



सत्यमेव जयते

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

No: NRPC/OPR/106/01/2018/12365-406

Dated: 26 .10.2018

**विषय: - उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 152 वीं बैठक का कार्यवृत्त I
Minutes of 152nd OCC meeting of NRPC.**

उत्तर क्षेत्रीय विद्युत समिति की प्रचालन समन्वय उप-समिति की 152 वीं बैठक 16.10.2018 को आयोजित की गयी थी। उक्त बैठक का कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट <http://www.nrpc.gov.in> पर उपलब्ध है। यदि कार्यवृत्त पर कोई टिप्पणी हो तो कार्यवृत्त जारी करने के एक सप्ताह के अन्दर दे सकते हैं।

152nd meeting of the Operation Co-ordination Sub-Committee of NRPC was held on 16.10.2018. 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.

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(उपेन्द्र कुमार)
अधीक्षण अभियंता(प्रचालन)

संलग्न: उपर्युक्त / Enclosures : As above.

सेवा में,
प्रचालन समन्वय उप-समिति के सभी सदस्य

Minutes of the 152nd Meeting of the Operation Coordination Sub-Committee (OCC) of NRPC held on 16.10.2018 at NRPC Secretariat, New Delhi.

152nd meeting of OCC of NRPC was held on 14.10.2018 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 152nd OCC meeting.

PART-A: NRPC

Confirmation of Minutes:

- 1.1. Minutes of the 151st OCC meeting held on 13.09.2018 at NRPC, New Delhi were issued vide letter of even number dated 01.10.2018.

HVPNL has commented on the minutes as under:

“It is submitted that the anticipated peak demand for the month of October, 2018 on month ahead basis was intimated as 8130 MW. May kindly consider for correction in *Annexure-IV* in the MOM issued.”

- 1.2 Sub-Committee confirmed the minutes of the 151st OCC meeting by incorporating the above amendment suggested by HVPNL.

Review of Grid operations of September, 2018

- 2.1. **Anticipated vis-à-vis Actual Power Supply Position (Provisional) September, 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 September, 2018 in terms of peak demand for Chandigarh, Delhi, Haryana & UP and in terms of energy requirement for all.

SE(O) stated that the variation was a lot in this month.

- 2.1.2. **UP:**

UP representative stated that energy requirement was lower on account of better monsoon and mild weather during the month whereas availability was less due to coal shortage at Rosa TPS, Lalitpur TPS & Anpara-C.

- 2.1.3. **Delhi:**

The peak was given by taking 5% more projection over last year peak of 5661 MW. There has been lots of weather changes and rain during August, 2018 which continued in September also on account of which Delhi could not even touch the last year peak during the month. Based on this 5% growth projection the variation was on account of the change in climatic conditions as the projections made by them were as per the previous year.

- 2.1.4. **Haryana:**

Haryana representative stated that the peak of 10257 MW was given initially on the basis of 5% growth. However, on the month ahead basis they have projected peak demand of 9428 MW based on temperature variation etc. in the last OCC vis-à-vis 9008 MW actual.

- 2.1.5.** All utilities were of the opinion that because of the weather becoming cooler requirement of energy decreased.
- 2.1.6.** 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.
- 2.1.7.** Further, SE (O) informed that from the Power Supply Position it could be noticed that during last month all states have less demand than the projected one. In spite of that average frequency during last week of September was 49.95 Hz and almost every state has overdrawn. Because of these all 13 stations got schedule in RRAS and total of 133 Cr was payable from the pool to these stations under RRAS as against around 25 Cr per week even during high demand period. This was a self-conflicting scenario in which states actual demands were less than projected demand and still every state was overdrawing because of which RRAS were schedules to such extent. SE (O) requested all the Members to please take note of this and deliberate on the issue.
- 2.1.8.** UP representative submitted that though the actual demand of the states were less the availability were even more less. In UP alone there was a shortage of more than 2000 MW due to coal shortage. However, booking of RRAS is a major issue and there has to be some analysis of the same whether it is being booked wisely. It has been observed that RRAS has booked many times even under the situation of non-over-drawl, frequency staying with in the band and no issue of transmission. Therefore, there has to be some scientific of using RRAS instead of booking it in panic.
- 2.1.9.** NTPC representative stated that by 15th October 75 mcm of R-LNG has been used in NR equivalent to 330 MU and total of Rs 330 Cr @ Rs 10/unit. In fact, NTPC had to renegotiate the contract with GAIL to increase the supply as the envisaged quantity of 30 mcm was consumed during the 1st week itself.
- 2.1.10.** NRLDC representative stated that the States had overdrawn at 1st instance and whatever was scheduled has been shown in the availability. Power which was not scheduled should have been the availability of some States that was reflected in RRAS. Why did the States overdraw in spite of availability?
- 2.1.11.** NRLDC advised the state to schedule the power as per their demand and to keep the reserves above that else there would be under frequency situations. Therefore, in order to maintain frequency some controls have to be kept in the form of reserves.
- 2.1.12.** There was disagreement on the issue/methodology of booking RRAS between UP and NRLDC and UP representative ask for a report from NRLDC on block wise booking of RRAS and reasons thereof.
- 2.1.13.** CEA representative stated that it has to be operated economically and SOP should be saving of money while operating the grid securely and reliably. He advised NRLDC to revise the schedule of the overdrawing entity as per the regulation 6.5.20 of the IEGC in place of booking RRAS. If frequency is below the band for more than 50% of time then it is a law to fire RRAS.
- 2.1.14.** NRLDC representative stressed the need for proper operational planning for resolving such issues.

2.1.15. Members agreed for the proper analysis of booking the RRAS in view of the objection raised by the UP on operational methodology of the RRAS. UP agreed to share the data in which RRAS was booked in the same time block so as to improve the system.

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 September 2018 are as follows: -

- 2.3.1. Frequency remained within the IEGC band for 80.23% of the time during September 2018, which is more than that of last year during same month (September 2017) when frequency (within IEGC band) remained 78.50% of the time. The maximum and minimum frequencies recorded were 50.17 Hz (22.09.2018 at 13:00 hrs) and 49.59 Hz (24.09.2018 at 13:30) respectively.
- 2.3.2. 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.
- 2.3.3. Maximum and minimum load for the region during September 2018 were 56408 MW (18.09.2018 at 19:20 hrs) and 32096 MW (23.09.2018 at 13:30 hrs). It was highlighted that during the month of September, 2018 Northern Region faced more than 5.0% variation in the Anticipated vis-à-vis Actual Power Supply Position in terms of Peak demand for Chandigarh, Delhi, Haryana & UP and in terms of Energy requirement for Chandigarh, Delhi, Haryana, Uttarakhand, HP, J&K, Punjab, Rajasthan & UP.
- 2.3.4. The average consumption, of the Northern Region, for September 2018, increased by 1.70% (19 MU per day) with respect to the corresponding month in previous year. The reason for the same was the decreased temperature in the month of September with respect to the last year.
- 2.3.5. The average Thermal generation in September 2018 decreased by 2.83% (17 MU/Day) with respect to the corresponding month in previous year. The details are enclosed at **Annexure II (A)**.
- 2.3.6. The average Hydro generation in September 2018 increased by 22 MU/day with respect to the corresponding month in previous year. The reason for low hydro generation was less water on account of less snowfall.
- 2.3.7. The average Renewable generation in September 2018 increased by 29.15 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.
- 2.3.8. The average nuclear generation in September 2018 was decreased by 2.65 MU/day per day as compared to corresponding month in previous year.

- 2.3.9. The net Average Inter-Regional import decreased by 46.49 MU/day during the month of September 2018, as compared to the corresponding month in previous year.
- 2.3.10. The net Average Import from WR decreased by 29.91 MU/day during September 2018 as compared to corresponding month in previous year.
- 2.3.11. The net Average Import from ER decreased by approximately 19.94 MU/day during September 2018 as compared to corresponding month in previous year.
- 2.3.12. The net Average Import from NER increased by approximately 3.37 MU/day during September 2018 as compared to corresponding month in previous year.
- 2.3.13. The major reasons for decrease in the import, from other regions was the decreased demand in power on account of the weather conditions.
- 2.3.14. The transmission losses are depicted at **Annexure II (B)**.
- 2.3.15. The STOA summary for September 2018 is placed at **Annexure II (C)**.
- 2.3.16. The outages of generating Units were discussed in detail and the same is placed at **Annexure II (D)**. NTPC & all State utilities were requested to review the status of generating units in view of the upcoming summer months.
- 2.3.17. Long outages of transmission lines were discussed & all constituents were requested to revive the elements under long outages at the earliest (**Annexure II E**).
- 2.3.18. The new elements charged were discussed and the list is attached at **Annexure II (F)**.
- 2.3.16. Total outages during September 2018 were 543 including Planned S/D (197) and Forced S/D (Trippings-223+Emergency S/D-123)

Maintenance Program of Generating Units and Transmission Lines

3.1. Maintenance Program for Generating Units.

- 3.1.1. The maintenance program for Generating Units for the month of November, 2018 was discussed on 15.10.2018 at NRPC, New Delhi. The approved outages of generating units as per deliberations held in OCC has been issued vide letter of even no dated 26.10.2018.

3.2. Outage Program for Transmission Elements.

- 3.2.1. The Outage program of transmission elements for the month of November, 2018 was discussed on 15.10.2018 at NRPC, New Delhi. The approved outages of transmission elements as per deliberations in OCC has been issued vide letter of even no dated 26.10.2018.

Planning of Grid Operation

- 4.1. **Anticipated Power Supply Position in Northern Region for November, 2018 (As per 15th LGBR Sub-committee meeting)** - The Anticipated Power Supply Position in Northern Region for November, 2018 as updated by Haryana (7033 MW) and Delhi (3800 MW) is enclosed at **Annexure-IV**.

Data for the last quarter of 2018-19 required to be submitted by DICs connected to ISTS

- 5.1. SE (O) informed the Sub-committee that the details of non-ISTS lines which have to be certified for being used as inter-state transmission for the year 2018-19 as per CERC (Sharing of inter-State Transmission Charges and Losses) Regulations, 2010 (as amended) have been forwarded to the NRLDC for carrying out studies. Only HPPTCL, PSTCL, PTCUL and RVPN have furnished the required data after being regularly followed up in OCC and through mails.
- 5.2. Further, he requested all the DICs to submit the MW and MVAR data for injection or drawl at various nodes or a group of nodes for maximum injection/maximum withdrawal for each application period as per CERC (Sharing of inter-State Transmission Charges and Losses) Regulations, 2010 (as amended). Such data it was added should include the power tied in long term contracts and approved medium term open access agreements.

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

- 6.1. 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.

Reactive compensation at 220 kV/400kV level

- 7.1. **In the 38th TCC & 41st NRPC following elements in NR were approved:**
 - a) 500 MVAR TCR at 400 kV bus at Kurukshetra S/S of Powergrid.
 - b) 30 no. 220 kV bus reactors at 220 kV sub-stations and 18 no. 400 kV bus reactors at 400 kV sub-stations subject to the availability of space.

POWERGRID

Representative of POWERGRID had 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.

- 7.1.1. 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 has been charged on 28.09.2018.
- 7.1.2. Regarding the installation of the bus reactors at 400 kV ISTS substations which is to be done through TBCB route as per the MoP Gazette Notification dated 08.05.2018, POWERGRID representative was requested to update the progress of the same from CTU.
- 7.2. **DTL:**
 - 7.2.1. DTL has informed that as per the revised approval of SCPSPNR held on 22.06.2018, DTL will install 7 no. bus reactors, six 25 MVAR, 220 kV bus reactors at Mundka, Harsh Vihar, Peeragarhi, Electric lane, Bamnauli & Indraprastha substation and 1 no. 125 MVAR, 400 kV bus reactor at Mundka substation. DTL has submitted that these reactors

would be commissioned by **December 2020**. Out of the above, scheme for five reactors at 220 kV level are under approval.

7.2.2. DTL representative informed that order for the above reactors is expected to be placed by **December 2018**.

7.3. PSTCL:

7.3.1. Technical bid for 400 kV bus reactor at Dhuri substation has been opened and Price bid will be opened on 18.10.2018. As regards 220 kV bus reactors at Dhuri and Nakodar substation, tender has been opened on 15-06-2018 (technical bid) & is under evaluation. DPR for installation of 400 kV and 220 kV bus 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.

7.4. Uttarakhand:

7.4.1. PTCUL representative informed that for 125 MVAR reactors at Kashipur tender date has been extended as only 2 bids were received. 80 MVAR reactor at Srinagar has been received at site and shall be commissioned by end of this month.

7.5. Rajasthan:

7.5.1. Rajasthan representative updated as under:

7.5.1.1. The DPR for 3 Nos. each of 25 MVAR reactors (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 and approval is under process at their end. The installation process of these 3 reactors shall be started on receipt of approval by PSDF.

7.5.1.2. The MS NRPC advised that 450 MVAR (13x25+1x125MVAR) agreed in the standing committee should have been got installed even if the locations had changed in revised study / proposal. In this context it is to submit that the revised DPR for 450 MVAR approved Reactor after separating STATCOM has been sent to POSOCO for approval vide letter dated 12.10.2018.

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

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

8.1. 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.

8.2. 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.

8.3. 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.

8.4. 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).

- 8.5. 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.

- 8.6. 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 You tube 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

- 8.7. 152nd OCC meeting:** No progress has been made so far for submission of data. All the utilities were again requested to make efforts to do the needful.

Phase nomenclature mismatch issue with BBMB and interconnected stations

- 9.1.** The Protection Sub-Committee while discussing multiple elements tripping at 400/220/132kV Dehar HEP of BBMB in its 34th meeting held on 21.04.2017 recommended inter-alia that BBMB should modified nomenclature of phase sequencing at Dehar as Y-B-R instead of R-Y-B. The issue was further deliberated in the 138th OCC meeting held on 23.08.2017, wherein it was observed that nomenclature of phases at BBMB end has inadvertently been marked as outlined below:

Phase of the grid	Corresponding nomenclature of the phase at BBMB end
R Phase	B Phase
Y Phase	R Phase
B Phase	Y Phase

The BBMB was asked to rectify the nomenclature issue at their end accordingly.

- 9.2.** However, BBMB raised concern that the issue could not be resolved in one go, as coordination would be required from all the concerned utilities to carry out this activity and requested NRPC to form a committee comprising of BBMB and its partner states,

utilities with which BBMB has interconnection, NRPC Secretariat and POWERGRID for the same. NRPC in its 41st meeting held on 28th February, 2018 approved the proposed formation of the committee and advised BBMB to resolve the issue within six months. BBMB drew a draft action plan which was duly deliberated by the Committee in its 1st meeting held on 04.06.18. The action plan was circulated to all the concerned utilities for their comments and concurrence. The execution of the action plan was tentatively planned during month of November-December, 2018.

- 9.3. HPSEB and PSTCL agreed with action plan, however, PSTCL was of the view that 400kV Dehar-Rajpura line is owned by PGCIL and hence the work is to be executed by them. Comments on the action plan were also received from NTPC and POWERGRID BBMB has agreed with the comments from NTPC and has given their reply on the comments of POWERGRID.
- 9.4. The reply of BBMB vis-à-vis the comments of POWERGRID were deliberated in the 151st OCC meeting wherein members were of the view that reply of BBMB was generally in order. However, POWERGRID representative stated that the matter pertains with NR-I and NR-II region of POWERGRID and final decision regarding the same is to be taken up at the level Executive Directors of respective regions.
- 9.5. Accordingly, the matter was taken up vide letter of even number dated 07.10.2018 for POWERGRID consent to the action plan. However, reply of the same is still awaited.
- 9.6. **152nd OCC meeting:** POWERGRID representative assured that the issue will be resolved with BBMB.
- 9.7. SE (O) requested POWERGRID to give their consent at the earliest so as the BBMB could execute the work in the upcoming months of November & December as per the decision of NRPC.

Follow up of issues from previous OCC Meetings – Updated Status

- 10.1 The detail of the updated status of Agenda items is enclosed at **Annexure-X**.

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

- 11.1 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 format on the NRPC website.
- 11.2 **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. All constituents are again requested to update the desired information in soft copy in excel format on a regular basis. 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 shall coordinate and submit the information.

- 11.3** PSPCL submitted the contact details of the officer concerned with FGD installation. Randhir Singh Bains, Dy. CE/GGSSTP, Ropar- M. 9646117711
- 11.4** **152nd OCC meeting:** SE(O) NRPC informed that in June, 2018, MoP in a letter to the CERC stated that investment in the installation of emission control technology like FGDs in TPPs in compliance to MoEF&CC norms will be considered for pass through in tariffs and TPPs can approach appropriate commission for the approval of additional capital expenditure and compensation for the increased cost on account of this change-in-law event.
- 11.5** The Sub-Committee was also informed about revised phasing plan received from TR&M Division of CEA placed at **Annexure-XI (A)**. He requested all utilities to look into the same and implement the installation plan accordingly and update.

LVRT compliance by wind generators.

- 12.1** 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.

- 12.2** **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.
- 12.3** **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.”

12.4 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.

12.5 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. NRPC 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.

12.6 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 23.7.2018 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.

12.7 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.

12.8 151st OCC meeting:

The MOM of the meeting held on 23.07.2018 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.

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

12.9 152nd OCC Meeting:

RRVPL representative intimated that a meeting along with presentation from LVRT solution provider (M/s Enerfra) has been convened on dated 09.10.2018. MOMS of said meeting are attached as **Annexure-XII**. During the meeting, he informed that it was also decided by MS, NRPC that a meeting of WTG Manufacturers and generators will be convened at NRPC on dated 23.10.2018 to discuss bottlenecks issues in implementation of LVRT in Rajasthan control area.

System Protection Scheme (SPS) in NR

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

13.1.1 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.

13.1.2 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.

13.1.3 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.

13.1.4 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. He 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.

13.1.5 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, 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.

13.1.6 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

13.1.7 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.

13.1.8 152nd OCC meeting:

POWERGRID updated that the work will be completed in totality by November end. He added that physical installation will be completed within this month and testing of the 21 number of link will start thereafter.

NRLDC representative stated that the Mock testing would be planned thereafter in the first week of December, 2018.

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

13.2.1 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”.

13.2.2 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.

13.2.3 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 40 days. The cost of the work would be 54.20 lac & UPPTCL has been intimated about the same.

13.2.4 152nd OCC meeting: UPRVUNL updated that they will complete the work by November end. UPPTCL representative stated that the work at their end and LANCO is complete and once the UPRVUNL completes the work mock testing will be done. It was further added by representative of UPRVUNL and UPPTCL that only action at Anpara D is pending and therefore with the commissioning of scheme at Anapara D, entire scheme would stand commissioned.

13.3 SPS for Kawai – Kalisindh - Chhabra generation complex:

13.3.1 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.”

13.3.2 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.

13.3.3 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.

13.3.4 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.

13.3.5 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.

13.3.6 151st OCC meeting:

RRVPNL representative submitted the written communication from their STU in this regard is enclosed at Annexure 12A of the MOM of the 151st OCC meeting. 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.

13.3.7 152nd OCC meeting:

RRVPNL representative submitted a letter from SE (Procurement-I), RVPN, Jaipur Annexure-XII, vide which it has been intimated that the Technical specification for implementation of Automatic load shedding scheme under SPS for Kawai Kalisindh

generation complex is under approval. Further, it was intimated that the contract will be awarded within 4-5 months and complete implementation of above scheme may take further 6-7 months. SLDC Rajasthan representative confirmed that Chabra STPS units have also been wired to the SPS.

Automatic Demand Management System

14.1 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.

14.2 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.

14.3 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.

14.4 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.

14.5 151st OCC meeting:

PTCUL representative intimated that the matter stands taken up with the Operation circle of Utrakhand 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

14.6 152nd OCC meeting:

UPPTCL representative informed that the remote operation of 132 kV feeders under ADMS has been done, but for the below network they have taken up the issue with the Distribution companies.

Haryana & PTCUL representative informed the Sub Committee that they are vigorously taking up the issue with the distribution companies in this regard.

Rajasthan representative updated as under:

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. Financial Bid has also been opened and financial bid analysis is yet to be submitted for approval of WTD. Work order is expected to be placed by December-18 after expiring of model code of conduct for assembly election in Rajasthan.

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

- 15.1 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.
- 15.2 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.
- 15.3 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.)
- 15.4 150th OCC meeting:** NTPC submitted the information for NCR (Annexure 15 of the MOM of the 150th OCC meeting).
- 15.5 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.
- 15.6 152nd OCC meeting:** All utilities other than mentioned above were again requested to update the status as per the prescribed Formats.

Planning, procurement and the deployment of Emergency Restoration System.

- 16.1 The updated status in the 152nd OCC meeting is as under:**
- DTL, PSTCL, J&K & UPPTCL -** 02 nos. of ERS procured.
- RRVPNL: -** For procurement of ERS, the preparation of Tender documents is completed and has been in-principle approved. The Tender is likely to be floated in the month December-18 after expiring of model code of conduct for assembly election in Rajasthan
- HVPNL: -** BOQ finalization it's under process.
- SE(O) 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.

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

Cleaning and Replacement of porcelain insulators

17.1 Northern Regional power transmission lines are exposed to the high pollution levels along their routes. Such pollution levels with the onset of the winter season, lead to the frequent trippings and finally to breakdown and long outages of the transmission lines. These outages make the grid weak, thereby endangering the grid reliability and security. Therefore, in order to avoid/mitigate trippings of lines during foggy (smog) weather in winter season, preventive actions like cleaning/washing of insulators, replacement to conventional insulators with polymer insulators has been recommended and are being taken every year.

