2018

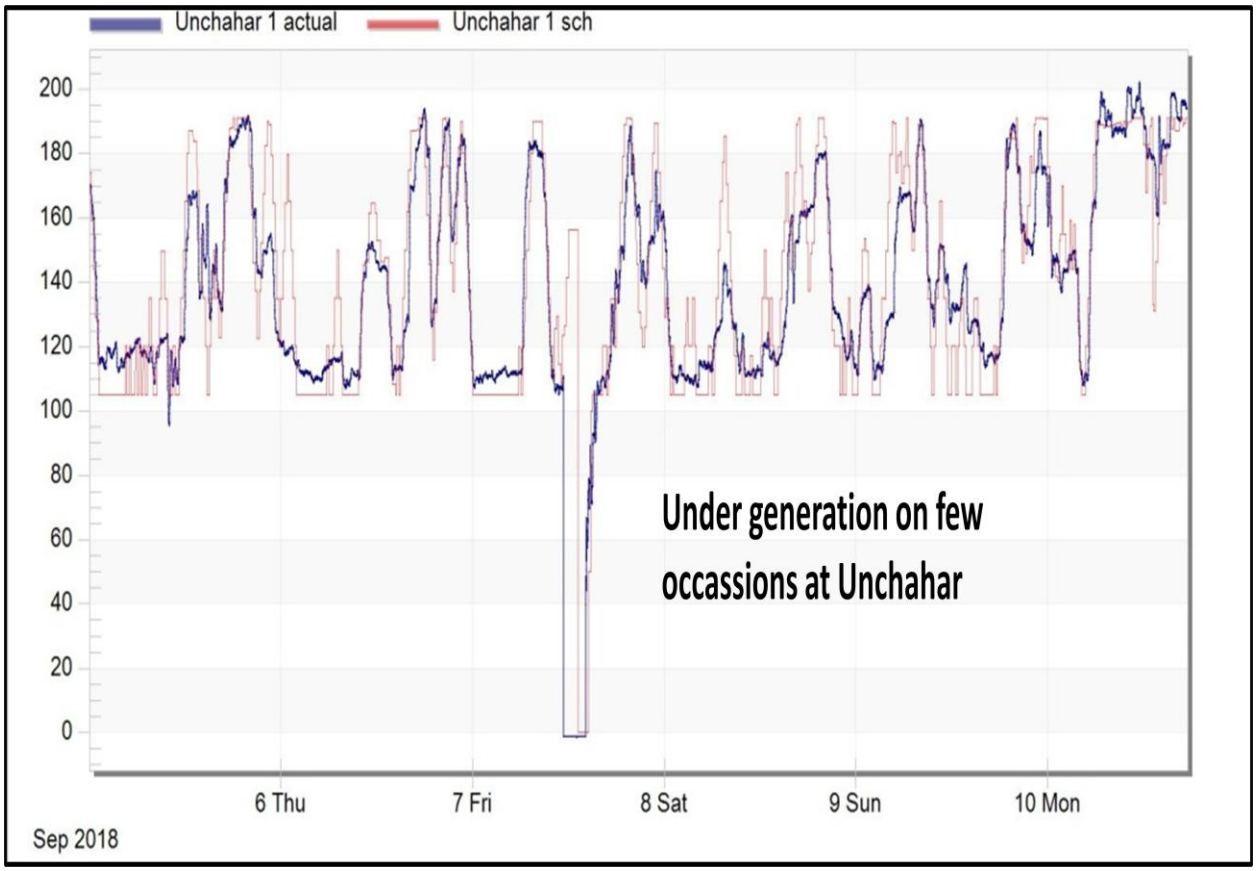

Violation of regulation 7 (1) of CERC (Deviation Settlement and related matters) Regulation 2014 for period 01.08.2018 to 31.08.2018
Average no. of Blocks/day
HP O/D
HP U/D
Haryana O/D
Haryana U/D
UP O/D
UP U/D
Rajasthan O/D
Rajasthan U/D
Jammu & Kashmir O/D
Jammu & Kashmir U/D
Chandigarh O/D
Chandigarh U/D
Punjab O/D
Punjab U/D
Uttarakhand O/D
Uttarakhand U/D
Delhi O/D
Delhi U/D
HP
Haryana
UP
Rajasthan
Jammu & Kashmir
Chandigarh
Punjab
Uttarakhand
Delhi