17.2 It being a regular activity, all the transmission licensees in the Northern Region are being requested in monthly OCCM since the 148th Meeting to plan insulator replacement work from September 2018 onwards.

The meeting for cleaning and replacement work of conventional insulator was held on 15.10.2018. The Minutes of the same would be issued separately.

All utilities were requested to stick to the timeline as brought out in the meeting to mitigate fog related trippings during winter season and to ensure proper submission of data in line with the discussions held in the meeting.

Cyber Security Preparedness Monitoring

18.1 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.
- 18.2 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.
- 18.3 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.
- 18.4 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.
- 18.5 151st OCC meeting:** The information has been received from NTPC, NHPC, Tata Power, THDCIL, PTCUL, NPCIL RAPS, NAPS, PSTCL, DTL & PTCUL.
- 18.6 152nd OCC meeting:** Other utilities (except from those mentioned above) were requested to update.

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

- 19.1** 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.
- 19.2 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.
- 19.3 149th OCC meeting:** All utilities were again requested to submit the desired information. Rajasthan representative stated 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

19.4 The Agenda item was taken up subsequently in the 150th OCC Meeting & 151st OCC Meetings & all utilities were requested to make all out efforts and submit the desired information. Punjab has submitted the information that has been forwarded to concerned office of CEA.

19.5 152nd OCC Meeting:

All utilities except Punjab were requested to update. The representatives of Rajasthan informed the Sub-Committee that they are making all out efforts to get the information from the distribution companies but communication from NRPC Secretariat would help in expediting the issue.

SE(O) informed that the issue would be brought forth in the next meeting scheduled to be held with the DISCOMs.

Distribution automation and development of smart grid in NCR

20.1 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.

20.2 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.

20.3 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.

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.

21.1 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 Vindhychal 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

21.2 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 Vindhychal & Rihand HVDC may also be included.

21.3 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.

21.4 152nd OCC Meeting:

The meeting of the committee was held prior to the OCC meeting. The minutes of the same would be shared separately

Discrepancies in Generation Schedules

22.1 NTPC representative informed that it is being observed that Generation Schedules of NTPC Gas Stations posted on NRLDC scheduling web-based portal are getting changed post facto w.r.t to real time schedules at the end of the day i.e., schedules are getting changed for the lapsed time blocks. The issue is more alarming in case of gas stations running of RRAS. This happening due to malfunction of NRLDC new web-based scheduling software necessitating resolving of discrepancies on post facto basis. The problems have been reported to NRLDC with a copy to NRPC many a times since last 3 months, but the same is not getting resolved. Such post facto changes of schedules create confusion and difficult to detect at times. Discrepancies in scheduling leads to accounting related problems which has financial implications. A typical case of such

discrepancies for 01.10.18 is placed at Annexure-XXI of the Agenda of the 152nd OCC meeting.

NRLDC representative admitted that there is some software bug in web-based scheduling software leading to post facto revision of schedules. He added that they have taken up the issue with the software developer (PwC) who is still working to resolve the matter as the problem is not occurring logically but happens illogical and randomly, therefore, difficult to diagnose and taking time to resolve. However, software developer is already on the job.

- 22.2 When UP representative complained about schedule revision on SCADA, NRLDC suspected that it might be due to browser issue, as web scheduling and SCADA both are in sync. UP was asked to share few incidences of the same, to which UP agreed. The Sub Committee advised NRLDC to get the issue resolved on priority.

Non-availability of technical minimum schedules on real time for units on-bar

- 23.1 NTPC representative informed that Gas Stations are being often run on RRAS with R-LNG/LF fuel to meet demand in grid. Most often, on-bar running gas stations are not being provided with technical minimum schedules by NRLDC citing that RRAS schedules are given by NLDC. However, there is no issue of maintain station on technical minimum but issues are in accounting as there are discrepancies in real time schedule vis-à-vis technical minimum. Gas stations are instructed to keep running on technical minimum levels without real time schedules available to them. These schedules then need to be taken up separately with NRLDC for post facto revision, burdening the executives involved in scheduling verification work on day to day basis. NRLDC requested to ensure that if units are to be kept on-bar, then timely schedules must be provided on real time basis.

The issue was deliberated in the OCC and after deliberation NRLDC agreed that certainly there are problems in giving real time schedule as scheduling by the beneficiaries in between would result in change RRAS on technical minimum which is to be conveyed back to NLDC and to be revised manually, however, assured to resolve the issue of giving schedules in real time through software at the earliest. Further, NRLDC stated that the WBS software also has an option of entering the quantum of power to be bid in PX. Therefore, generators can directly enter the quantum in WBS rather than intimating NRLDC through mails. NRLDC clarified that since scheduling RRAS and URS requisitions are happening simultaneously, the issues of gate closure is not adhered and therefore at times this is happening and contrary sometime higher schedule is also happening. However such issues are being taken care of. Gate closure could be a solution to such issues.

On related point raised by NTPC representative that some time the schedule of gas stations is more than the DC, NRLDC representative mentioned that this could happen under following conditions:

- a. Seeing the under requisitions power simultaneously power may get scheduled under RRAS as well though requisitioning by any beneficiary on URS. Since both the actions are being taken simultaneously from two places. Therefore again Gate-Closure concept could be helpful for such situations.

- b. Other condition is while generating station sells power through PX (certain % of DC) on day ahead basis and there is down word revision by plant in DC during the course of the day with all the beneficiaries requisitioning full power. Under such situation schedules would continue to be higher as Px scheduled are non-revisable.

Improper approval procedure for transmission elements and generators

- 24.1 NTPC representative stated that as per the laid down procedure, transmission elements and generator shut down are proposed by uploading requests at NRPC TSOP web-based application. Shut downs are approved after discussions in NRPC OCC subject to grid real time condition. However, confusion is being experienced by respective stations while obtaining outage code for the approved date despite applying for the code on N-3 criterion. The problem is especially predominant if shut down required is with effect from 1st day of the week i.e., Monday or a day after public holiday. At times, it is stated that code cannot be given as concerned executive is on leave. Many a times, it is cited by NRLDC SCE that they are not aware of the approved shut down list and OCC approved list have to be provided to them. In the absence of timely issuance of outage code, manpower arranged at site for the purpose sits idle which in turn has contractual obligations. TSOP system is not person specific and outage code should be given by SCEs manning NRLDC control room or else a separate 24x7 control room at NRLDC should be established for the purpose.

NRLDC representative requested the utilities seeking outage to also check back their mail for NRLDC approval on N-3 criterion and assured that necessary instructions would be passed to all the concerned for timely issuance of outage codes. He further explained that shut downs are normally approved well in advance and same is being communicated to respective stakeholders. NRLDC requested the transmission agencies/stakeholders to ensure the approval before asking for code for shutdown in real time. In order to have continuity, NRLDC has entrusted the outage coordination to specific team of officers and therefore preapproval is necessary to enable real time operator to grant code. Therefore, all stakeholders shall cooperate and contact the concerned NRLDC officer for approval if the same has not been received by them on day ahead basis. However, a new web based shutdown management system is under development at NRLDC wherein OCC approvals would also get linked and therefore further streamlining the shutdown management.

Heavy over draw from the grid leading to very poor frequency profile.

- 25.1 A letter dated 18.09.2018 issued by Power System Operation Corporation Limited in this regard was attached at Annexure24 of the Agenda of the 152nd OCC meeting. It has been highlighted that the frequency remained below the mandated minimum value of operating range for 42% and 27% of time on 15.9.2018 & 16.9.2018. During this period HP state control area has been overdrawing from the grid.
- 25.2 HP representative added that the main reason was unprecedented weather conditions. He added that HP made its efforts to decrease overdrawal by booking power through RF/LF , purchasing power at IEX platform and purchasing power on as and when basis.

Reactive Power Control Settings adopted at terminal stations of multi-terminal HVDC BNC-Alipurduar -Agra.

- 26.1** A letter dated 5.10.2018 issued by Power System Operation Corporation Limited in this regard was attached at Annexure25 of the Agenda of the 152nd OCC meeting. It has been highlighted that the HVDC BNC-Alipurduar –Agra is a high power corridor which impacts transfer of power between three regions. Any contingency on this link affects parallel AC lines and the voltage variation tends to be alarming. The details of the RPC settings adopted for each terminal station needs to be known for ensuring a safe operation.
- 26.2** **POWERGRID gave a detailed presentation on the HVDC settings and the operating procedure (Annexure XXVI).**

Observance of High Shaft Vibration at DADRI Stage 2 units (#5&6) during power system faults near its vicinity.

- 27.1** A letter dated 5.10.2018 issued by Power System Operation Corporation Limited in this regard was attached at Annexure26 of the Agenda of the 152nd OCC meeting. In the letter the issue of vibrations in the machine at the time of fault in feeders emanating from 400kV Dadri bus has been observed.
- 27.2** NRLDC representative in the meeting stated that vibrations could be on account of earthing. He added that a report of Adani on a similar problem can be referred, to deliberate and discuss the actions required to be taken for mitigation of vibrations from Grid as well as from generators perspective.

Sub Committee further advised NTPC to take advice of academic expert like from IITs on the issue.

Report of allocation of Anticipated Energy and the generation programme for the BBMB power houses for the month of September 2018

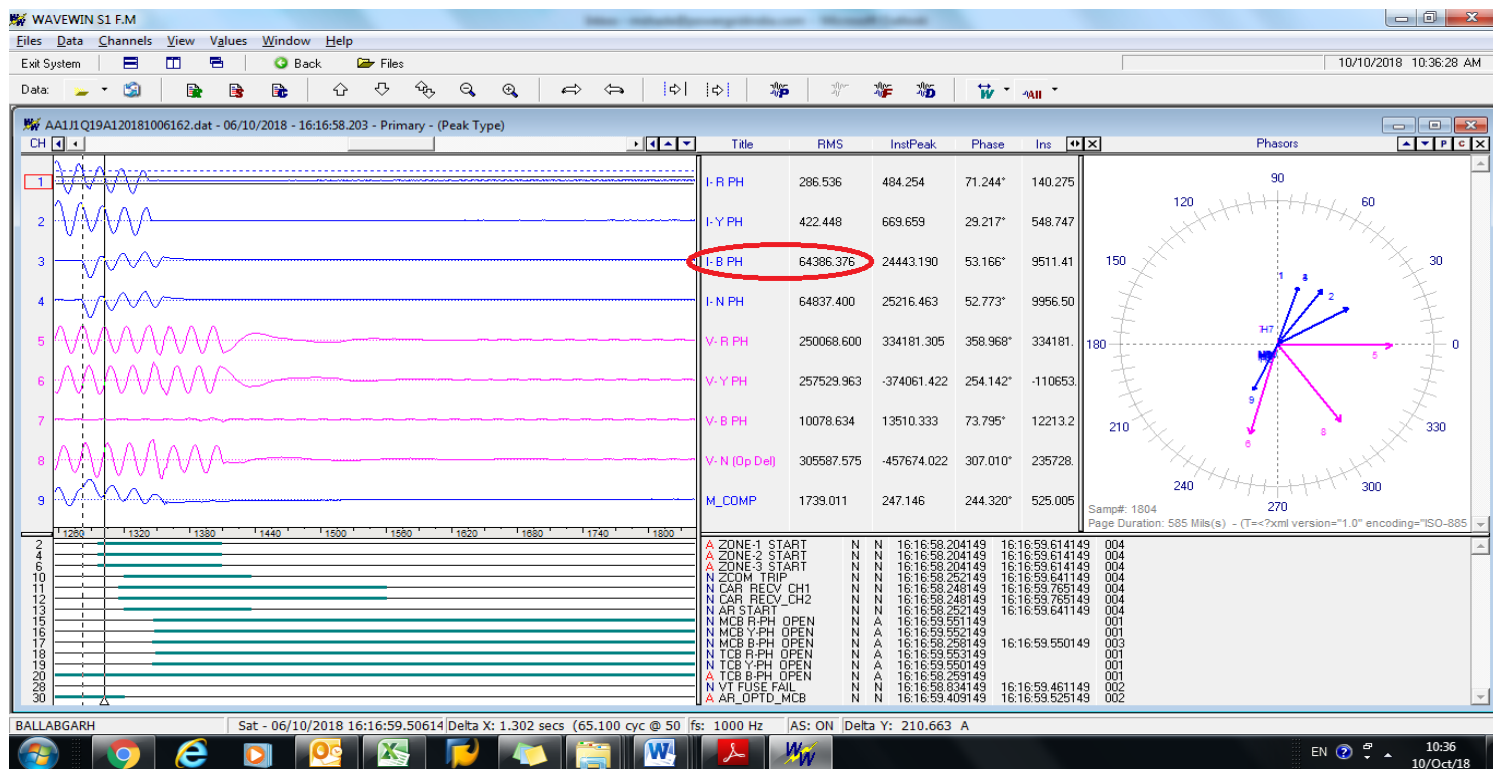
- 28.1** A letter dated 21.9.2018 issued by BBMB in this regard was attached at Annexure 27 of the Agenda of the 152nd OCC meeting. On review of the report it has been observed that the Auxiliary Consumption is greater than 2% .As per CERC Tariff regulations the consumption can be maximum 1.2%.Efforts need to be made to reduce it.
- 28.2** BBMB representative updated that the information in the letter under reference is the anticipated energy which is a reference document for the states. As per actual the consumption of BBMB is below the maximum limit of 1.2%

Estimated SEM/DCD requirement for next 2 YEARS.

- 29.1** A letter dated 1.10.2018 issued by Power System Operation Corporation Limited in this regard is attached at Annexure28 of the Agenda of the 152nd OCC meeting.
- 29.2** POWERGRID was requested to update regarding the details of utilization of number of meters and DCDs since 2015& the details of number of defective meters and DCs in store. POWERGRID was requested to update in addition the Annexure I & II attached with the Annexure 28.
- 29.3** POWERGRID representative informed the Sub-Committee that the issue stands resolved with NRLDC regarding the meters and action will be initiated accordingly for purchase of new meters.
- 29.4** SE (O) requested POWERGRID to submit the details as desired in the Annexure referred to the NRPC Secretariat also.

New Construction Scheme of Series Bus Reactor at Mandola & Ballabgarh and Series Line reactor of Dadri line at Mandola end

- 30.1** POWERGRID representative stated that with the growth of the power transmission/generation network phenomenal increase in short circuit level in NCR areas has taken place. During the 32nd and 33rd Standing Committee meetings of Power System Planning of Northern Region held on 31/8/2013 and 23/12/2013, possibility of measures to control the short circuit level was discussed. Based on studies carried out to control the short circuit level, series reactors at various locations were proposed to enable security level as per CEA guideline.
- 30.2** However, considering this would be a new kind of element in the grid, it was agreed that initially two series bus reactors at 400kV Mandola & Ballabgarh and series line reactors on Dadri- Mandola 400kV D/c line may be taken up and subsequently with the acquired operational experience, series reactors proposed at other locations in the 400kV ring could be considered for implementation.
- 30.3** For Grid safety augmentation involving control of the high short circuit levels in the Delhi/NCR areas, provision of series reactors at following locations was agreed to be implemented by POWERGRID:
- Series Bus reactors**
- i. 1 no. of 12 Ω Series Bus Reactor at Mandola 400/220 kV (POWERGRID) Substation along with associated bays.
 - ii. 1 no. of 12 Ω Series Bus Reactor at Ballabgarh 400/220 kV (POWERGRID) Substation along with associated bays.
- Series Line reactors:**
- i. 1 no. of Series Line reactor of 12 Ω in Dadri- Mandola 400kV Ckt-I at Mandola
 - ii. 1 no. of Series Line reactor of 12 Ω in Dadri- Mandola 400kV Ckt-II at Mandola
- 30.4** The above works have been agreed during the 32nd and 33rd Standing Committee meetings of Power System Planning of Northern Region held on 31/8/2013 and 23/12/2013. The scheme was also discussed and agreed in the 30th NRPC held 28/02/2014.
- 30.5** The NCR area has a 400kV high capacity D/c (Quad Moose) transmission ring, i.e., Dadri Generating station - Ballabgarh (via Maharaniabagh/Greater Noida/Navada) - Bamnauli - Jhatikara - Mundka - Bawana - Mandola, which is connected strongly with rest of the grid through high capacity 765kV network at Jhatikara & 400kV network at other buses.
- 30.6** Growth of the network & generation addition has resulted in phenomenal increased in short circuit levels beyond the rated capacity of existing equipment in various buses in NCR area which is endangering grid safety & security. In recent incident of “B” Phase LA failure of Mainpuri Ckt #2, Fault current recorded at Ballabgarh end was ~ 64.3kA which is immediately required to be addressed in the interest of grid safety & security levels.



30.7 The primary functions of a current limiting series reactor are:

- To reduce the flow of current during any short circuit so as to protect the power system apparatus and parts of the system from excessive mechanical stress/overheating/violent failures.
- To reduce the magnitude of voltage disturbances caused by short circuits/time graded/delayed fault clearance.
- To restrict impact by containing fault current and aid the fault to the source of fault location only.
- To reduce the duty imposed on switching and other associated EHV equipment during short circuits.

30.8 Sub committee agreed to the proposal of POWERGRID that the early charging of Series Bus/ Line Reactors at Mandola & Balabgarh would be beneficial for the system. NRLDC representative requested POWERGRID to ensure the commissioning of the said assets by November-December 2018 as the fault level in the area is generally high. He added that POWERGRID may review the suggestions given in the letter written to them by NRLDC dated 04.10.2018. NRLDC representative added that if feasible, as per the physical condition the shifting of lines on both side of the series reactor may be considered at Mandola. POWERGRID representative informed that the same would be considered after commissioning of the present system. POWERGRID representative informed that they will provide necessary inputs to NTPC in view of taking series line reactor into service in Mandola-Dadri line.

POWERGRID was requested to submit the dynamic impact study to POSOCO and NRPC.

New Construction Scheme of Transmission System associated with RAPP-7&8 (Part-B)

- 31.1** POWERGRID representative informed that for evacuation of power from RAPP- 5 to 8 (1840MW), RAPP-5&6 (440MW) and RAPP-7&8 (2x700MW), following composite system was evolved and was planned to be developed in a phased manner matching with generation development :

With RAPP-5&6

- (i) RAPP-Kankroli 400kV D/c
- (ii) RAPP-Kota 400kV S/c

With RAPP-7&8

- (i) RAPP-Jaipur (South) 400kV D/c (with one circuit via Kota)
- (ii) RAPP-Shujalpur 400kV D/c

- 31.2** RAPP-5&6 generation along with above mentioned transmission system for RAPP-5&6 have been commissioned and are in operation. NPCIL is presently implementing RAPP-7&8 generation.

- 31.3** Some constraints are being faced in evacuation of power from RAPP-5&6 under certain conditions due to the changes in load generation scenario of that area. To overcome these constraints & to improve the power evacuation from RAPP generation complex, part of the composite system under RAPP-7&8 was preponed for early commissioning as:

Transmission System associated with RAPP - 7 & 8, Part A

- RAPP – Kota 400 kV D/c (bunched at both ends) – (part of RAPP – Jaipur (South) 400 kV D/c line with one ckt LILOed at Kota)
- One no of 400 kV bay at Kota

The transmission system associated with RAPP-7&8 has been commissioned and in operation.

Transmission System associated with RAPP - 7 & 8, Part B

- Kota – Jaipur (South) 400 kV D/c (part of RAPP – Jaipur (South) 400 kV D/c line with one ckt LILOed at Kota)
- 2 nos. of 400 kV line bays at Jaipur (South)
- 1 no. 400 kV line bay at Kota
- 2 nos. of 400 kV line bays at Shujalpur
- Realignment line works near Kota so as to achieve the approved system configuration which is RAPP – Jaipur 400kV D/c with one ckt LILOed at Kota.

- 31.4** RAPP-5&6 generating station is facing high voltage under certain conditions and one circuit of 400kV RAPP-Kankroli D/c is kept open to control the voltage. Under such condition, tripping of 400kV RAPP-Kota S/c resulted in oscillations as only one circuit of RAPP-Kankroli 400 kV line is available for evacuation of RAPP 5&6 units.

- 31.5** To overcome this problem, it was considered prudent that there should be two interconnections of RAPP generation with Kota. For providing second 400 kV connectivity of RAPP with Kota, it was agreed to prepone RAPP-Kota section of 400kV

RAPP-Jaipur D/c (with one circuit via Kota) covered under the Transmission System associated with RAPP 7 & 8- Part A and balance works required to achieve the approved system configuration covered under present scheme i.e. Transmission System associated with RAPP 7 & 8- Part B to be matched with RAPP 7&8 generation.

- 31.6** It is learnt that generation by NPCIL under RAPP-7&8 is getting delayed and expected to be commissioned by 2020. Transmission line along with associated bays at Kota & Jaipur(S) end is expected to be completed within the current calendar year itself and line required to be charged for anti-theft purpose. The line length from Jaipur(S) to LILO point at Kota is ~ 180km and charging of such long line on anti-theft for long time will leads to reactive power generation in transmission corridor where high voltage is already prevailed under present grid condition. Furthermore charging of above system will strengthen the grid connectivity and reliability of generation evacuation of RAPP-5&6 will further improve.

In view of above it is proposed that OCC members may deliberate and recommend the delinking of transmission system associated with RAPP-7&8 Part-B and commissioning of transmission system for Grid Strengthening and Security.

- 31.7** In the meeting, SE (O) requested POWERGRID to give the original & the agreed schedule for the lines referred. NRLDC representative informed that early commissioning of RAPP-Jaipur south will not benefit the system as such. Sub-Committee does not agree to the proposal of early commissioning.