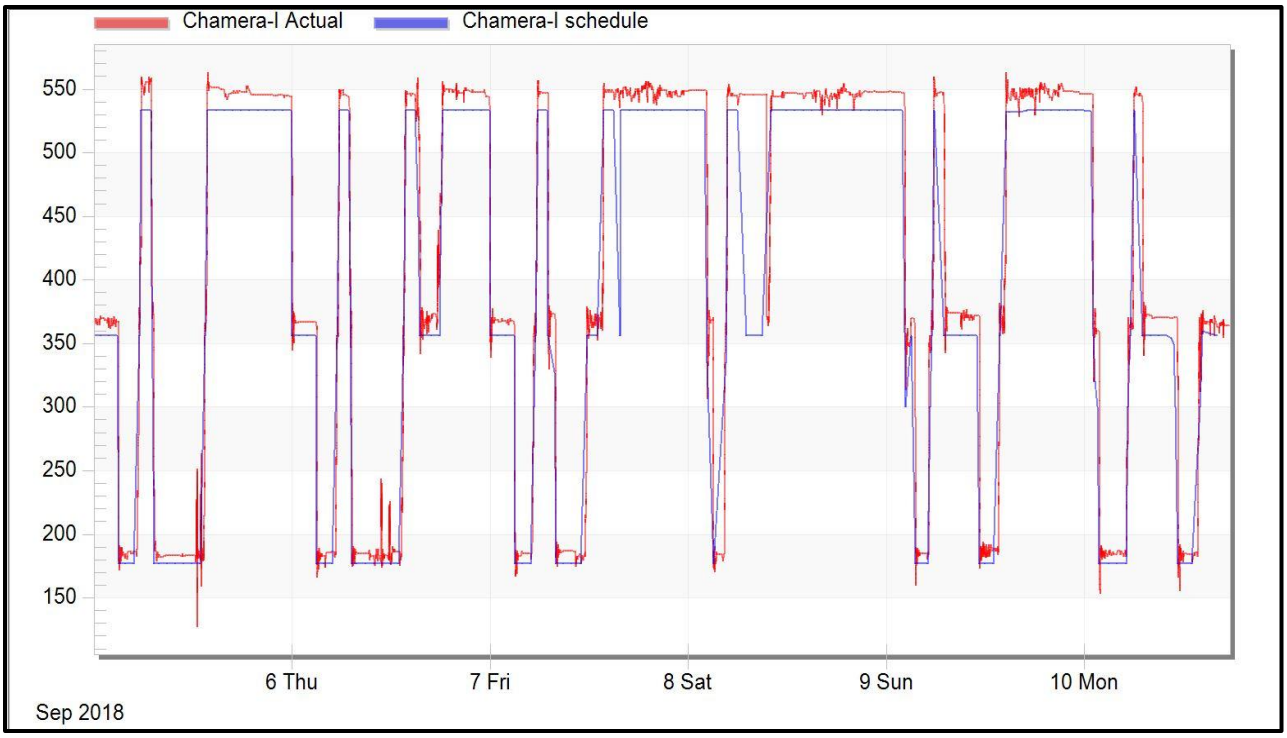

Total no. of zero crossing violations
Total no. of violations
179
162
115
109
99
75
56
53
40
Himachal...
Chandigarh
Uttarakhand
PDD J&K
Delhi
Rajasthan
Haryana
Uttar...
Punjab


Rihand-III Actual
Rihand 3 Sch
950
900
850
800
750
700
650
600
550
6 Thu
7 Fri
8 Sat
9 Sun
10 Mon
Sep 2018


Singrauli
Singrauli sch
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
6 Thu
7 Fri
8 Sat
9 Sun
10 Mon
Sep 2018


D-Thm-I Actual
D-Thm 1 Sch
Under generation at Dadri Thermal-1
400
380
360
340
320
300
280
260
240
220
200
6 Thu
7 Fri
8 Sat
9 Sun
10 Mon
Sep 2018


Unchahar 1 actual
Unchahar 1 sch
200
180
160
140
120
100
80
60
40
20
0
Under generation on few occassions at Unchahar
6 Thu
7 Fri
8 Sat
9 Sun
10 Mon
Sep 2018


Chamera-I Actual
Chamera-I schedule
550
500
450
400
350
300
250
200
150
6 Thu
7 Fri
8 Sat
9 Sun
10 Mon
Sep 2018