Procedure when only one beneficiary is requesting for UNIT to be on BAR

- 32.1** Tata Power-DDL representative informed that One Unit of Aravali Jhajjar was brought on bar solely on request of Delhi while Haryana had refused to provide consent for the same. Tata Power-DDL even agreed to make whole MTL power of the plant. But it has been observed that Haryana has been scheduling power from this unit of Aravali Jhajjar in peak hours. MTL power was not schedule to Haryana for the whole period for which the unit was running

Tata Power-DDL plan our power management for next day considering Unit exclusively for us.

- 32.2** We should make a procedure that if the unit was brought on bar on request of one beneficiary only then the power should schedule to him only. If the other beneficiary is required then he can schedule the left over power through URS. Such unplanned scheduling of other SLDC may result into undue problems in real time operations including load-shedding to a large extent considering an allocation of close to 580 MW to us

Sequence of event for 12th to 16th Sep 2018 are as follow:

On 10th Sep 2018

Tata Power-DDL requested full share of 582 MW from Aravali from 00:00 Hrs. of 11th Sep 2018

On 11th Sep 2018

- 32.3** Haryana started scheduling power from 2nd unit, Hence Tata power-DDL full schedule could not be reach to entitlement of 582 MW. We requested to run 3rd unit.

Haryana SLDC did not give clearance for box-up of 3rd unit. Haryana SLDC has given in written through e-mail dated 11th Sep 2018 stated that “It is requested not to synchronize any additional unit of NTPC Aravali and ensure maximum 155 MW and Min. Nil power schedule to Haryana from the running two units from 00:00 Hrs of dated 12.09.2018 to 24:00 Hrs of dated 16.09.2018.”

- 32.4** Tata Power-DDL planned power management considering Haryana maximum schedule of 155 MW from 12th to 16th Sep 2018.
- 32.5** However Haryana schedule power more than 155 MW (350-450 MW) during peak time , resulting in shortage of 200 to 300 MW for Tata Power-DDL.
- 32.6** TPDDL requested to correct the same in implemented schedule.

DATE	Time slot	IMPLEMENTED SCHEDULE	CORRECTION REQUIRED BY NRLDC	DIFF
13-09-2018	17:30 - 17:45	466.83	654.97	188.14
15-09-2018	19:45 - 20:00	438.49	654.97	216.48

- 32.7** OCC deliberated the matter and CEA representative was of the view that the issue should be mutually decided by NRLDC, Delhi DICOMS, Haryana SLDCs and its DISCOMs to avoid the problem highlighted above. The NRLDC representative stated that as per present formulations in Grid Code, beneficiaries are entitled to proportional schedule on running units and therefore, beneficiaries should themselves agree that during situation wherein only one or few entities have agreed to run the units and thus having the pain of giving technical minimum during low demand hours, should get power during high demand period also. ‘Pain and Gain’ both shall go together.
- 32.8** He further said that in the present case both Delhi Discoms and Haryana discoms shall agree not to schedule once they have agreed not to share the technical minimum voluntarily. He stated that Haryana DISCOM/SLDC shall elaborate the reasons for scheduling in this specific case.

TTC assessment considering temperature dependent rating of lines/terminal equipment

- 33.1** In line with the decisions in the meetings of Sub-Group of NRCE for finalizing the methodology for computation of TTC/ATC/TRM, PGCIL vide letter dated 18.04.2018 has submitted the details of current rating of terminal equipment for high capacity 400kV lines owned by POWERGRID.
- 33.2** In response to the NPC Division letter dated 17.08.2018, seeking status report regarding compliance/implementation of ambient temperature adjusted TTC for all the transmission corridors of the country, POSOCO vide letter dated 31.08.2018 (Annexure 32/A of the Agenda of the 152nd OCC meeting) has informed that the terminal equipment rating of both ends for the lines were available only for 99 Nos. of 400 kV lines, out of 183 lines as per the data submitted by PGCIL& it had requested NPC to facilitate.. Therefore, we are again taking up with PGCIL to send the complete information. NPC vide letter dated 20.09.2018 (Annexure-32/B of the Agenda of the 152nd OCC meeting) had requested RPCs to furnish the terminal equipment ratings of the STUs’ and other transmission utilities’ transmission lines in respective Region

33.3 All STUs' and other transmission licensees' transmission lines were requested to compile & furnish the data as desired at the earliest.

Replacement and Cleaning of Insulators of lines in Northern Region – Reg.

34.1 PSTCL representative stated that in view of avoiding fog/pollution related trippings the use of Anti-fog Porcelain Disc insulators is in vogue in PSTCL on its 220KV Transmission lines. These are being procured for the last 8-10 years and the performance is satisfactory. However, since last 2-3 years PSTCL has started to use Long Rod Polymer Insulators (Non Ceramic Composite) in small proportions on its 220 KV Transmission Lines. On 400KV lines of PSTCL, at identified locations Long Rod Polymer Insulators have already been installed. The rest of the locations have conventional porcelain insulators.

34.2 The composite insulators are generally used for their good contamination and wetting performance, high ratios of strength to weight, easy transport and installation and cost advantages over conventional ceramic insulators. However, during the last few years some disadvantages of polymer insulator have surfaced and they are being widely reported in studies on internet. A summary of the main disadvantages of composite polymer insulators, based on such studies, is as follows:

- i. They are subjected to chemical changes on the surface due to weathering and form dry band arcing
- ii. Suffer from erosion and tracking which may lead ultimately to failure of the insulator
- iii. Life expectancy is difficult to evaluate,
- iv. Long term reliability is unknown,
- v. Faulty insulators are difficult to detect
- vi. Eating by rodents etc during storage
- vii. Notching by birds
- viii. Due to improper storage, petticoat has a tendency to shear. Polymers have also tendency to develop algae, fungus and lichens. This reduces ph value, lowers hydrophobicity and decolourisation, finally drying the bands leading to breakage of the insulators.
- ix. Aging, which leads to loss of hydrophobicity, tracking and erosion, and eventually to flashover is still one of the main problems with polymeric insulators.

34.3 Further, there have been no laboratory tests known to judge their performance in service or life expectancy though they are in use for the last 7-8 years. Suitability of composite insulator design and materials can be proven by long-term service experience only. Although the polymer Insulators are Puncture proof yet these are prone to flash over due to ingress of moisture between outer silicone and inner FRP rod. Many Indian manufacturers now make Polymer Long Rod Insulators but the quality varies a lot. As per feedback from CPRI, failure of poor quality polymer insulator can happen within 5 years (**Annexure-XXXIV**). On the other hand Porcelain insulators have an established

long life of 40-50 years and the performance of Anti-fog Insulators having high creepage in Pollution affected areas is quite satisfactory in Indian conditions.

- 34.4** Although the cost of Porcelain Insulators is higher than that of Polymer Insulators yet due to their established life of 40-50 years in comparison to life expectancy of 10-15 years in case of Polymer Insulators, the usage of Porcelain Insulators is considered much more beneficial.
- 34.5** Although NRPC has suggested for replacement of conventional insulators with polymer insulators & to build new lines with polymer insulators yet in light of the above mentioned analysis and report/analysis of shortcoming of Polymer Insulator as available on internet, it is felt that the recommendations of the expert committee of CEA constituted vide office order dated 27.1.2007, are still relevant and need to be followed to ensure fault free grid operations. Accordingly, PSTCL has decided to go in for use of Porcelain Long Rod Insulators instead of Polymer Long Rod Insulator, as they have an established life of 40-50 years against no certainty of life expectancy in case of Polymer Insulator.
- 34.6** As per recommendations of the Expert Committee of CEA, in areas exposed to heavy fog and medium pollution level antifog disc insulators of creepage distance of 440 mm or higher (corresponding to creepage distance of 22 mm /kV for 400 kV lines of the 23 disc) or Porcelain long rod insulators offering equal creepage distance may be employed with insulator profiles as per IEC 60815.
- 34.7** The area in the state of Punjab generally falls under heavy fog and medium pollution Category. Accordingly in line with the recommendations of the Expert Committee of CEA , PSTCL has decided to use 120 KN (For Suspension) and 160 KN (For Tension) Porcelain Long Rod Insulators with 23-25mm/kV creepage distance for replacement on PSTCL's existing 400 KV Transmission Lines, which are ideally suited to our conditions. To start with replacement of conventional insulators with Porcelain Long Rod Insulators is planned on the following lines and the NIT for the same is in final stage with work expected to be completed before next paddy:
- i) 400 kV Talwandi Sabo – Mukatsar D/C.
 - ii) 400 kV Talwandi Sabo – Nakodar D/C.
 - iii) LILO of Talwandi Sabo – Nakodar at 400 kV S/Stn Moga.

Rest of the replacement work will be carried out gradually in a phased manner.

- 34.8** CEA representative stated that as per the report of the committee formed to evaluate the Grid disturbance in 1/2007 the recommendations had been given for pollution mapping and use of polymers insulator, where both Fog and pollution are prevalent. He further added that states like Maharashtra referred to by Punjab does not have fog hence the scenario cannot be compared. He further added that Power grid by investing in Polymer insulators has mitigated fog related trippings in the winter months to a large extent.
- 34.9** POWERGRID representative added that the transit damage in the long rod porcelain insulator cannot be detected and the handling problems are there, as they are much heavier. He said that the pollution criteria, medium or thick cannot be judged in the case of lines as the development of pollution on the length of the line cannot be predicted. He also added that product life cycle cost of long rod and polymer insulators is approximately same.

- 34.10** NRLDC representative also added that the use of polymer insulators in state of Haryana and Punjab has come up on account of the persistent fog related trippings in the area in winter months.
- 34.11** SE(O) concluded that as the issue had been decided in the NRPC this agenda needs to be taken to upcoming NRPC meeting with the views of OCC that Polymer insulators should be used.

PART-B: NRLDC

1. Deviation by NR entities and normal agenda item 24:

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 continuously over/under drawing from the Grid on various instances. Deviation violations (average number of blocks of overdrawl/ underdrawl) for the month of July-September 2018 were presented in the meeting (attached as **ANNEXURE-I**) along with deviations observed based on SCADA data.

NRLDC representative highlighted that some of NR states such as HP, Haryana, Rajasthan and UP have been over drawing while J&K has been under drawing for most of the time in past 3-4 months. This was highlighted in 150th and 151st OCC meeting as well, however the trend is still continuing. Even though major simultaneous silt based outages were not reported this year, HP had over drawl for most of the time which needs to be restricted. Haryana and Rajasthan were overdrawing for most of the months in past year.

OCC agreed that more concrete actions are required by states for restricting overdrawl/ underdrawl and thus better grid management.

2. Tap optimization exercise in Northern region

NRLDC representative highlighted that present tap positions were provided by NR-2, NR-3, and PSTCL which were taken into consideration while performing tap changing studies. Moreover, while identifying nodes for tap change, the scatter plots of nodes for the month of September 2018 were also taken into account. Study report for tap changing exercise in Northern region for winter 2018 was attached as Annexure of OCC agenda. NRLDC/NRPC requested OCC members to discuss/ approve the tap change exercise at these nodes so that it could be completed before this winter season.

OCC approved list of nodes for which tap change exercise was suggested and advised utilities to complete the exercise in coordination with NRLDC in coming weeks.

3. Reliability issues in the grid

NRLDC representative highlighted that for better results from simulation studies, utilities are requested to provide details of new elements commissioned at 220kV & below voltage level. It was also requested that All India PSSe base case may checked for any shortcomings. Further, states were also requested to assess ATC/TTC limits in co-ordination with NRLDC.

Reliability issues witnessed in past months are mentioned below:

Rajasthan: NRLDC representative highlighted that loading on 400kV Anta-Kota line (synchronised on 7th July 2018) is crossing 800 MW very frequently (Plot attached as ANNEXURE-II). Loading of 400kV Anta-Kota increases with increased generation at Kawai-Kalisindh-Chhabra complex. Commissioning of Chhabra SCTPS would further increase the loading on this line.

The loading on 400 kV Anta-Kota line is very high and in case of tripping of single/ both 765 kV Anta-Phagi lines, this line will not be able to survive. It was requested that some load shifting arrangement may be sought at Rajasthan SLDC end to control the loading of this line to ensure the reliable operation in this corridor.

He stated that this reason why NRLDC insists the approval of planning bodies/standing committee.

Therefore, planning studies done by STU for this element are very important. Rajasthan representative agreed to share planning studies carried out.

As decided in last OCC meeting, Rajasthan was requested to present report on the fire incidents, rearrangement of network carried out and renewable curtailment done at Akal during this time.

N-1 non-compliance at Jodhpur ICTs was also observed. 400kV lines (LILO of Jodhpur-Rajwest S/C) and 400/220kV ICTs at Kankani station has been commissioned in Oct'18. As informed by Rajasthan in 152nd OCC, with commissioning of underlying n/w it is expected that loading of Jodhpur ICTs shall be relieved.

Delhi: LILO of 400kV Ballabgarh-Bamnoli D/C and 220kV Badarpur-Mehrauli D/C has been completed at 400/220kV Tughlaqabad S/s on 10.10.2018. The loading of 400/220kV Bamnoli ICTs (nearly 20%) and 220kV Ballabgarh-Badarpur has reduced considerably since commissioning of Tughlaqabad S/s.

UP: N-1 non-compliance has been observed at 400/220kV ICTs of Azamgarh. Evacuation constraints of Anpara-D, Lalitpur 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). UPPTCL was requested to have some generation at Lalitpur also to reduce line loading in Rihand-Singrauli-Anpara complex. UP representative highlighted they back down generation in Anpara complex if loading on 400kV Anpara-Sarnath D/C exceeds 1300MW. NRLDC representative suggested that loading of 400kV Anpara-Sarnath D/C shall be restricted upto 1250MW so as that loading of other line is restricted below thermal limit under N-1 of single circuit.

Punjab: N-1 non-compliance at Rajpura, Muktsar, Amritsar and Dhuri ICTS were observed in the month of September. Punjab representative informed that Dhuri ICT under outage would be revived shortly.

4. Deviation by generators

NRLDC representative highlighted that in 151st OCC meeting, following issues were highlighted related to deviation by generators. These deviations are still persisting and need actions. Plots for deviations observed in last 30 days are attached as **ANNEXURE-III**.

Over injection at Rihand III: It was observed that Rihand-III has been over injecting most of the time. 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 requested to provide reason for the same.

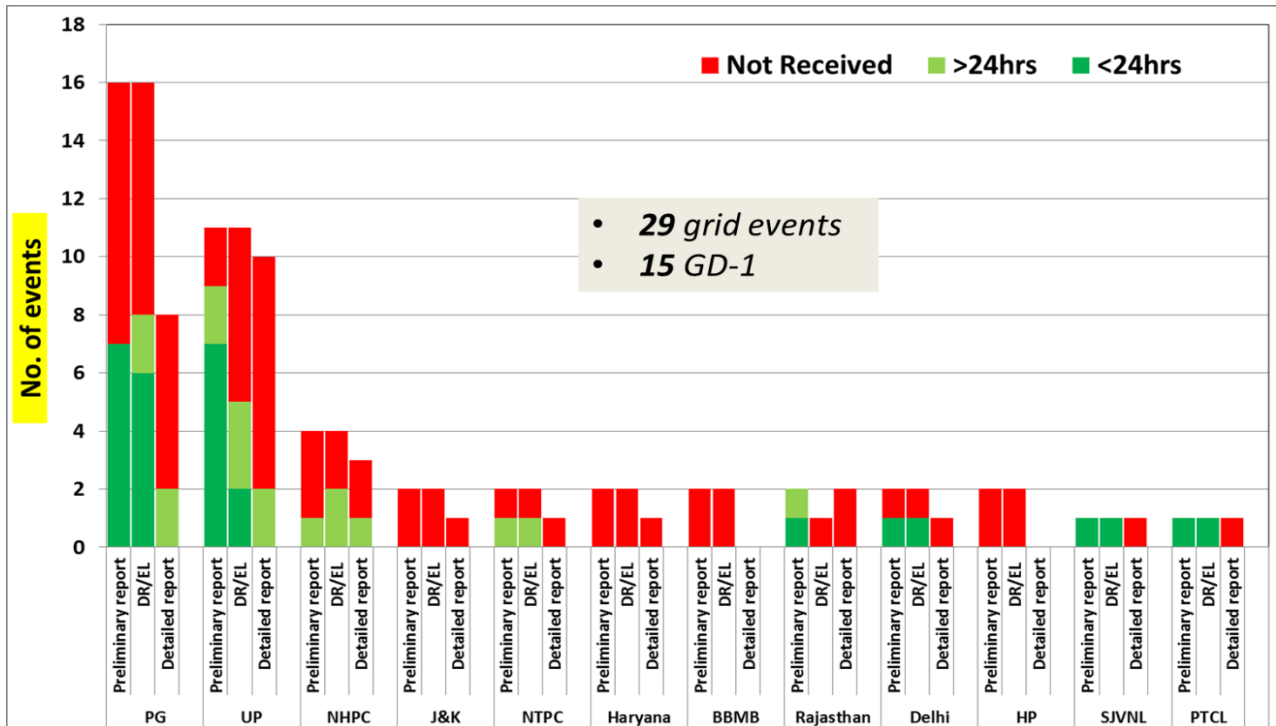
MW data at Singrauli showing under/ over injection: The injection figure of Singrauli (MW) available in SCADA was lower than the actual generation at Singrauli. It was reported that MW data for one of the units is showing lower value. Then, MW data for this unit was calculated using data of outgoing lines from Singrauli. Now, injection figure available is considerably higher and deviation is still persisting. NTPC was requested to kindly look into the matter.

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). 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. Although the issue was attended on 08.10.2018 still, it was observed that Chamera-I had slight over-injection at the time it was given schedule. NHPC representative said they would check data at their end.

Further, it was highlighted that temperature and humidity data of substation which is already available at station shall be having telemetry with RLDC/SLDCs. This would provide accurate real-time temperature and humidity data thus, helping in assessment of fog conditions over different stations.

5. Multiple element tripping events in Northern region in the month of Sep'18:

NRLDC representative stated that a total of **29** grid events occurred in the month of Sep-2018 of which **15** 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 05-Oct-18 was attached at Annexure-V of the Agenda point.



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 6 out of 27 events, no detail has been received at all till 05-Oct-18.

Maximum Fault Duration is **2520ms** in the event of multiple element tripping at Sarnath (UP) substation on 17th Sep 2018 at 11:30hrs.

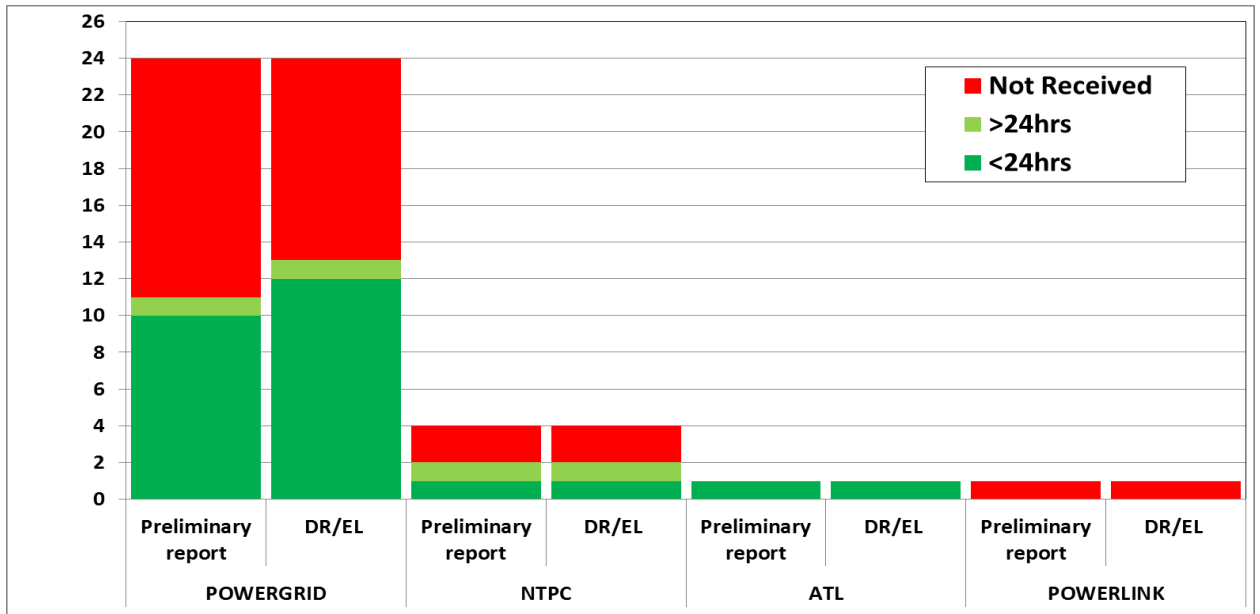
Delayed clearance of fault (more than 100ms for 400kV and 160ms for 220kV system) observed in total **9** events out of 29 events in the month.

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.

6. Details of tripping of Inter-Regional lines from Northern Region for Sep’18:

NRLDC representative highlighted that a total of **26** inter-regional lines tripping occurred in the month of Sep’18. The list was attached at Annexure-VI of the Agenda point. 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 trippings in future.

7. 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 is proposed. The power stations may confirm and inform to all the concerned persons of control centre/ substations to facilitate the exercise.

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.

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 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 is as follows:

Hydro Power Stations:

Date	Name of stations
18-Oct-18	*Kishanganga (new plant)
24-Oct-18	*Malana-2
26-Oct-18	Dhauliganga
2-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
3-Dec-18	Chamera-1 & Chamera-2
11-Dec-18	Parbati-3
14-Dec-18	Bairasiul
19-Dec-18	Koteshwar
28-Dec-18	AD Hydro
4-Jan-19	Tehri
8-Jan-19	Karcham Wangtoo
11-Jan-19	Koldam

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

SJVNL informed that date would be separately informed. NHPC has also submitted some modification in the dates and would inform the date for Kishanganga HEP separately.

Proposed schedule along with suggested changes tabulated below:

Date	Name of stations	Remarks
18-Oct-18	*Kishanganga (new plant)	Date shall be intimated separately
24-Oct-18	*Malana-2	
26-Oct-18	Dhauliganga	15-Jan-19
2-Nov-18	*Salal	NHPC confirmed
13-Nov-18	Nathpa Jhakri & Rampur	Date shall be intimated separately by SJVNL, tentative schedule in the month of December-2018
16-Nov-18	*Uri-I, II HEP, Lower Jhelum HEP, Pampore GT's & Upper Sindh	NHPC confirmed
19-Nov-18	*Budhil	
28-Nov-18	Chamera-3	NHPC confirmed
30-Nov-18	Sewa-2	NHPC confirmed
3-Dec-18	Chamera-1 & Chamera-2	NHPC confirmed

11-Dec-18	Parbati-3	NHPC confirmed
14-Dec-18	Bairasiul	Power House shall be under complete shutdown since 01/10/2018 for R&M of power house
19-Dec-18	Koteshwar	
28-Dec-18	AD Hydro	
4-Jan-19	Tehri	
8-Jan-19	Karcham Wangtoo	
11-Jan-19	Koldam	

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

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.

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 may also carryout 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
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
30		Pragati GPS	2x104.6+1x121.2
32	Haryana	Faridabad GPS	2x137.75+1x156.07

During last winter, SLDCs had been requested to carry out mock drills and share their experiences. Last year, Mock black start exercise were carried out at Baspa and Malana-I in HP and Indraprastha GT in Delhi. However, the information was received from HP (Sainj: only schedule of exercises) and Rajasthan (only schedule of exercises) only but mock exercise could not done. SLDCs were requested the following:

- Share the information and report on black start 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 further 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 30th October 2018.

8. High Shaft Vibration observed in Dadri stage-II during electrical fault in nearby area:

On 28-Jun-18, LLG fault occurred in 400 kV Dadri-G. Noida line and it resulted into high vibration in unit-5 & 6 of Dadri stage-II. During the incident Dadri unit-5 & 6 of 490MW was also tripped due to tripping setting in the units on vibration level above the certain value.

After the incident, many times during fault in nearby area of Dadri station, high vibration sensed at Dadri stage-II units. NTPC has given details of vibrations observed in Dadri stage-2 units since 01st Jun 2018 to 23rd September 2018. This issue was also discussed in 150th OCC meeting and meeting held on 09th Aug 2018 in between NTPC and POSOCO member.

FSC of 400kV Ballabgarh-Kanpur ckt-2 & 3 (ckt-1 FSC already out) was also by-passed on 09-Aug-18 on test basis based on the inputs from NTPC and likelihood of Ferro-resonance phenomena.

PMUs have not captured any oscillations in the electrical parameters. The prony analysis of the raw data of Disturbance Record (DR) of unit #5 and # 6 received from NTPC, also does not show any dominant frequency component in electrical signals. The results were shown in the meeting. Though, NRLDC has further taken up the issue with CTU and CEA (SP&PA wing) also. NRLDC Letter was attached as Annexure-VII of the Agenda point.

NRLDC suggested NTPC to also look into the following points:

- Earth fault current inward from GT neutral during fault in nearby area of Dadri.
- Earthing of vibration sensor at multiple point.
- DC voltage input to the vibration sensor

It was discussed that vibrations at Dadri are still taking place despite FSCs at Ballabgarh being out of service.

OCC finally decided the following action points:

- To put back the FSC of 400 kV Kanpur-Ballabgarh (PG) ckt-2 & 3 in system.
- NTPC to do following action points:
 - Earth fault current inward from GT neutral during fault in nearby area of Dadri.
 - Earthing of vibration sensor at multiple point.
 - DC voltage input to the vibration sensor
- CTU to do following action points:
 - Detailed study for root cause analysis of vibration in the generators from grid perspective.

9. Coordination and document furnishing responsibilities for new element charging and for LILO work of existing line in following cases.

NRLDC representative raised the concern for furnishing the documents in case of new elements charging. OCC decided that the original asset owners will furnish the details for respective end.

10. Minimize gap between supply and demand:

NRLDC representative presented demand pattern of NR states, units under reserve shutdown and market price pattern and exhorted NR utilities to maximize their generation to get benefit of high demand period of other regions as well as help in frequency stabilization.

OCC advised all beneficiaries to act accordingly.

List of participants in the 152nd OCC meeting held on 16th October 2018, New Delhi

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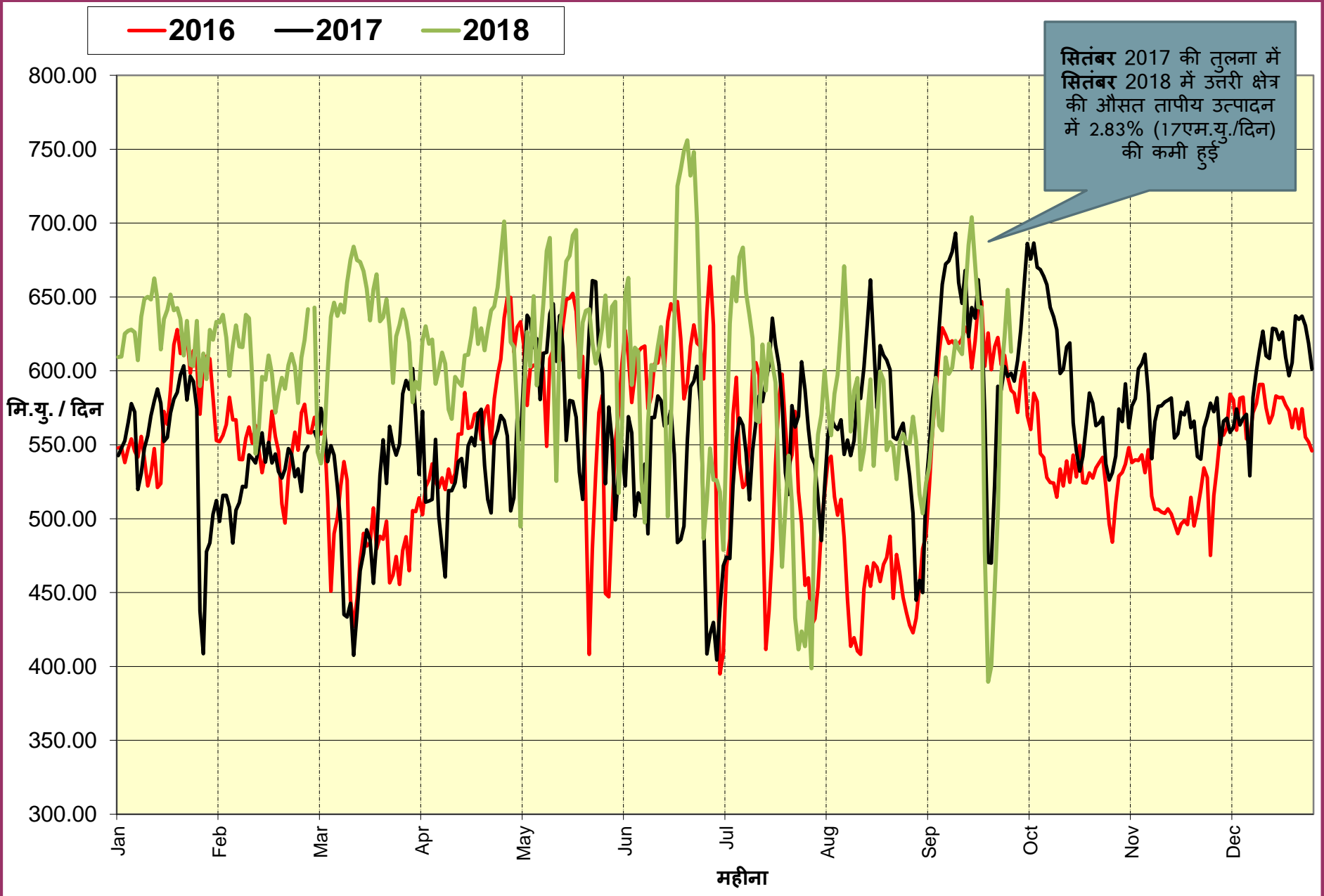
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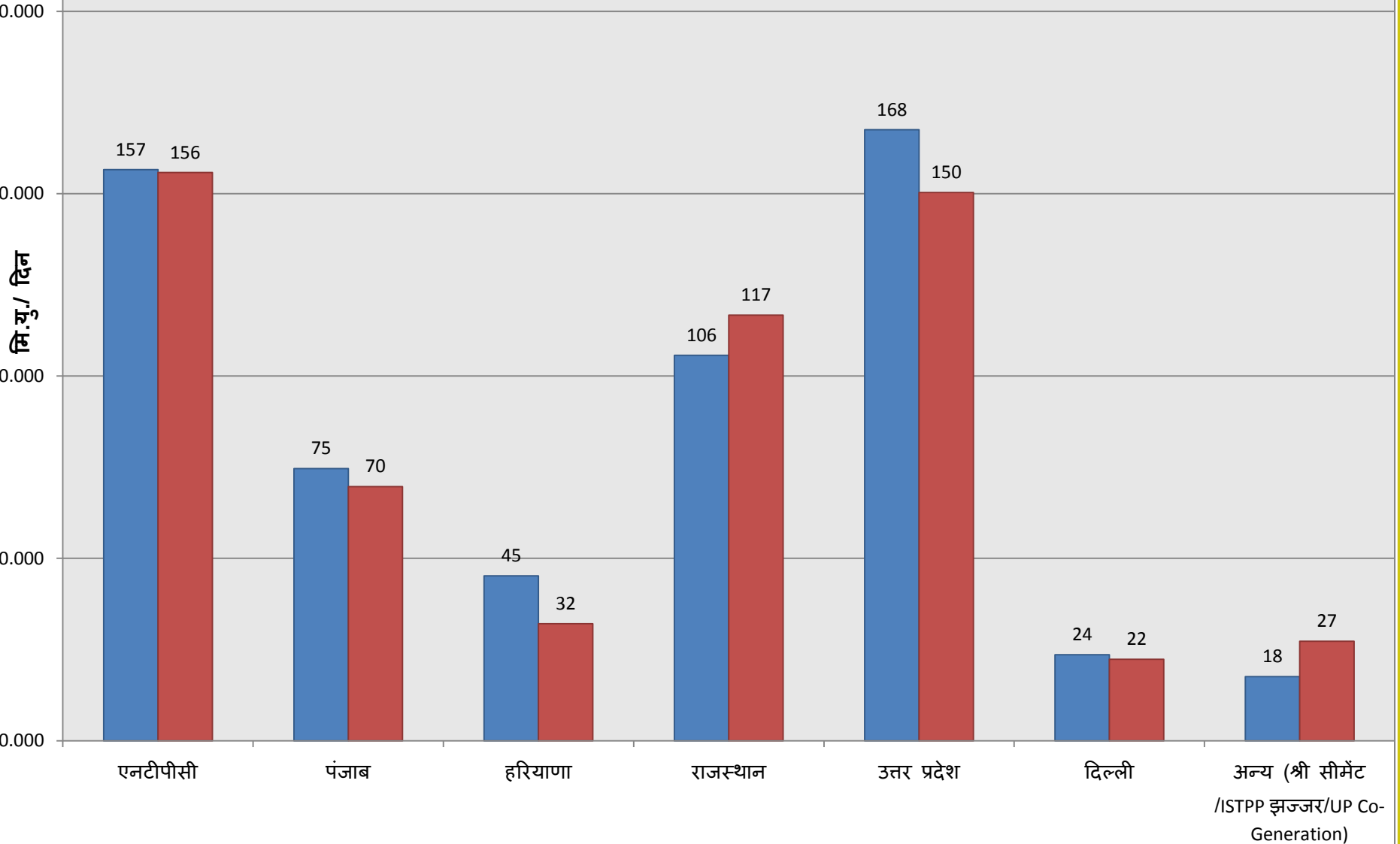
उत्तरी क्षेत्र की तापीय (Thermal) उत्पादन की स्थिति (MUs)



औसत तापीय उत्पादन :-
सितंबर 2018 : 574 मि.यु./ दिन
सितंबर 2017 : 591 मि.यु./ दिन
तापीय उत्पादन में कमी : 17 मि.यु./ दिन

तापीय उत्पादन (Thermal Generation)- संस्थाओं के अनुसार

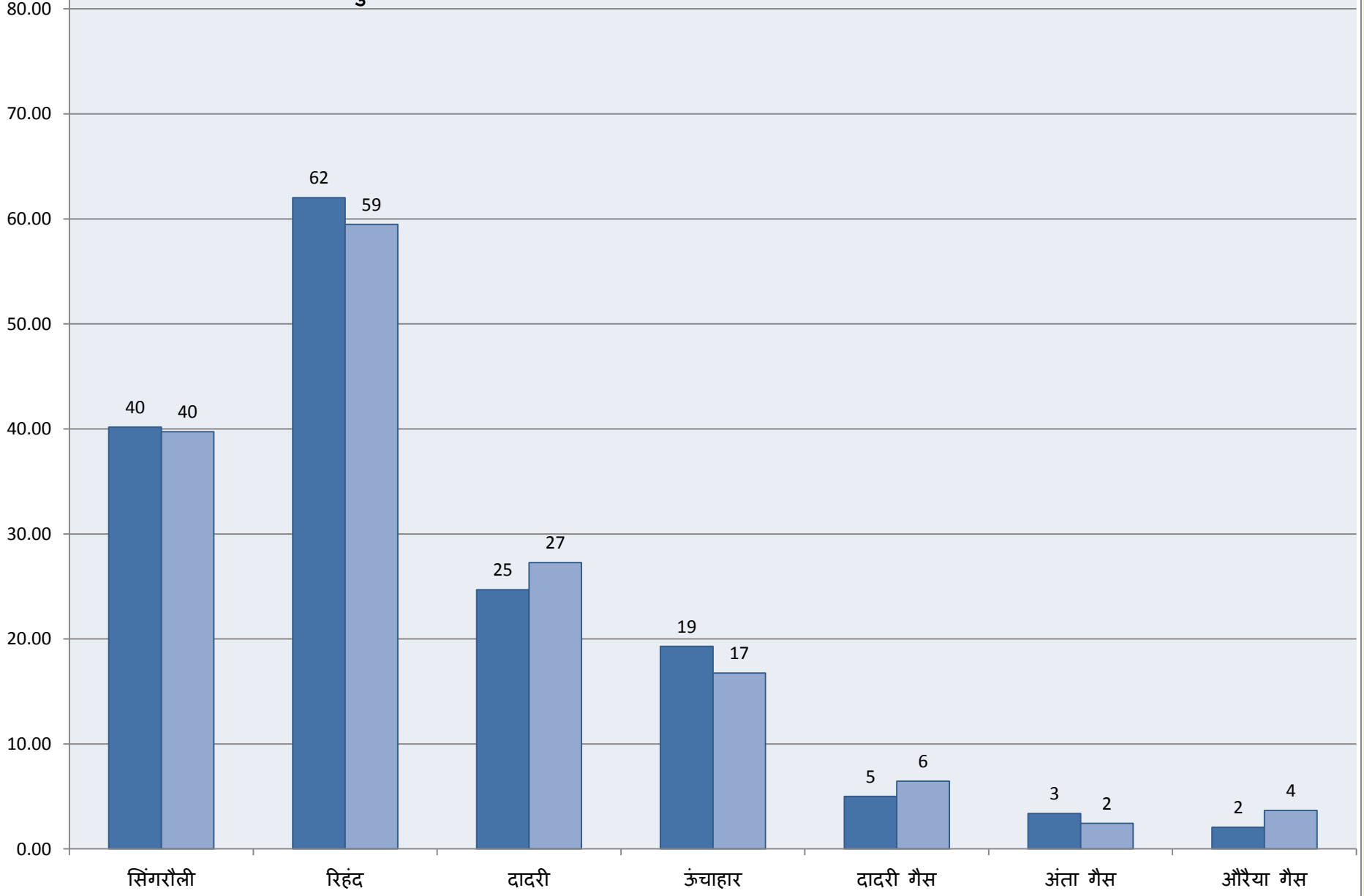
■ सितंबर-2017
■ सितंबर -2018



औसत तापीय उत्पादन :-
सितंबर 2018 : 156 मि.यु./ दिन
सितंबर 2017 : 157 मि.यु./ दिन
तापीय उत्पादन में कमी : 01 मि.यु./दिन

एनटीपीसी - तापीय उत्पादन (Thermal Generation)

■ सितंबर-2017
■ सितंबर -2018



औसत तापीय उत्पादन :-

पंजाब - तापीय उत्पादन (Thermal Generation)

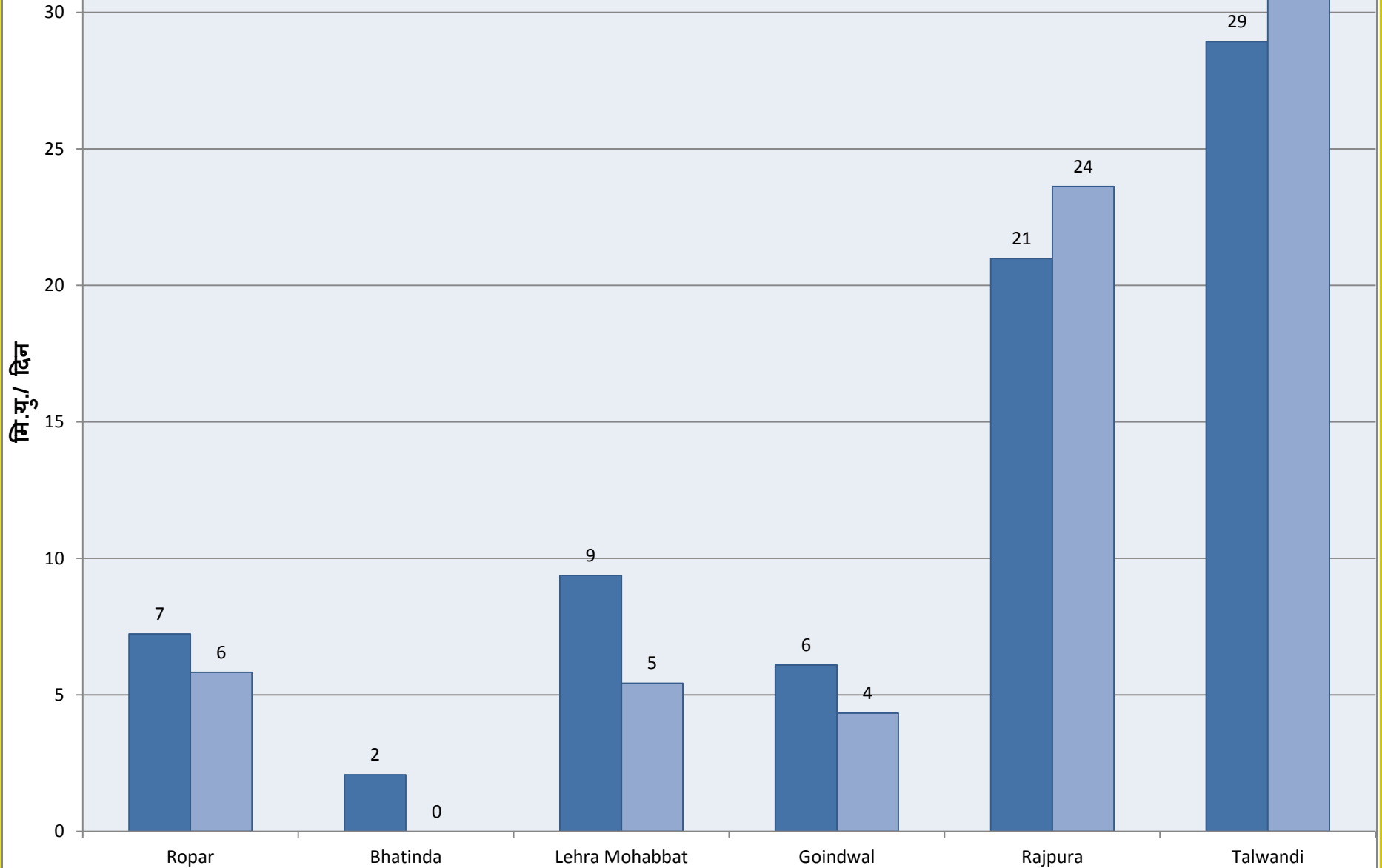
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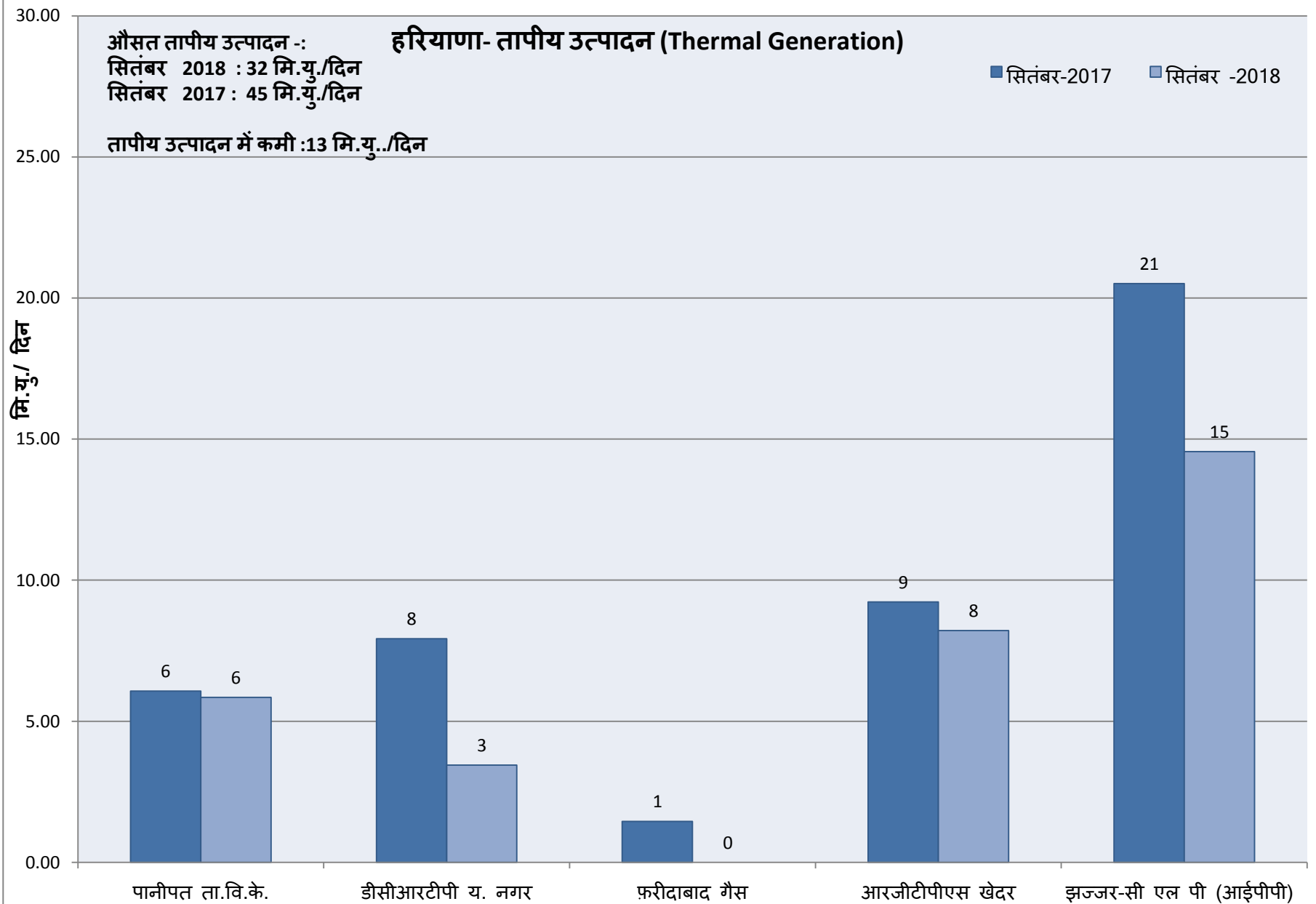
सितंबर 2017 : 75 मि.यु./ दिन