Adani PL.	(i) Sh. Nirmal Sharma, VP (O&M), Fax- 0141-2292065 (ii) Sh. Sameer Ganju, Head-Northern Region, Fax No. 011-24115560
APCPL	(i) AGM (O&M)-I, IGSTPP, Fax No. 01251-266326 (ii) AGM (EEMG), 01251-266326
BBMB	(i) Director (PR) Fax- 0172-2652820 (ii) Power Controller, Fax- 0172-2653297.
HVPNL	(i) Chief Engineer (Comm.); SE (SO & SLDC): 0181-2664440 Fax-0172-2560622
NHPC	(i) Sh. Janardan Choudhary, E.D., Faridabad – Fax-0129-2272413 (ii) Sh.V.K.Sinha,Chief Engineer (O&M), Faridabad – Fax-0129-2272413
POWERGRID	(i) Sh. Prabhakar singh, ED (NR-I), Fax No. 011-26853488 (ii) Sh. A.K. Arora, General Manager (O&M), NR-I, (iii) Sh. R.V.S Kushwaha, General Manager (O&M), Jammu; Fax- 0191-2471187 (iv) Sh.Rajeev Sudan Dy, General Manager (OS), Fax- 0191-2471187
RRVUNL	(i) Sh. P.S Arya, Chief Engineer (PPMC & IT),) Fax- 0141-2740006
NTPC	(i) Head of OS/ Head of RCC, Fax No. 0120-2410082 (ii) Sh. Praveen Chaturvedi, GM (OS), NRHQ Lucknow; Fax-0522-2305849. (iii) DP Singh AGM –OS NRHQ NTPC LIMITED Lucknow
HPSEBL	(i) Sh Suneel Grover, Chief Engineer (SO &P), Fax No. 0177-2653656 (ii) Sh. Deepak Uppal, SE (PR& ALDC): Fax-0177-2837143 (iii) Sh. Joginder Singh. Power Controller, Fax No. 0177-2837143.
NRLDC	General Manager - 26854861, 4051, 26569504 Fax- 26852747
NLDC	General Manager, NLDC, Fax: 011-26853488/26601079
Lanco APTL	Sh. Raj Kumar Roy, Director, Fax: 0124-2341627/4741024
SJVNL/NJHPS	General Manager (C&SO), Fax- 0177-2673283
PTCUL/UPCL	(i) Sh. Anupam Sharma, SE (SLDC), Fax- 0135-2451160, 0135-2763570
UPPTCL	(i) Director (Op), Fax- 0522-2286476 (ii) Chief Engineer (SLDC), Fax- 0522-2287880, 2288736
HPLDS	(i) Sh. N.P.sharma, SE, SLDC, Fax: 0177-2837649 (ii) Sh. Lokesh Thakur, Executive engineer, Fax: 0177-2837649
DTL	General Manager (SLDC)/ General Manager (Protection) Fax-23236462, 23221069
THDCIL	Sh. GM (EM - Design), Rishikesh
PSTCL	(i) Chief Engineer (SLDC) Fax – 0175-2365340 (ii) Dy.Chief Engineer (SLDC) Fax – 0175-2365340
CHANDIGARH	Sh. M.P.Singh, SE (Elect. Op.Circle) – Fax-0172-2740505
IPGCL/PPCL	(i) Sh. Y.P.Arora,GM (T), IPGCL, New Delhi, Fax- 23370884 (ii) Sh. R.K.Yadav, DGM (T), IPGCL, New Delhi, Fax- 23370884
BRPL	Sh. Satinder Sondhi, VP & Head System Operations, Fax No. 011-39996549
Everest PPL	Sh. Yogendra Kumar, Chief Operating Officer, Fax No. 011-45823862/ 43852507
RPSCL	Sh. Niranjan Jena, Addl.VP/ Sh. Suvendu Dey, Asst. VP-O&M, Fax: 05842-300003
HPGCL	Sh. S.K. Wadhwa SE/Technical(HQ), Fax: 0172-5022436
CEA	(i) Sh.Vikram Singh, Director; Fax-26170385,26108834 (ii) Chief Engineer, NPC, New Delhi
TPDDL	(i) Sh. Sanjay Banga, VP, Tata power-DDL, New Delhi (Fax: 011-27468042) (ii) Sh. Praveen Verma, Addl. GM, Tata Power-DDL, New Delhi (Fax: 011-27468042)
PTC India Ltd.	Sh. Ajit Kumar, Director (Commercial & Operations), PTC India Ltd., New Delhi (Fax- 011-41659144,41659145)
AD Hydro	Sh. Anil Kumar Garg, General Manager(BD), AD Hydro Power Ltd., Noida-201301, (Fax: 0120-4323271/4278772)
DISCOM UP	Sh. Rakesh Kumar, Director (T), Dakshinanchal VVNL, Agra-282007 (Fax- 0562-2605465)

NPL Mr. Rajesh Kumar, Head Operations- 08427183924, Email id: Kumar.Rajesh@larsentoubro.com
Address: Nabha Power Limited, PO box 28, Near Village Nalash, Rajpura, Punjab 140401.

Mr. Ravinder Singh Lall, Head O&M – 09815355411, Email : Ravindersingh.lall@larsentoubro.com
Mr. Pinaki Mukherjee, Sr. DGM, Commercial – 09871391388, Email id: Pinaki.mukhejee@larsentoubro.com

HPPTCL	Director (Planning & Contracts), Fax: 0177-2626284
J&K (PDD)	Chief Engineer (Survey & Commercial) Fax-0191-2476213
J&K SPDCL	GM, Fax: 0194-2500145
PSPCL	Engineer-in- Chief (PPRR), Fax- 0175-2308698.
RRVPNL	Chief Engineer (LD); SE (SO&LD) – Fax- 0141-2740920
UPRVUNL	DGM (TOM), 0522-2287861
UJVNL	General Manager Engineering: 0135-2761485, fax- 0135-2761549
NPCIL	(i) Station Director, NAPS; Fax. 05734-222177.(ii) Sr. Manager (Transmission), NPCILFax.-022-25563350
JPPVL	Sh. Suresh Chandra, Director, Fax- 0120-4516201/4609464/4609496
Jhajjar PL	Sh. Goutam Biswas, GM (Production), 01251-270155.
	Nabha Power Ltd (Rajpura)
LPGCL	Sh. A. N. Sar, Unit Head And Exec. Director, Fax- 91-22-22048681

Talwandi saboo Pvt ltd	Amit Mittal,GM- Power Sales, Strategy & Corporate Affairs,Talwandi Saboo