तापीय उत्पादन में कमी : 05 मि.यु./दिन

■ सितंबर-2017

■ सितंबर -2018

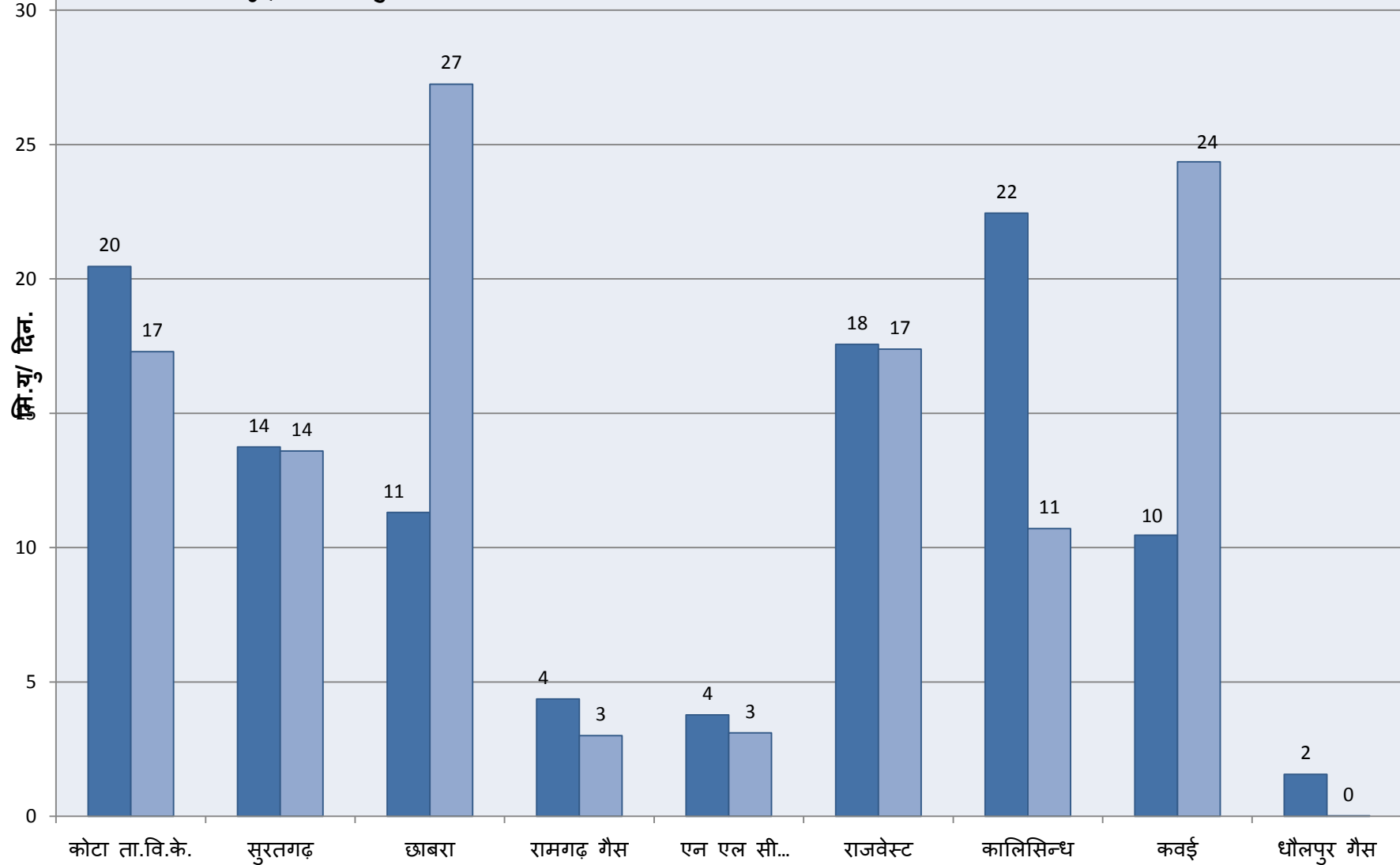




औसत तापीय उत्पादन :-
सितंबर 2018 : 117 मि.यु./ दिन
सितंबर 2017 : 106 मि.यु./ दिन
तापीय उत्पादन में वृद्धि : 11 मि.यु./ दिन

राजस्थान - तापीय उत्पादन (Thermal Generation)

■ सितंबर-2017 ■ सितंबर -2018



50

औसत तापीय उत्पादन :-

सितंबर 2018 : 150 मि.यु./दिन

सितंबर 2017 : 168 मि.यु./दिन

तापीय उत्पादन में कमी : 18 मि.यु./दिन

उत्तर प्रदेश - तापीय उत्पादन (Thermal Generation)

■ सितंबर-2017

■ सितंबर -2018

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35

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28
30

मि.यु/ दिन.

25

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अनपरा

ओबरा

परिखा

पनकी

हरदुआगंज

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अनपरा-सी

बजाज उर्जा...

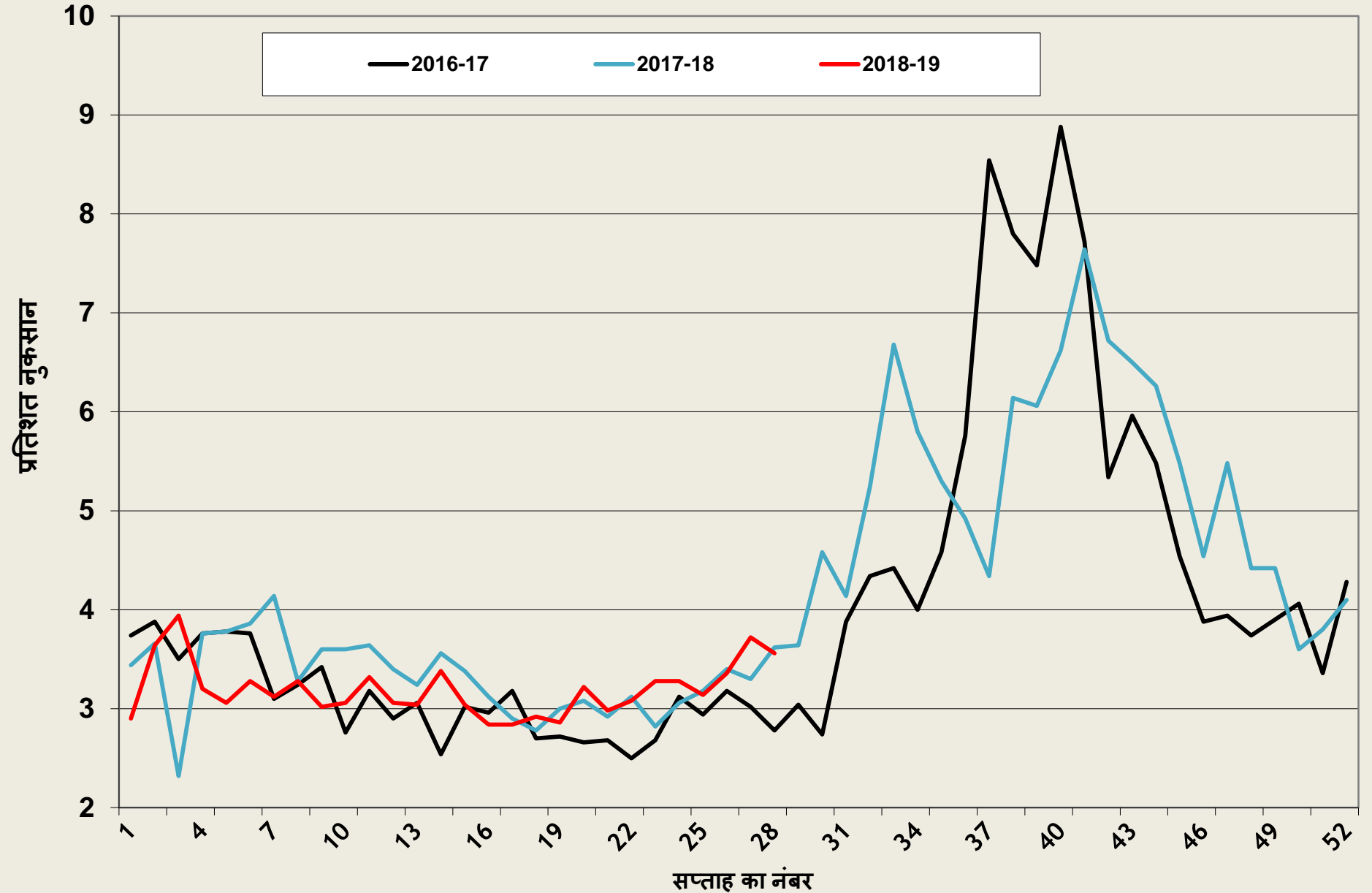
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ललितपुर

बारा

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200
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1924
1520
10

ट्रांसमिशन में पावर क्षति



एस.टी.ओ.ए (STOA) का सारांश- सितंबर 2017 vs सितंबर -2018



'ट्रांसेक्शन टाइप' के आधार पर वर्गीकृत

अनुमोदनों की संख्या

	सितंबर-17	सितंबर -18
अगले दिन का (DA)	826	715
आकस्मिक (Contingency)	208	262
पहले आओ पहले पाओ (FCFS)	27	46
अग्रिम (AD)	31	65
कुल	1092	1088

ऊर्जा स्वीकृत (एम.यू.)

अगले दिन का (DA)	576.97	588.37
आकस्मिक (Contingency)	80.42	105.26
पहले आओ पहले पाओ (FCFS)	586.66	145.19
अग्रिम (AD)	1000.11	3429.53
कुल	2243.95	4268.36

अंतः/अंतर-क्षेत्रीय लेन-देन के आधार पर वर्गीकृत

अनुमोदनों की संख्या

	सितंबर-17	सितंबर-18
अंतः क्षेत्रीय	225	335
अंतर क्षेत्रीय	867	753
कुल	1092	1088

ऊर्जा स्वीकृत (एम.यू.)

अंतः क्षेत्रीय	1253.71	1367.32
अंतर क्षेत्रीय	990.24	2901.03
कुल	2243.95	4268.36

SL. No	Element Name	Type	Voltage Level	Owner	Outage		Reason / Remarks
					Date	Time	
1	FSC of Pampore-1 at Kishenpur	FSC	220 kV	PGCIL	30-10-2012	12:00	Line length has reduced after LILO work completion
2	Vindhyachal HVDC BtB Block 2	HVDV Station	500 kV HVDC	PGCIL	26-11-2017	14:55	Differential protection operated.
3	Allahabad Rewa Road(400kV)(UP)-Meza TPS(UP) 1	Line	400 kV	UPPTCL	4/9/2018	10:48	PLCC Malfunctioning at Meja. DT received at Rewa road.
4	Dhuri(400) 500 MVA ICT 2	ICT	400/220 kV	PSTCL	19-08-2017	10:47	Bus bar protection operated Buchholz relay operated / will replace by new.
5	Akal 500 MVA ICT 4	ICT	400/220 kV	RRVPLN	5/8/2018	16:00	ICT burnt
6	Akal 315 MVA ICT 2	ICT	400/220 kV	RRVPLN	22-08-2018	22:55	ICT burnt.
7	Bawana 315 MVA ICT 3	ICT	400/220 kV	DTL	2/9/2018	16:22	Differential protection operated (R-Ph,E/F)
8	Wagoora 50 MVAR B/R	Bus Reactor	400 kV	PGCIL	22-04-2015	18:56	Taken out due to low voltage.
9	FACT at BLB in Knp-BLB Line	FACTS	400 kV	PGCIL	2/7/2016	10:20	Y-Phase current imbalance
10	FSC (50%) of Koteswar Pool -2 at Meerut (PG)	FSC	400 kV	PGCIL	14-07-2017	19:22	Fire in Y-ph unit
11	FSC of Balia-I at Lucknow	FSC	400 kV	PGCIL	29-11-2017	13:30	E/SD due to Hot Spot at Isolator
12	FSC (40%) of Fatehpur-II at Mainpuri(PG)	FSC	400 kV	PGCIL	5/8/2018	0:10	Minimum oil protection operated. Presently out due to Low current.
13	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.
14	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.
15	AD Hydro(ADHY)-Phojal(HP)	Line	220 kV	ADHYDRO	23-09-2018	11:47	Due to floods in Phozal S/s, Phozal S/s is complete shutdown to avoid possibility of risk and danger.
16	Chhaur(MALN2)-Phojal(HP)	Line	220 kV	ADHYDRO	23-09-2018	11:47	Due to floods in Phozal S/s, Phozal S/s is complete shutdown to avoid possibility of risk and danger.

Long Outage of Generating Units

Sl. No	Station Name	Location	Owner	Unit No	Capacity	Reason	Outage		Remarks
							Date	Time	
1	RAPS-A	RAJASTHAN	NPC	1	100	Subject to regulatory clearance	9/10/2004	22:58	
2	Badarpur TPS	DELHI	NTPC	2	100	Order of NGT for Environmental protection	24-09-2015	19:29	
3	Badarpur TPS	DELHI	NTPC	3	100	Order of NGT for Environmental protection	9/10/2015	1:00	
4	Badarpur TPS	DELHI	NTPC	1	100	Order of NGT for Environmental protection	30-10-2015	15:30	
5	Obra TPS	UP	UPRVUNL	7	100	R & M work	1/7/2010	13:44	
6	Paricha TPS	UP	UPRVUNL	1	110	R & M Work	2/7/2016	17:30	
7	Unchahar TPS	UP	NTPC	6	500	Furnace pressure high	1/11/2017	15:40	
8	Pong HPS	HP	BBMB	2	66	Repair and Replacement of draft tube gates.	28-03-2018	16:20	
9	Pong HPS	HP	BBMB	1	66	Replacement of digital governer	2/5/2018	22:42	
10	Rihand-III STPS	UP	NTPC	1	500	Boiler tube leakage Now in AMP	23-09-2018	1:30	
11	Giral (IPP) LTPS	RAJASTHAN	RRVUNL	1	125	Bed materials leakage.	11/7/2014	8:20	
12	Giral (IPP) LTPS	RAJASTHAN	RRVUNL	2	125	Boiler tube leakage	27-01-2016	15:27	
13	Obra TPS	UP	UPRVUNL	13	200	R & M work	23-02-2018	7:00	
14	Kalisindh TPS	RAJASTHAN	RRVUNL	2	600	Generator transformer tripped.	7/4/2018	17:21	
15	Kota TPS	RAJASTHAN	RRVUNL	1	110	Economiser tube leakage	31-05-2018	17:25	
16	Bara PPGCL TPS	UP	Jaypee	2	660	Unit tripped due to emergency stop valve damaged.	15-09-2018	14:04	
17	Rajwest (IPP) LTPS	RAJASTHAN	RRVUNL	5	135	Tripped due to bed material leakage	24-09-2018	0:30	
18	Obra TPS	UP	UPRVUNL	12	200	Tripping details awaited.	24-09-2018	17:26	

Central Sector reserve shutdown (2008 MW)

SL. No	Station Name	Location	Owner	Unit No	Capacity	Reason	Outage		Remarks
							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	Faridabad GPS	HARYANA	NTPC	2	137.75	Reserve Shutdown	6/7/2018	22:51	
4	ISTPP (Jhajjar)	HARYANA	NTPC	1	500	Fuel Shortage Coal shortage.	5/10/2018	0:50	
5	Auraiya GPS	UP	NTPC	4	111.19	Reserve Shutdown	11/10/2018	23:26	
6	Dadri GPS	UP	NTPC	1	130.19	Reserve Shutdown	11/10/2018	23:34	
7	Dadri GPS	UP	NTPC	5	154.51	Reserve Shutdown	11/10/2018	23:35	
8	Dadri GPS	UP	NTPC	2	130.19	Reserve Shutdown	11/10/2018	23:41	
9	Auraiya GPS	UP	NTPC	6	109.3	Reserve Shutdown	11/10/2018	23:42	
10	Auraiya GPS	UP	NTPC	3	111.19	Reserve Shutdown	11/10/2018	23:47	
11	Anta GPS	RAJASTHAN	NTPC	2	88.71	Reserve Shutdown	11/10/2018	23:48	
12	Dadri GPS	UP	NTPC	4	130.19	Reserve Shutdown	13-10-2018	22:52	
13	Auraiya GPS	UP	NTPC	2	111.19	Reserve Shutdown	13-10-2018	23:21	

State Sector reserve shutdown/Coal shortage (**3480 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	Panipat TPS	HARYANA	HPGCL	6	210	Reserve Shutdown	4/8/2018	20:26	-
3	DCRTPP (Yamuna Nagar)	HARYANA	HPGCL	1	300	Reserve Shutdown	22-09-2018	4:51	-
4	Guru Hargobind Singh TPS (Lehra Mohabbat)	PUNJAB	PSEB	4	250	Reserve Shutdown	22-09-2018	19:05	-
5	Guru Gobind Singh TPS (Ropar)	PUNJAB	PSEB	4	210	Reserve Shutdown	11/10/2018	13:10	-
6	Guru Hargobind Singh TPS (Lehra Mohabbat)	PUNJAB	PSEB	3	250	Reserve Shutdown	13-10-2018	2:09	-
7	Guru Hargobind Singh TPS (Lehra Mohabbat)	PUNJAB	PSEB	2	210	Reserve Shutdown	13-10-2018	7:08	-
8	Guru Gobind Singh TPS (Ropar)	PUNJAB	PSEB	6	210	Reserve Shutdown	13-10-2018	7:35	-
9	DCRTPP (Yamuna Nagar)	HARYANA	HPGCL	2	300	Reserve Shutdown	13-10-2018	12:14	-
10	Guru Hargobind Singh TPS (Lehra Mohabbat)	PUNJAB	PSEB	1	210	Reserve Shutdown	13-10-2018	19:10	-
11	Guru Gobind Singh TPS (Ropar)	PUNJAB	PSEB	5	210	Reserve Shutdown	13-10-2018	21:38	-
12	Panipat TPS	HARYANA	HPGCL	7	250	Reserve Shutdown	13-10-2018	22:37	-
13	Jhajjar-CLP (IPP) TPS	HARYANA	HPGCL	2	660	Fuel Shortage Coal shortage	9/10/2018	21:30	-

Transmission Lines

(400kV- 329 ckt. km & 220kV- 0.6 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	220kV Tanda-New Tanda inter-connector bays no 205(Tanda) & 203 (New Tanda)	220	0.6	Twin Moose	NTPC		21.08.2018	21:59
2	400kV Bikaner-SSCTPP-DC line-1 and associated bays 406A & 406T at Bikaner end	400	139.65	ACSR Twin Moose	RRVPNL		30.09.2018	12:45
3	400kV Bikaner-SSCTPP-DC line-2 and associated bays 405A & 405T at Bikaner end	400	139.65	ACSR Twin Moose	RRVPNL		30.09.2018	15:08
4	400kV DC Chittorgarh-Bhilwara-1 with existing main bays (402A) at Bhilwara end & main(401A) at Chittorgarh end.	400	49.43	ACSR Twin Moose	RRVPNL		07.09.2018	18:40

LILO of Transmission Lines (220kV- 38 ckt. 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 Roorkee-Imlikheda-S/c & Roorkee bay 201{ LILO of 220kV Roorkee-Roshnabad at Imlikheda}	220	19.479	single zebra	5.432	UPPCL		24.09.2018	16:30
2	220kV Roshnabad-Imlikheda-S/c & Roshnabad bay 202 { LILO of 220kV Roorkee-Roshnabad at Imlikheda}	220	18.967	single zebra	5.432	UPPCL		24.09.2018	16:30

Bus Reactor
(Capacity Addition - 125 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	125 MVAR Bus Reactor at Kurukshetra & associated existing bay no 407 (Temporary arrangement as Branch-3 a part of ACF-1 D type filteris not ready)	400	125	New	CGL	PGCIL		28.09.2018	14:56

Line Reactor
(Capacity Addition - 100 MVAR)

1	50 MVAR switchable line Reactor of Bikaner-1 bay no Y-9 R at Suratgarh Super Critical	400	50	New	BHEL	RRVPNL		27.09.2018	16:24
2	50 MVAR Non switchable line Reactor of Bikaner-2 bay no Y-10R at Suratgarh Super Critical	400	50	New	BHEL	RRVPNL		27.09.2018	16:25

Annexure-4

		MU	MW
State		Nov-18	Nov-18
Chandigarh	Availability	115	330
	Requirement	100	195
	Surplus/Shortfall (MU)	15	135
	Surplus/Shortfall (%)	15.0%	69.2%
Delhi	Availability	3250	5210
	Requirement	1960	3800
	Surplus/Shortfall (MU)	1290	1410
	Surplus/Shortfall (%)	65.8%	37.1%
Haryana	Availability	5170	8020
	Requirement	3560	7033
	Surplus/Shortfall (MU)	1610	987
	Surplus/Shortfall (%)	45.2%	14.0%
Himachal Pradesh	Availability	1010	2210
	Requirement	870	1600
	Surplus/Shortfall (MU)	140	610
	Surplus/Shortfall (%)	16.1%	38.1%
Jammu & Kashmir	Availability	750	1950
	Requirement	1560	2590
	Surplus/Shortfall (MU)	-810	-640
	Surplus/Shortfall (%)	51.9%	24.7%
Punjab	Availability	4648	7547
	Requirement	3310	6410
	Surplus/Shortfall (MU)	1338	1137
	Surplus/Shortfall (%)	40.4%	17.7%
Rajasthan	Availability	7722	11298
	Requirement	6711	11749
	Surplus/Shortfall (MU)	1011	-451
	Surplus/Shortfall (%)	15.1%	-3.8%
Uttar Pradesh	Availability	9786	16700
	Requirement	9900	19000

	Surplus/Shortfall (MU)	-114	-2300
	Surplus/Shortfall (%)	-1.2%	12.1%
Uttarakhand	Availability	990	1880
	Requirement	1140	1960
	Surplus/Shortfall (MU)	-150	-80
	Surplus/Shortfall (%)	-	-
Total NR	Availability	33440	53265
	Requirement	29111	49400
	Surplus/Shortfall (MU)	4329	3865
	Surplus/Shortfall (%)	14.9%	7.8%

SNO	Description of Agenda point	Details	STATUS UPDATED
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 was received from Punjab, Rajasthan, Delhi & UP in the last OCC meeting.	The updated status available was attached as Annexure 9/1 of the Agenda. The updated status was received from Punjab, Rajasthan & UP in the last OCC meeting.
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 was enclosed as Annexure 9/2 OF the Agenda of the 152nd OCC meeting. All concerned were requested to update regularly and ensure that the work is completed expeditiously.
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 10/30F THE AGENDA OF THE 146TH OCC MEETING. 151st OCC meeting: UP & RAJASTHAN submitted the data as per prescribed format .All other utilities were requested to update regularly.	UP & RAJASTHAN submitted the data as per prescribed format .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	All utilities were requested to submit the reports of UFR testing of period ending September 2018.

		<p>from all states.</p> <p>151st OCC meeting: 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.</p>	
5	<p>Strengthening of Intra-State transmission system</p>	<p>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</p> <p>151st OCC meeting: PTCUL & Rajasthan have submitted the data regarding the constraints / bottlenecks observed in the system to their STU. Punjab has submitted the data</p> <p>All states were again requested by SE(O) to update regularly as this information is very crucial for better planning of the grid.</p>	<p>Punjab & Rajasthan have submitted the data including the action taken by PLANNING wing on the constraints / bottlenecks observed.</p> <p>PTCUL to submit the action taken by Planning wing on the constraints intimated. HVPNL & UPPTCL were requested to submit the information.</p>
6	<p>Mapping of Feeders in SCADA</p>	<p>In the 141st OCC meeting members were informed about the “Compendium of SPS in NR” (<i>Annexure-9 of the MOM</i>) 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 were requested to update.</p> <p>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.</p>	<p>All states except Punjab were requested to update.</p>

Sr. No.	Developer	Name of Project	Sector	State	Region	Unit No	Unit Capacity	DATE of COMMISSIONING (MM/DD/YYYY)	ESP Phasing plan for implementation	Current SPM (mg/Nm3)	SPM Norms (mg/Nm3)	Current Status
1	NTPC	KAHALGAON TPS	Central	Bihar	ER	1	210	31-03-92	12-31-2022			0
2	NTPC	KAHALGAON TPS	Central	Bihar	ER	2	210	17-03-94	12-31-2022			0
3	NTPC	KAHALGAON TPS	Central	Bihar	ER	3	210	24-03-95	12-31-2022			0
4	NTPC	KAHALGAON TPS	Central	Bihar	ER	4	210	18-03-96	12-31-2022			0
5	NTPC	NABI NAGAR TPP	Central	Bihar	ER	2	250	04-04-17	12-31-2022			
6	NTPC & Bih	MUZAFFARPUR TPS	Central	Bihar	ER	3	195	31-03-15	12-31-2022			0
7	NTPC & Bih	MUZAFFARPUR TPS	Central	Bihar	ER	4	195	24-03-17	12-31-2022			
8	D.V.C	BOKARO `A` TPS	Central	Jharkhand	ER	1	500	22-03-16	6-30-2022			0
9	TenughatVN	TENUGHAT TPS	State S	Jharkhand	ER	1	210	14-04-94	12-31-2020			0
10	Ind barath	IND BARATH TPP	Private	Odisha	ER	1	350	25-02-16	3-31-2022			0
11	NTPC	TALCHER STPS	Central	Odisha	ER	5	500	13-05-04	12-31-2022			0
12	NTPC	TALCHER STPS	Central	Odisha	ER	6	500	06-02-05	12-31-2022			0
13	OPGCLtd	IB VALLEY TPS	State S	Odisha	ER	1	210	02-06-94	9-30-2021			The original design is for achieving 50 mg/Nm3. Flu gas conditioning system will be implemented for further SPM reduction. Feasibility study completed by consultant Blach & Veach. Their expected date of award of Environment retrofit EPC contract is by 28 Dec. 2018.
14	OPGCLtd	IB VALLEY TPS	State S	Odisha	ER	2	210	22-10-95	9-30-2021			0
15	D.P.L.	D.P.L. TPS	State S	West Benga	ER	6	110	03-07-85	3-31-2022			0
16	D.P.L.	D.P.L. TPS	State S	West Benga	ER	7	300	24-11-07	6-30-2022			0
17	D.P.L.	D.P.L. TPS EXT.	State S	West Benga	ER	8	250	31-03-14	3-31-2022			0
18	D.V.C	MEJIA TPS	Central	West Benga	ER	1	210	01-03-96	12-31-2022			0
19	D.V.C	MEJIA TPS	Central	West Benga	ER	2	210	24-03-97	12-31-2022			0
20	D.V.C	MEJIA TPS	Central	West Benga	ER	3	210	25-03-98	12-31-2022			0
21	D.V.C	MEJIA TPS	Central	West Benga	ER	4	210	12-10-04	12-31-2022			0
22	D.V.C	MEJIA TPS	Central	West Benga	ER	5	250	01-10-07	12-31-2022			0
23	D.V.C	MEJIA TPS	Central	West Benga	ER	6	250	31-03-07	12-31-2022			0
24	D.V.C	MEJIA TPS	Central	West Benga	ER	7	500	30-09-10	9-30-2021			0
25	D.V.C	MEJIA TPS	Central	West Benga	ER	8	500	26-03-11	9-30-2021			0
26	NTPC	FARAKKA STPS	Central	West Benga	ER	1	200	01-01-86	12-31-2022			0
27	NTPC	FARAKKA STPS	Central	West Benga	ER	4	500	25-09-92	12-31-2022			0
28	NTPC	FARAKKA STPS	Central	West Benga	ER	5	500	16-02-94	12-31-2022			0
29	NTPC	FARAKKA STPS	Central	West Benga	ER	6	500	07-03-11	12-31-2022			0
30	WBPDC	KOLAGHAT TPS	State S	West Benga	ER	1	210	16-01-93	6-30-2022			Unit-3 completed in 2018, then unit-2 & finally unit-1
31	WBPDC	KOLAGHAT TPS	State S	West Benga	ER	2	210	13-08-90	3-31-2021			Unit-3 completed in 2018, then unit-2 & finally unit-1
32	WBPDC	KOLAGHAT TPS	State S	West Benga	ER	3	210	16-12-85	9-30-2021			0
33	WBPDC	KOLAGHAT TPS	State S	West Benga	ER	4	210	24-01-84	3-31-2022			0

34	WBPDC	KOLAGHAT TPS	State S	West Benga	ER	5	210	28-12-93	6-30-2021			0
35	WBPDC	KOLAGHAT TPS	State S	West Benga	ER	6	210	17-03-91	12-31-2021			0
36	WBPDC	SAGARDIGHI TPS	State S	West Benga	ER	1	300	20-07-08	12-31-2020			Tentative Order Placement: Nov. 2018, Tentative Material Received: June 2019, Date of Retrofitting: Aug.-Sep. 2020
37	WBPDC	SAGARDIGHI TPS	State S	West Benga	ER	2	300	21-12-07	3-31-2021			Tentative Order Placement: Nov. 2018, Tentative Material Received: April 2020 Date of Retrofitting: July-Aug. 2020
38	WBPDC	SANTALDIH TPS	State S	West Benga	ER	5	250	07-11-07	3-31-2021			Tentative Order Placement: May 2018 Tentative Material Received: May 2019 Date of Retrofitting: Nov-Dec. 2019
39	WBPDC	SANTALDIH TPS	State S	West Benga	ER	6	250	29-06-11	12-31-2021			Tentative Order Placement: May 2018, Tentative Material Received: April 2020 Date of Retrofitting: Aug-Sep. 2020
40	HGPCorpn	PANIPAT TPS	State S	Haryana	NR	7	250	28-09-04	2-28-2021			1. The overhauling of ESP fields in respect of unit- 7 & 8 has already been carried out nad now all the ESP fields are in working order. Afger the overhauling of ESP, the value of SPM is within rooms. The ammonia Flue Gas Conditioning (AFGC) system will also be commissioned shortly. 2. Action has also been initaited for installation of FGD to control SOx levels which will further reduce the SPM levels. Necessary action for retrofitting of ESP, if required, shall be taken after installantion of FGD.

41	HGPCorpn	PANIPAT TPS	State S	Haryana	NR	8	250	28-01-05	12-31-2020			<p>1. The overhauling of ESP fields in respect of unit- 7 & 8 has already been carried out and now all the ESP fields are in working order. After the overhauling of ESP, the value of SPM is within rooms. The ammonia Flue Gas Conditioning (AFGC) system will also be commissioned shortly. 2. Action has also been initiated for installation of FGD to control SOx levels which will further reduce the SPM levels. Necessary action for retrofitting of ESP, if required, shall be taken after installation of FGD.</p>
42	HGPCorpn	RAJIV GANDHI TPS	State S	Haryana	NR	1	600	31-03-10	4-30-2022			<p>Two nos. ESP fields in respect of unit-1 are not in service and case for rectification of these fields from OEM i.e. SEC, Chiena is under final stage of award. The work shall be got executed during forthcoming annual overhauling of unit. 2. The overhauling of ESP in respect of unit-2 has already been carried out and all the ESP fields are in working order. 3. Action has also been initiated for installation of FGD to control SOx levels which will further reduce the SPM levels. Necessary action for retrofitting of ESP, if required, shall be taken after installation of FGD.</p>
43	HGPCorpn	RAJIV GANDHI TPS	State S	Haryana	NR	2	600	01-10-10	2-28-2022			0

76	Bajaj Power	KUNDARKI TPS	Private	Uttar Pardes	NR	2	45	29-02-12	3-31-2021			
77	Bajaj Power	MAQSOODPUR TPS	Private	Uttar Pardes	NR	1	45	03-11-11	9-30-2021			
78	Bajaj Power	MAQSOODPUR TPS	Private	Uttar Pardes	NR	2	45	21-01-12	3-31-2021			
79	Bajaj Power	UTRAULA TPS	Private	Uttar Pardes	NR	1	45	21-02-12	9-30-2021			
80	Bajaj Power	UTRAULA TPS	Private	Uttar Pardes	NR	2	45	19-03-12	3-31-2021			
81	NTPC	RIHAND STPS	Central	Uttar Pardes	NR	1	500	31-03-88	2-28-2022			0
82	NTPC	RIHAND STPS	Central	Uttar Pardes	NR	2	500	05-07-89	12-31-2021			0
83	NTPC	RIHAND STPS	Central	Uttar Pardes	NR	3	500	31-01-05	10-31-2021			0
84	NTPC	RIHAND STPS	Central	Uttar Pardes	NR	4	500	24-09-05	4-30-2021			0
85	NTPC	SINGRAULI STPS	Central	Uttar Pardes	NR	1	200	14-02-82	12-31-2021			0
86	NTPC	SINGRAULI STPS	Central	Uttar Pardes	NR	2	200	25-11-82	12-31-2021			0
87	NTPC	SINGRAULI STPS	Central	Uttar Pardes	NR	3	200	28-03-83	8-31-2021			0
88	NTPC	SINGRAULI STPS	Central	Uttar Pardes	NR	4	200	02-11-83	8-31-2021			0
89	NTPC	SINGRAULI STPS	Central	Uttar Pardes	NR	5	200	26-02-84	4-30-2021			0
90	NTPC	SINGRAULI STPS	Central	Uttar Pardes	NR	6	500	23-12-86	2-28-2021			0
91	NTPC	SINGRAULI STPS	Central	Uttar Pardes	NR	7	500	24-11-87	12-31-2020			Statutory limits being complied
92	NTPC	UNCHAHAR TPS	Central	Uttar Pardes	NR	1	210	21-11-88	12-31-2022			0
93	NTPC	UNCHAHAR TPS	Central	Uttar Pardes	NR	2	210	22-03-89	12-31-2022			0
94	NTPC	UNCHAHAR TPS	Central	Uttar Pardes	NR	3	210	27-01-99	10-31-2022			0
95	NTPC	UNCHAHAR TPS	Central	Uttar Pardes	NR	4	210	22-10-99	10-31-2022			0
96	NTPC	UNCHAHAR TPS	Central	Uttar Pardes	NR	5	210	28-09-06	4-30-2022			0
97	NTPC	UNCHAHAR TPS	Central	Uttar Pardes	NR	6	500	31-03-17	8-31-2020			
98	Prayagraj Power	PRAYAGRAJ TPP	Private	Uttar Pardes	NR	3	660	22-05-17	2-29-2020			
99	Rosa Power	ROSA TPP Ph-I	Private	Uttar Pardes	NR	1	300	10-02-10	12-31-2021			0
100	Rosa Power	ROSA TPP Ph-I	Private	Uttar Pardes	NR	2	300	26-06-10	12-31-2021			0
101	UPRVUNL	ANPARA TPS	State S	Uttar Pardes	NR	1	210	24-03-86	10-31-2022			0
102	UPRVUNL	ANPARA TPS	State S	Uttar Pardes	NR	2	210	28-02-87	8-31-2022			0
103	UPRVUNL	ANPARA TPS	State S	Uttar Pardes	NR	3	210	12-03-88	6-30-2022			0
104	UPRVUNL	ANPARA TPS	State S	Uttar Pardes	NR	4	500	19-07-93	4-30-2022			0
105	UPRVUNL	ANPARA TPS	State S	Uttar Pardes	NR	5	500	04-07-94	2-28-2022			0
106	UPRVUNL	ANPARA TPS	State S	Uttar Pardes	NR	7	500	06-03-16	4-30-2021			0
107	UPRVUNL	OBRA TPS	State S	Uttar Pardes	NR	10	200	14-01-79	10-31-2022			0
108	UPRVUNL	OBRA TPS	State S	Uttar Pardes	NR	11	200	31-12-77	12-31-2022			0
109	UPRVUNL	OBRA TPS	State S	Uttar Pardes	NR	12	200	28-03-81	6-30-2022			R&M under progress
110	UPRVUNL	OBRA TPS	State S	Uttar Pardes	NR	13	200	21-07-82	4-30-2022			0
111	UPRVUNL	PARICHHA TPS	State S	Uttar Pardes	NR	3	210	29-03-06	4-30-2022			0
112	UPRVUNL	PARICHHA TPS	State S	Uttar Pardes	NR	4	210	28-12-06	4-30-2022			0
113	UPRVUNL	PARICHHA TPS	State S	Uttar Pardes	NR	5	250	24-05-12	2-28-2022			0
114	UPRVUNL	PARICHHA TPS	State S	Uttar Pardes	NR	6	250	11-03-13	12-31-2021			0
115	APGENCO	Dr. N.TATA RAO TPS	State S	Andhra Pradesh	SR	7	500	08-10-09	12-31-2020			0
116	APGENCO	RAYALASEEMA TPS	State S	Andhra Pradesh	SR	1	210	31-03-94	12-31-2021			0
117	APGENCO	RAYALASEEMA TPS	State S	Andhra Pradesh	SR	2	210	25-02-95	9-30-2021			0
118	APGENCO	RAYALASEEMA TPS	State S	Andhra Pradesh	SR	3	210	25-01-07	9-30-2020			0
119	APGENCO	RAYALASEEMA TPS	State S	Andhra Pradesh	SR	4	210	20-11-07	6-30-2021			0
120	APGENCO	RAYALASEEMA TPS	State S	Andhra Pradesh	SR	5	210	31-12-10	6-30-2020			0
121	APPDCL	DAMODARAM SANJEEV	State S	Andhra Pradesh	SR	1	800	28-08-14	12-31-2020			0

122	APPDCL	DAMODARAM SANJEEV	State S	Andhra Pradesh	SR	2	800	17-03-15	12-31-2019				0
123	NTPC	SIMHADRI	Central	Andhra Pradesh	SR	3	500	29-03-11	9-30-2022				0
124	NTPC	SIMHADRI	Central	Andhra Pradesh	SR	4	500	30-03-12	12-31-2022				0
125	Jindal (Pvt Co)	TORANGALLU TPS EX	Private	Karnataka	SR	1	300	23-04-09	6-30-2022				0
126	Jindal (Pvt Co)	TORANGALLU TPS EX	Private	Karnataka	SR	2	300	24-08-09	9-30-2022				0
									3-31-2021				
127	KPCL	RAICHUR TPS	State S	Karnataka	SR	1	210	29-03-85					FGD will reduce SPM level also. Various technical proposal received against EOI, same are under consideration. KPCL has engaged a consultant to explore the technologies to meet the new norms. The consultant has submitted feasibility report/ DPR. The same has been put up to HQ.
128	KPCL	RAICHUR TPS	State S	Karnataka	SR	2	210	02-03-86	6-30-2021				0
									9-30-2021				
129	KPCL	RAICHUR TPS	State S	Karnataka	SR	3	210	30-03-91					FGD will reduce SPM level also. Various technical proposal received against EOI, same are under consideration.
130	KPCL	RAICHUR TPS	State S	Karnataka	SR	4	210	29-09-94	12-31-2021				0
									3-31-2022				
131	KPCL	RAICHUR TPS	State S	Karnataka	SR	5	210	31-01-99					FGD will reduce SPM level also. Various technical proposal received against EOI, same are under consideration.
132	KPCL	RAICHUR TPS	State S	Karnataka	SR	6	210	22-07-99	6-30-2022				0
133	KPCL	RAICHUR TPS	State S	Karnataka	SR	7	210	11-12-02	9-30-2022				0
134	KPCL	RAICHUR TPS	State S	Karnataka	SR	8	250	26-06-10	12-31-2022				0
135	KPCL	YERMARUS TPP	State S	Karnataka	SR	2	800	29-03-17	12-31-2022				
136	NTPC	KUDGI	Central	Karnataka	SR	2	800	23-03-17	9-30-2022				
													Administrative approval proposal under scrutiny
137	NLC + TANGEDCO	TUTICORIN (JV) TPP	Central	Tamil Nadu	SR	1	500	10-03-15	12-31-2021				
138	NLC + TANGEDCO	TUTICORIN (JV) TPP	Central	Tamil Nadu	SR	2	500	09-07-15	6-30-2020				0
139	TANGEDCO	METTUR TPS	State S	Tamil Nadu	SR	1	210	04-01-87	3-31-2021				
140	TANGEDCO	METTUR TPS	State S	Tamil Nadu	SR	2	210	01-12-87	6-30-2021				
141	TANGEDCO	METTUR TPS	State S	Tamil Nadu	SR	3	210	22-03-89	9-30-2021				
142	TANGEDCO	METTUR TPS	State S	Tamil Nadu	SR	4	210	27-03-90	12-31-2021				
143	TANGEDCO	NORTH CHENNAI TPS	State S	Tamil Nadu	SR	1	210	25-10-94	12-31-2022				0
144	TANGEDCO	NORTH CHENNAI TPS	State S	Tamil Nadu	SR	2	210	27-03-95	6-30-2022				0
145	TANGEDCO	NORTH CHENNAI TPS	State S	Tamil Nadu	SR	3	210	24-02-96	3-31-2022				0
146	NTPC	RAMAGUNDEM STPS	Central	Telangana	SR	2	200	29-05-84	3-31-2022				0
147	NTPC	RAMAGUNDEM STPS	Central	Telangana	SR	4	500	26-06-88	6-30-2022				0
148	NTPC	RAMAGUNDEM STPS	Central	Telangana	SR	5	500	26-03-89	9-30-2022				0
149	NTPC	RAMAGUNDEM STPS	Central	Telangana	SR	6	500	16-10-89	9-30-2022				0
150	NTPC	RAMAGUNDEM STPS	Central	Telangana	SR	7	500	26-09-04	12-31-2022				0
151	TSGENCO	KAKATIYA TPS	State S	Telangana	SR	1	500	27-05-10	3-31-2020				0

152	TSGENCO	KOTHAGUDEM TPS (N	State S	Telangana	SR	11	500	26-06-11	9-30-2019			Feasibility study is in progress by BHEL
153	Bharat Alum	BALCO TPS	Private	Chhatisgarh	WR	1	300	04-06-15	9-30-2021			0
154	Bharat Alum	BALCO TPS	Private	Chhatisgarh	WR	2	300	24-03-16	6-30-2021			0
155	NTPC	KORBA STPS	Central	Chhatisgarh	WR	1	200	28-02-83	12-31-2022			0
156	NTPC	KORBA STPS	Central	Chhatisgarh	WR	2	200	31-10-83	12-31-2022			0
157	NTPC	KORBA STPS	Central	Chhatisgarh	WR	4	500	31-05-87	12-31-2022			0
158	NTPC	KORBA STPS	Central	Chhatisgarh	WR	5	500	25-03-88	12-31-2022			0
159	SKS Power	Binjkote TPP	Private	Chhatisgarh	WR	1	300	25-04-17	9-30-2020			
160	GIPCL	SURAT LIG. TPS	Private	Gujarat	WR	3	125	12-04-10	9-30-2020			
161	GIPCL	SURAT LIG. TPS	Private	Gujarat	WR	4	125	23-04-10	12-31-2020			
162	GMD Corpn.	AKRIMOTA LIG TPS	State S	Gujarat	WR	1	125	31-03-05	9-30-2020			
163	GMD Corpn.	AKRIMOTA LIG TPS	State S	Gujarat	WR	2	125	19-12-05	12-31-2020			
164	GSECL	KUTCH LIG. TPS	State S	Gujarat	WR	1	70	29-03-90	12-31-2021			Order for feasibility study and DPR issued on 08-02-2018 and consultant has submitted draft feasibility report, DPR expected by Sep., 2018.
165	GSECL	KUTCH LIG. TPS	State S	Gujarat	WR	2	70	25-03-91	12-31-2021			0
166	GSECL	KUTCH LIG. TPS	State S	Gujarat	WR	3	75	31-03-97	12-31-2021			0
167	GSECL	KUTCH LIG. TPS	State S	Gujarat	WR	4	75	01-10-09	12-31-2020			
168	GSECL	UKAI TPS	State S	Gujarat	WR	3	200	21-01-79	12-31-2021			completed on 26-04-2016
169	GSECL	UKAI TPS	State S	Gujarat	WR	4	200	28-03-79	12-31-2021			completed on 04-05-2017
170	GSECL	UKAI TPS	State S	Gujarat	WR	5	210	30-01-85	12-31-2021			completed on 28-03-2017
171	GSECL	UKAI TPS	State S	Gujarat	WR	6	500	05-03-13	3-31-2022			complied with ESP norms
172	GSECL	WANAKBORI TPS	State S	Gujarat	WR	1	210	23-03-82	12-31-2021			completed on 07-03-2017
173	GSECL	WANAKBORI TPS	State S	Gujarat	WR	2	210	15-01-83	12-31-2021			completed on 08-05-2018
174	GSECL	WANAKBORI TPS	State S	Gujarat	WR	3	210	15-03-84	12-31-2021			completed on 27-11-2017
175	GSECL	WANAKBORI TPS	State S	Gujarat	WR	4	210	09-03-86	12-31-2021			Offer asked from various vendors for upgradation of ESP by replacement of rectifier transformer.
176	GSECL	WANAKBORI TPS	State S	Gujarat	WR	5	210	23-09-86	12-31-2021			0
177	GSECL	WANAKBORI TPS	State S	Gujarat	WR	6	210	18-11-87	12-31-2021			0
178	GSECL	WANAKBORI TPS	State S	Gujarat	WR	7	210	31-12-98	12-31-2021			complied with ESP norms
179	MPPGCL	AMARKANTAK EXT TP	State S	Madhya Pra	WR	5	210	15-06-08	3-31-2021			0
180	MPPGCL	SANJAY GANDHI TPS	State S	Madhya Pra	WR	1	210	26-03-93	3-31-2021			Order placed on FITCHNER Consulting Ltd. For Implementation Plan for FGD and other equipment in April. NIT to be Floated in June 2018. Order will be placed by Dec 2018. Completion by June 2021
181	MPPGCL	SANJAY GANDHI TPS	State S	Madhya Pra	WR	2	210	27-03-93	3-31-2021			0
182	MPPGCL	SANJAY GANDHI TPS	State S	Madhya Pra	WR	3	210	28-02-99	6-30-2021			0
183	MPPGCL	SANJAY GANDHI TPS	State S	Madhya Pra	WR	4	210	23-11-99	6-30-2021			0

184	MPPGCL	SANJAY GANDHI TPS	State S	Madhya Pra	WR	5	500	18-06-07	3-31-2021				0
185	MPPGCL	SATPURA TPS	State S	Madhya Pra	WR	10	250	22-03-13	3-31-2021				0
186	MPPGCL	SATPURA TPS	State S	Madhya Pra	WR	11	250	25-12-13	3-31-2021				0
187	NTPC	VINDHYACHAL STPS	Central	Madhya Pra	WR	1	210	10-10-87	12-31-2022				0
188	NTPC	VINDHYACHAL STPS	Central	Madhya Pra	WR	2	210	23-07-88	12-31-2022				0
189	NTPC	VINDHYACHAL STPS	Central	Madhya Pra	WR	3	210	03-02-89	12-31-2022				0
190	NTPC	VINDHYACHAL STPS	Central	Madhya Pra	WR	4	210	26-12-89	12-31-2022				0
191	NTPC	VINDHYACHAL STPS	Central	Madhya Pra	WR	5	210	31-03-90	12-31-2022				0
192	NTPC	VINDHYACHAL STPS	Central	Madhya Pra	WR	6	210	01-02-91	12-31-2022				0
193	NTPC	VINDHYACHAL STPS	Central	Madhya Pra	WR	9	500	27-07-06	9-30-2021				0
194	NTPC	VINDHYACHAL STPS	Central	Madhya Pra	WR	10	500	08-03-07	9-30-2021				0
195	MAHAGENC	BHUSAWAL TPS	State S	Maharashtra	WR	4	500	07-03-12	3-31-2021				0
196	MAHAGENC	BHUSAWAL TPS	State S	Maharashtra	WR	5	500	30-03-12	3-31-2021				0
197	MAHAGENC	CHANDRAPUR STPS	State S	Maharashtra	WR	8	500	29-03-15	3-31-2021				0
198	MAHAGENC	KHAPARKHEDA TPS	State S	Maharashtra	WR	1	210	26-03-89	3-31-2021				ESP upgradation is already under process.
199	MAHAGENC	KHAPARKHEDA TPS	State S	Maharashtra	WR	2	210	08-01-90	3-31-2021				Mahagenco will implement FGD installation first. If SPM level still remains high in some units, then ESP upgradation may be considered.
200	MAHAGENC	KHAPARKHEDA TPS	State S	Maharashtra	WR	3	210	31-05-00	3-31-2021				0
201	MAHAGENC	KORADI TPS	State S	Maharashtra	WR	7	210	13-01-83	3-31-2021				Mahagenco will implement FGD installation first. If SPM level still remains high in some units, then ESP upgradation may be considered.
202	MAHAGENC	KORADI TPS	State S	Maharashtra	WR	10	660	28-12-16	12-31-2020				0
203	MAHAGENC	NASIK TPS	State S	Maharashtra	WR	4	210	10-07-80	3-31-2021				0
204	MAHAGENC	NASIK TPS	State S	Maharashtra	WR	5	210	30-01-81	3-31-2021				0
205	MAHAGENC	PARAS TPS	State S	Maharashtra	WR	3	250	31-05-07	3-31-2021				0
206	MAHAGENC	PARAS TPS	State S	Maharashtra	WR	4	250	27-03-10	3-31-2021				0
207	MAHAGENC	PARLI TPS	State S	Maharashtra	WR	4	210	26-03-85	3-31-2021				0
208	MAHAGENC	PARLI TPS	State S	Maharashtra	WR	6	250	16-02-07	3-31-2021				0
209	MAHAGENC	PARLI TPS	State S	Maharashtra	WR	7	250	10-02-10	3-31-2021				0
210	MAHAGENC	PARLI TPS	State S	Maharashtra	WR	8	250	30-03-16	3-31-2021				0
211	NTPC	MOUDA TPS	Central	Maharashtra	WR	2	500	29-03-13	12-31-2022				0
212	NTPC	MOUDA TPS	Central	Maharashtra	WR	3	660	28-03-16	12-31-2022				0
213	NTPC	MOUDA TPS	Central	Maharashtra	WR	4	660	18-03-17	12-31-2020				0
214	NTPC	SOLAPUR	Central	Maharashtra	WR	1	660	07-04-17	12-31-2020				0
215	Ratan Power	NASIK (P) TPS	Private	Maharashtra	WR	1	270	25-02-14	3-31-2021				0
216	Ratan Power	NASIK (P) TPS	Private	Maharashtra	WR	2	270	15-02-17	3-31-2021				0
217	Ratan Power	NASIK (P) TPS	Private	Maharashtra	WR	3	270	14-04-17	12-31-2022				0
218	Ratan Power	NASIK (P) TPS	Private	Maharashtra	WR	4	270	19-05-17	12-31-2022				0
219	Ratan Power	NASIK (P) TPS	Private	Maharashtra	WR	5	270	30-05-17	12-31-2022				0
220	TATA Power	TROMBAY TPS	Private	Maharashtra	WR	5	500	25-01-84	3-31-2018				0


RAJASTHAN RAJYA VIDYUT PRASARAN NIG LIMITED

(An ISO 9001:2008 Certified Company)

[Corporate Identity Number (CIN) L40109RJ20005GC016485]

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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.

(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.

Superintending Engineer (Proc-I)

ANNEXURE-XIII

Minutes of Meeting held on 09.10.2018 to discuss Technical and Financial issues on implementation of LVRT with wind generators

As per the CERC order dtd. 05.01.2016 issued in petition No. 420/MP/2014, LVRT should be implemented in all wind turbines (except stall types) commissioned before 15.04.2014 having installed capacity equal to or more than 500kW. The implementation status of the same is being discussed since long back in every OCC, TCC & NRPC meeting.

Further, the same is also being regularly pursued by SLDC Rajasthan twice in a month during meeting with wind generators at SLDC, Jaipur.

Looking to poor progress and no response received in implementation of LVRT after meeting held on 23.07.2018, the SLDC Rajasthan called a meeting of WTG manufacturers and generators on 09.10.2018 to discuss Technical and Financial issues on implementation of LVRT followed by a presentation by Dr. Anil Gupta, Director, Enerfra Services Pvt. Ltd on LVRT solution.

1. Following were present in the meeting:

1. Sh. M.A.K.P. Singh, Member-Secretary, NRPC
2. Sh. R.P. Sharma, CE (LD), RVPNL.
3. Sh. A. K. Arya, SE (SOLD), RVPNL.
4. Smt. Sheela Mishra, SE (SSDA-SLDC), RVPNL
5. Sh. K.N.M Rao, AGM, NRPC
6. Sh. Vikram Vaishnav, CEA
7. Sh. Nitin Yadav, NRLDC
8. Sh. Sanjay Mathur XEN (REMC), RVPNL
9. Sh. Kamal patidar XEN-1 (SOLD), RVPNL
10. Sh. Shanti Prasad, consultant
11. Sh. Rajendra Vyas, President IWPA
12. Representative of WTG manufacturers and Generators

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ANNEXURE-XIII

- The Chief Engineer (LD) welcomed to Sh. M.A.K.P. Singh, Member-Secretary, NRPC, Sh.K.N.M Rao, NRPC, Sh.Vikram Vaishnav, CEA, Sh. Nitin Yadav, NRLDC and all participants.
- Dr. Anil Gupta, on the basis of WTG data provided by SLDC, worked out that in SLDC Rajasthan control area, LVRT is required to be implemented in 2,535 turbines of about 2.9 GW capacities. For 2.2 GW capacities, LVRT can be retrofitted suitably by the OEM, and the remaining via an external device. The estimated total cost of retrofit will be 265 crores, or about 9 lakhs/MW.
- It was emphasized by Member-Secretary, NRPC that the question of whether LVRT is really required has become irrelevant as CERC has already issued a regulation for implementation of LVRT. The same is to be implemented.
- Dr. Gupta in their presentation described that there are four types of wind Electric Conversion methods:

(1) Type A with Squirrel Cage Induction Generator, with no or negligible power electronics in it.

(2) Type B with Wound Rotor Induction Generator, with fixed or variable rotor resistance

(3) Type C with partial converter, with DFIG

(4) Type D with full scale converter (Synchronous type generators).

Type A and B are older designs. All newer models in India are Type C or D where it is best for the OEM to do software and if necessary, converter retrofit inside turbine to comply with CEA's LVRT specification. Almost all OEMs selling turbines in India already have competence, technology, and solution to achieve this. For Type A and B where the turbine does not have a converter, the most cost-effective and technically superior solution is an external dual-converter device per turbine.

- Sh. Shanti Prasad, consultant raised the concerned that non compliance could be very serious. The CERC may impose penalties under section 142 or the RE generators may loose the 'must run' status.

ANNEXURE-XIII

- The OEMs of these wind generators are required to be roped in and they must allow such agencies to retrofit these devices in their WTGs. The wind generators are urged to forcefully ask the OEMs to provide retrofitting of LVRTs as an after sales service.
- Member-Secretary, NRPC pointed out that do we have cheaper and viable alternatives/solutions besides the one suggested by Dr.Anil Gupta? Do we have to install LVRT at individual WTG level or installing a single LVRT at pooling station level would suffice?
- Further, it is advised to explore how other countries like China, Germany are tackling this problem, what other solutions they are having needs to be explored at length. These shall be discussed at NRPC level shortly in last week of Oct, 2018 and the same shall be communicated to the RE generators and SLDCs for interactive session at New Delhi.

Meeting ended with vote of thanks to the chair.

List of Participants present in meeting regarding technical and financial awareness on implementation of LVRT held on dt. 09.10.2018 at Hotel Park Prime, Prithviraj Road, Near Statue Circle, Jaipur

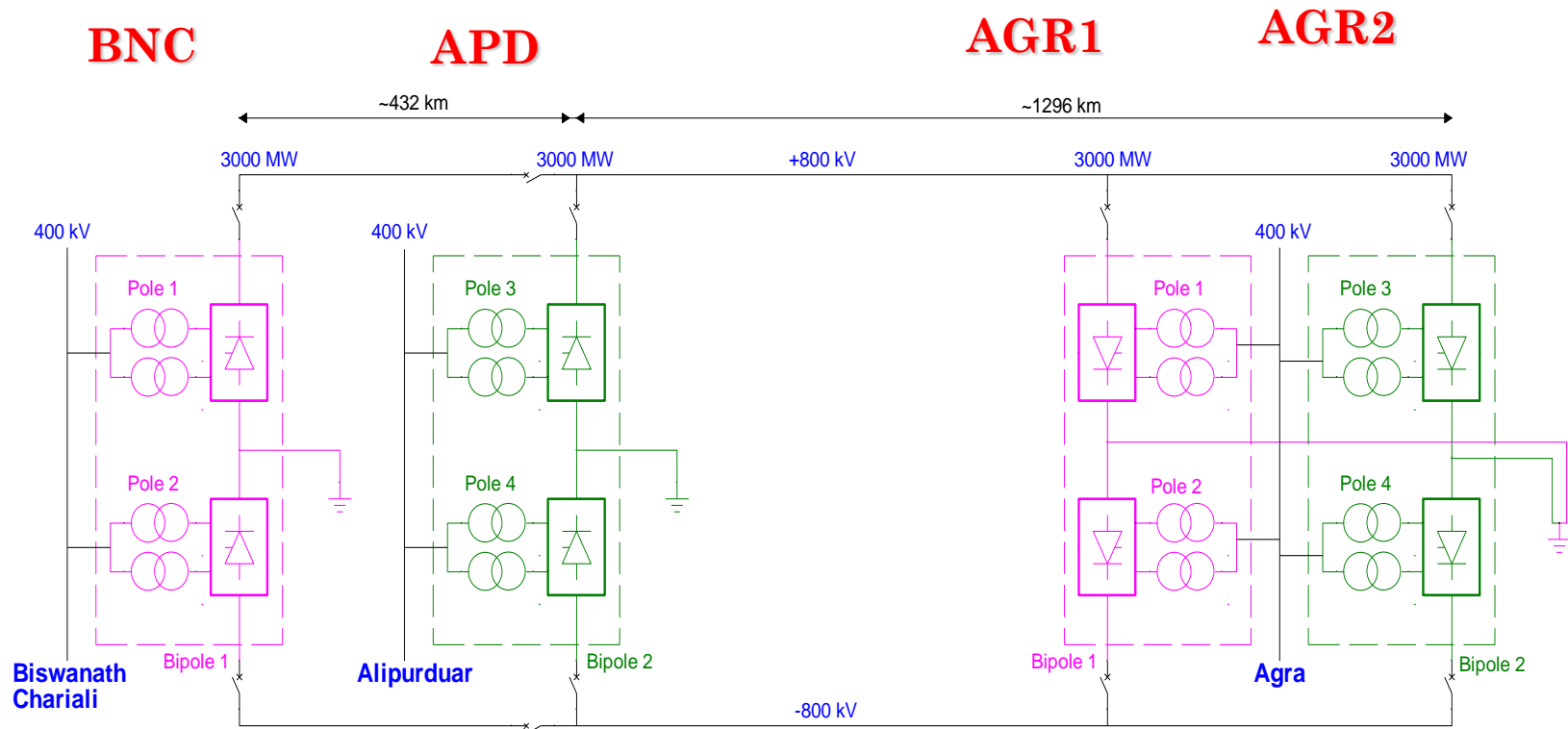
Sr. No.	Name	Designation	Organisation	Mobile No.	E-mail address	Signature
1	Nemra Ram	Summary	my fresh Energy	9829916752	nemra.ram@myfreshenergy.com	
2	Rakesh Chhangar	Sr. Manager	Vish Wind	9829916752	r.chhangar@vishwind.com	
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5	Rakesh Dubey	AGM	Orange Renewable	9981992426	rdc@orange-renewable.net	
6	Abhishat Jain	Sr Manager	Orange Renewable	8780922799	abhishatjain@orange-renewable.net	
7	Ravindranath	Project Manager	Stedding Agro. Infrast.	8586000914	windmill@stedding.com	
8	MANOJ KUMAR VERMA	Sr. manager	Suzlon Energy Ltd	9549651323	manoj.verma@suzlon.com	
9	ANSHAY VYAS	Asst MANAGER	SUZLON	9799995790	ankshay.vyas@suzlon.com	
10	अंकित वर्मा	असिस्टेंट मैनेजर	असिस्टेंट मैनेजर	9560270520	ankitinfo6@gmail.com	
11	नितीन यादव	असिस्टेंट मैनेजर	असिस्टेंट मैनेजर	9560270520	nitinyadav@posoco.in	
12	Roshanlal Surana	consultant	P.E.C. Delhi	9950199581	info@powerandenergyconsultants.com (roshanlalsurana@gmail.com)	
13	R.P. Sharma	CE (LD)	RVPMZ	9414061038	ce.ld@rvpm.co.in	
14	Narendra Somoshi	VP Head-Engineering	ReNew Power	9871364433	narendra.somoshia@renewpower.in	
15	M.A.K.P. SIMGH	Member Secy	NRPC	9425066437	ms-nrpc@nic.in	
16	ABHINAV SARASWAT	Manager-Engg. & Regulatory	RENEW Power	9407535324	abhinav.saraswata@renewpower.in	
17	Sunil Jain	Head (Technical Services)	CLP India	9924143164	SUNIL.JAIN@CLPINDIA.IN	
18	Sheela Mathur	S.E (SSDA-SLDC)	RVPN	9413393648	se.sdda@rvpn.co.in	
19	SANJAY MATHUR	XEN (REMC)	RVPN	9413382628	mathur.sanjay@rvpn.co.in	
20	कमलेश	Asst AGM	NRPC	9217256922	kamlesh2003@yahoo.com	
21	Vinay Vashnaw	Asst. Director	CEA	847000970	vinay.vashnaw@gov.in	
22	R. P. Joshi	परिचालक	Vish Wind	9829916752	rajain@vishwind.com	

ANNEXURE-XXVI



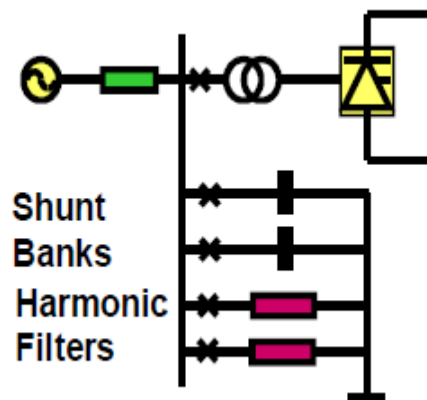
REACTIVE POWER CONTROL
NEA 800 HVDC PROJECT

NER-Agra Project Overview



Reactive Power : Introduction

Reactive power generated by following sources in HVDC System:



Reactive Power Generation

Shunt Capacitor banks

The reactive power that a shunt capacitor bank generates can be calculated as:

$$Q = 2 \pi f C U^2$$

Harmonic filter banks

Tuned to a certain harmonic frequency 11th, 13th etc. At fundamental frequency the filters are capacitive

PLC Filters

The PLC filters have high resonance frequencies and are built up of one series reactor and one shunt capacitor.



Reactive Power consumed by HVDC Converter

$$Q = K_{6p} * \chi * U_{dio} * I_d$$

$$\chi = \frac{2 * \mu + \sin(2 * \alpha) - \sin[2 * (\alpha + \mu)]}{4 * [\cos(\alpha) - \cos(\alpha + \mu)]}$$

$$\cos(\alpha + \mu) = \cos(\alpha) - 2 * d_x * \frac{I_d}{I_{dN}} * \frac{U_{dioN}}{U_{dio}}$$

$$Q = P_d \sqrt{\left(\frac{U_{dio}}{U_d / K_{6p}}\right)^2 - 1}$$

Where

- Q Reactive power absorption of the converter
- K_{6p} number of 6-pulse bridges forming the converter
- α firing angle in Radians. For inverter operation, the extinction angle γ shall be used.
- X factor defined by Equation (2)
- μ commutation overlap angle in Radians, calculated by Equation (3)
- U_{dio} Ideal no-load D.C Voltage per 6-pulse group, in kV
- I_d D.C current, in kA
- d_x relative inductive voltage drop in p.u
- I_{dN} Nominal D.C current, in kA
- U_{dioN} Nominal Ideal D.C Voltage per 6-pulse group, in kV

Reactive power generation

$$Q_{filter} = C * U_{AC}^2 * 2\pi f$$

Where

- C Capacitance (F) of the banks
 U_{AC} a.c bus voltage (kV)
 f a.c bus frequency (Hz)

Reactive power Balance

$$\Delta Q = Q_{filter} - Q_{conv}$$

Where

- Q_{conv} reactive power consumption of the converter
 Q_{filter} reactive power generation of the connected a.c filter and shunt capacitor banks minus the reactive power absorption of shunt reactor, if any

- The station absorbs reactive power from the a.c network if $\Delta Q < 0$. The station generates reactive power to the a.c network if $\Delta Q > 0$.
- The extreme point of reactive power generation and consumption can be depicted as follows,

$$\Delta Q_{max} = Q_{filtermax} - Q_{convmin}$$



AC Voltage Steps

- Upon switching of a.c filters and shunt capacitor branches, the change in a.c voltage should be kept lower.
- For a.c networks the voltage change upon switching of a.c filters or shunt capacitor can be calculated using equation.

$$\Delta U_{AC} = \frac{Q_{filter} - \Delta Q_{converter}}{S_{SC} - \sum Q_{filter}}$$

Where

ΔU	Steady state a.c voltage change
$\sum Q_{filter}$	Reactive power of the element to be switched
Q_{filter}	Total reactive power of the a.c filters and shunt capacitors connected after switching
S_{SC}	Minimum short circuit capacity
$\Delta Q_{converter}$	Change in reactive power consumption of the converter



Reactive Power Control

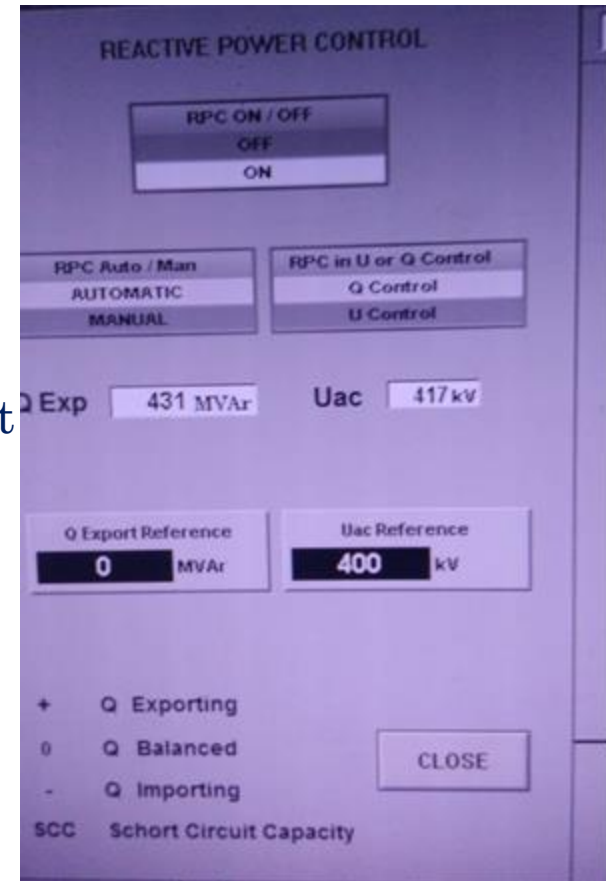
- The reactive power balance of each side of the HVDC transmission will normally be performed by reactive power controller (RPC).
- An RPC is located in each converter station and operates independently from the RPC in the other end of the HVDC transmission
- Switching of filter banks or sub-banks is ordered by the RPC
- Switching priority restrictions are determined by limits in the reactive power compensation study for the different control modes.



NEA800 RPC: At a glance



- **RPC- ON/ OFF**on when converter deblocked
- **RPC Auto/ Manual**..... Generally in Auto mode
- **RPC in U or Q Control**..... U Control at inverter & Q control at Rectifier



High priority restrictions

- Absmin filter
- U_maximum and U_minimum
- Minimum filter requirements
- Q-control or U-control (either of them active at a time)



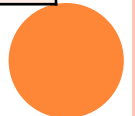
Absolute minimum filter:

- The absolute minimum filter function overrides all the control functions and will always connect necessary sub-banks when the converter is de-blocked.
- In case of Absolute minimum filter is not fulfilled, the transmitted power will be reduced to the level where Absolute minimum filter is fulfilled.
- If no filters are connected, the converter will be blocked after 15 sec.



Absolute minimum filter:

SI No.	Mode of Operation	Power Range in MW	HP 12 (125 MVAr)	HP 12B (201MVAr at AGR & 160 MVAr at BNC/ APD)	HP 24/36 (125 MVAr)	HP 24/36B (200 MVAr at AGR & 160 MVAr at BNC/ APD)	HP 3 (200 MVAr at AGR & 159 MVAr at VNC/ APD)
		Up to					
BISWANATH CHARIALI							
1	MONOPOLAR	525	1		1		
		1125	1	1	1		
		1500	2	1	1		
		2000	2	1	1	1	
ALIPURDUAR							
2	MONOPOLAR	525	1		1		
		1125	1	1	1		
		1350	2	1	1		
		1500	2	1	1	1	
		2000	2	1	1	1	1
AGRA							
3	MONOPOLAR	450	1		1		
		2000	1	1	1		



Absolute minimum filter: CONTD

SI No.	Mode of Operation	Power Range in MW	HP 12 (125 MVar)	HP 12B (201MVar at AGR & 160 MVar at BNC/APD)	HP 24/36 (125 MVar)	HP 24/36B (200 MVar at AGR & 160 MVar at BNC/APD)	HP 3 (200 MVar at AGR & 159 MVar at VNC/APD)
		Up to					
BNC							
1	BIPOLAR	750	2		1		
		1050	2	1	1		
		1200	2	1	1		1
		2250	3	1	1		1
		3000	3	1	1	1	1
AGRA							
2	BIPOLAR	750	1	1	1		
		900	1	1	1	1	
		1500	2	1	1	1	
		1620	2	1	1	1	1
		3900	3	1	1	1	1
3	2 BIPOLES	900	1	1	1	1	
		1200	2	1	1	1	
		2640	2	2	1	1	
		2940	2	2	1	1	1
		4380	3	2	1	1	1
		5760	3	3	1	1	1

U_maximum/U_minimum:

- The U_maximum disconnects or inhibits connection of sub-banks at high a.c. voltages.
- The U_minimum control connects or inhibits disconnection of sub-banks at low a.c. voltages.

Settings of U_maximum/ U_minimum	
U_maximum level for disconnection of filters	440 kV
U_maximum level to inhibit connection of filters	420 kV
U_minimum level for connection of filters	360 kV
U_minimum level to inhibit disconnection of filters	380 kV



Minimum filter requirement (Filter performance) :

- The Min_Filter control determines the minimum number and type of filters to be connected to fulfill the filter performance criteria depending on d.c power level, number of de-blocked poles and d.c. voltage level.
- The filters shall be automatically connected/ disconnected as per DC Power level to meet the performance criteria
- Detail of AC Filters are given in below link file:
- [AC Filters connection details at HVDC NEA.xlsx](#)

• AC SYSTEM VOLTAGE

	<u>Biswanath Chariali</u>	<u>Alipurduar</u>	<u>Agra</u>
Nominal operating voltage, U_{INR}/U_{INI}	400kV	400kV	400kV
Maximum system voltage, steady state	420kV	420kV	420kV
Minimum system voltage, steady state	380kV	380kV	380kV



- AC SYSTEM FREQUENCY**

	<u>Biswanath Chariali</u>	<u>Alipurduar</u>	<u>Agra</u>
Nominal frequency	50 Hz	50 Hz	50 Hz
Maximum continuous frequency for reactive power exchange calc.	50.5 Hz	50.5 Hz	50.5 Hz
Minimum continuous frequency for reactive power exchange calc.	49.0 Hz	49.0 Hz	49.0 Hz

- Performance parameters:**

The ac filter performance shall be better or equal to as defined by following performance parameters:

- i) The individual harmonic distortion, D_n , shall not exceed 1.0%
- ii) The total harmonic distortion, D , shall not exceed 4.0%
- iii) The telephone influence factor, TIF, shall not exceed 40



Q-control or U-control

- Q-control or U-control (either of them active at a time)
- U-Control

The U-control gives order to switch in and out a filter or shunt capacitor sub-bank when the a.c voltage exceeds the following limits:

$$\Delta UAC > U_{ref} + (U_{deadband})$$

$$\Delta UAC < U_{ref} - (U_{deadband})$$

Where

U_{ref} is a reference value

$U_{deadband}$ is the dead-band

Reference voltage range (U_{ref}) Setting	380 kV to 420 kV
Dead Band for AC Bus voltage control	11 kV



➤ Q-control

The Q-control gives order to switch in and out a filter or shunt capacitor sub-bank if the reactive power exchange exceeds the following limits:

$$\Delta Q > Q_{\text{ref}} + (\sim Q_{\text{filtermax}})$$

$$\Delta Q < Q_{\text{ref}} - (\sim Q_{\text{filtermax}})$$

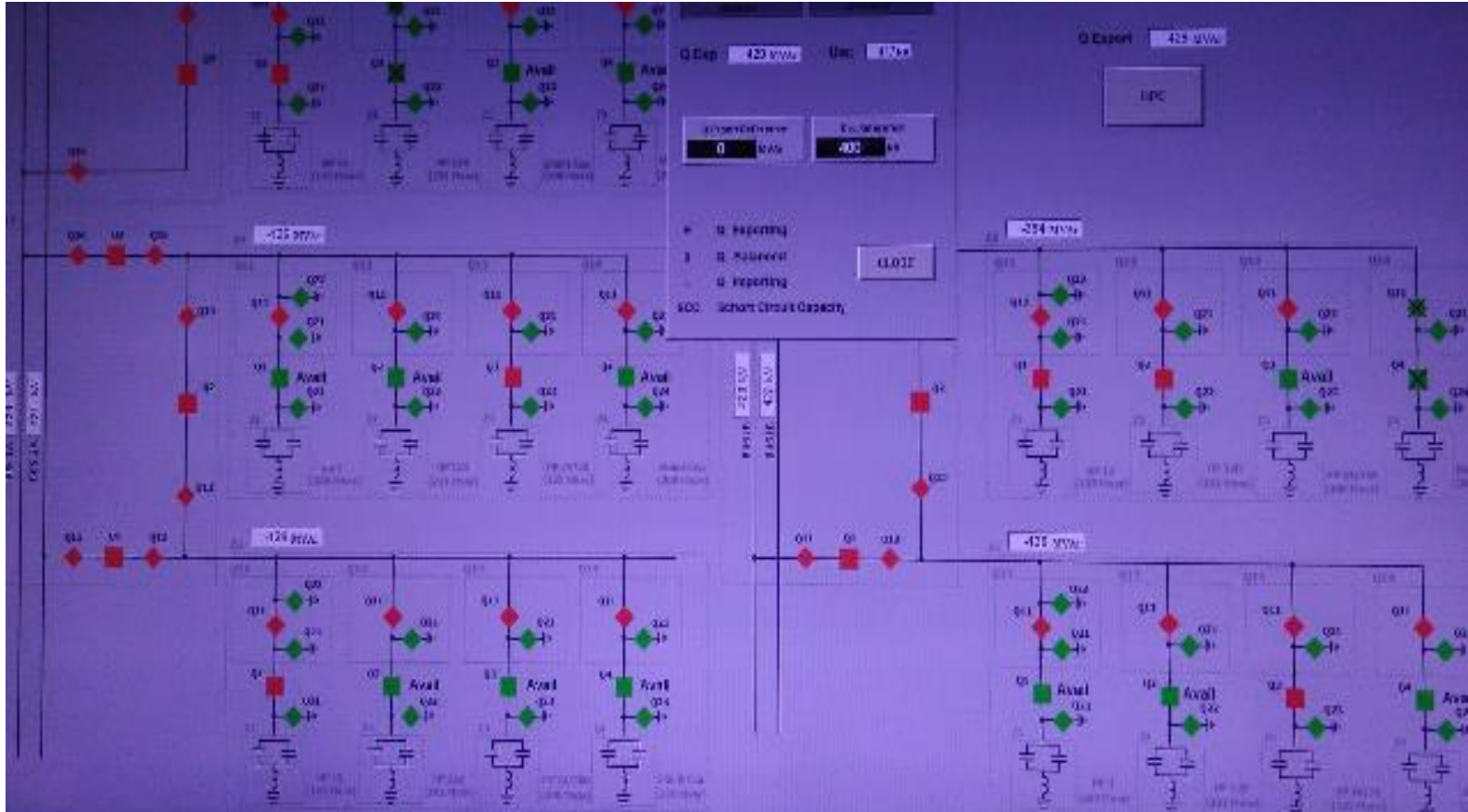
Where

Q_{ref} is a reference value $Q_{\text{filtermax}}$ is the dead-band

Reference MVar value Q_{ref}	+2000 MVar to – 2000 MVar
Dead band for $Q_{\text{filtermax}}$	160 MVar



TYPICAL FILTER AT AGRA



± 800kV, 6000 MW MULTI-TERMINAL HVDC ALIPURDUAR

AC FILTER CONNECTION DETAILS

AC VOLTAGE RANGE 380 kV to 420 kV

SI No.	Mode of Operation	Power Range in MW		HP 12 (125 MVar)	HP 12B (201MVar)	HP 24/36 (125 MVar)	HP 24/36B (200 MVar)
		From	Upto				
1	MONOPOLAR - DC FVO	150	375	1		1	
		375	600	1	1	1	
		600	750	2	1	1	
		750	900	2	1	2	
		900	1995	2	1	2	
2	MONOPOLAR - DC RVO	150	450	1		1	
		450	600	1	1	1	
		600	750	2	1	1	
		750	1200	2	1	1	
3	BIPOLAR - DC FVO	150	375	1	1	1	
		375	525	2	1	1	
		525	600	2	1	1	
		600	900	3	1	1	
		900	1200	3	1	2	
		1200	1800	4	1	2	
		1200	1500	3	1	3	
1800	1995	5	1	2			
4	BIPOLAR - DC RVO	150	375	1	1	1	
		375	450	2	1	1	
		450	900	2	1	1	
		900	1200	3	1	1	
5	BIPOLAR - DC UNBALANCED	150	405	1	1	1	
		405	540	2	1	1	
		540	810	2	1	1	
		810	1605	3	1	1	

HP 3 (200 MVar)
1
1
1
1
1
1
1
1
1
1
1
1

केन्द्रीय विद्युत अनुसंधान संस्थान

भारत सरकार, 11 बसोबास, विद्युत भवन

ए. एन. ए. रोड, सदाशिवनगर, बंगलूर, के. ए. ए. 560 080.

CENTRAL POWER RESEARCH INSTITUTE

(A Govt. of India Society under Min. of Power)

Post Bag 7, Purnan Road, Sadashivanagar P.O., PB No. 8066, Bangalore - 560 080 India

TELEX/website: CRP/WWW.CRI.INDIA

ANNEXURE - I

ANNEXURE-XXXIV

ACSTI
317

NO. PRETIV/PSIC/POL/2018

28.06.2018

To,
The Deputy Chief Engineer/TS (Design),
Punjab State Transmission Corporation Ltd.,
PSIB Head Office, The Mall,
Ludhiana - 147001, Punjab.
Telephone: 0175-2303676

Dear Sir,

Sub: Performance of Polymer Insulators.


This has reference to your letter No.470/TS-I/Polymer Insulators dated 05/06/2018. Polymer Insulators have been in use for many years. A good Quality Insulator have been in use for many years without any problem. Now a days failures have been reported within five years of Installations. This is due to bad quality of material used for the insulators.

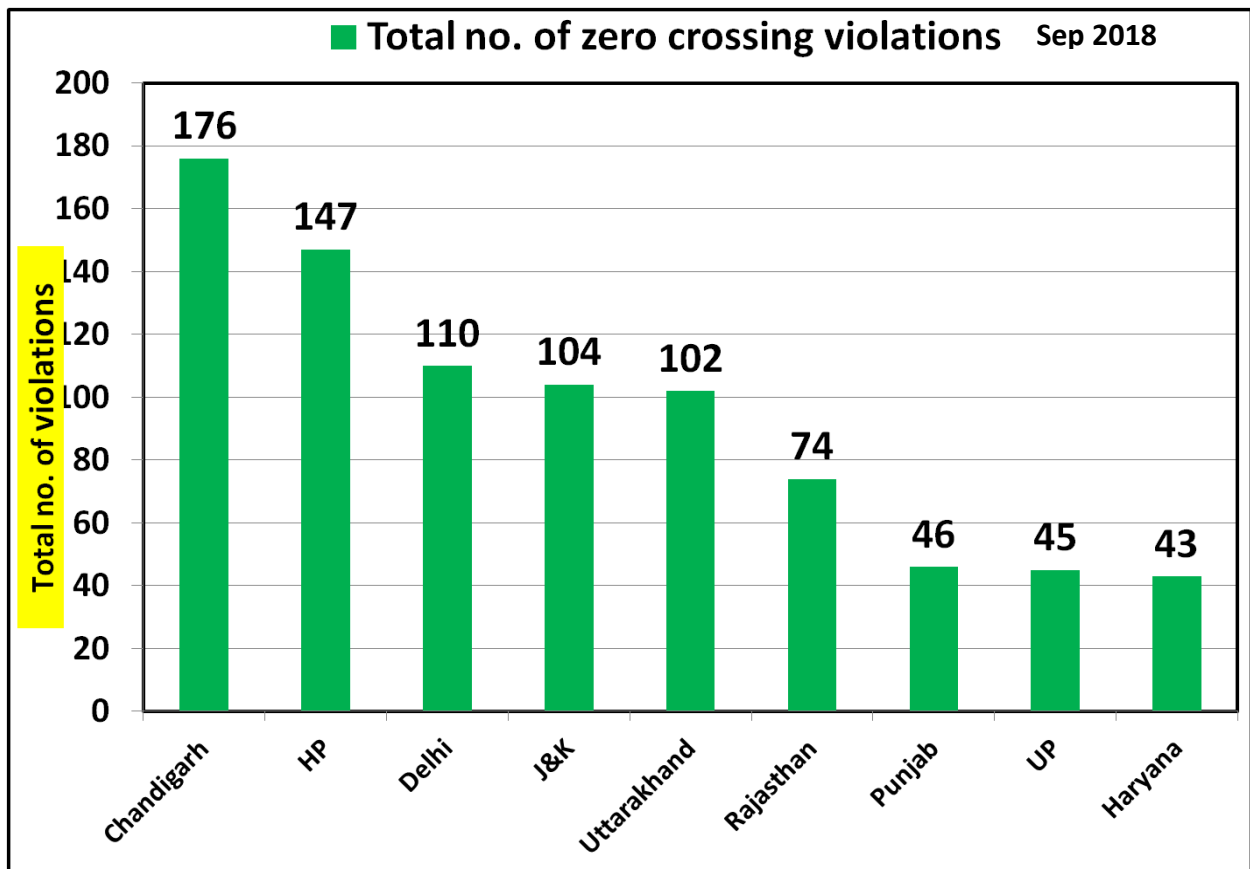
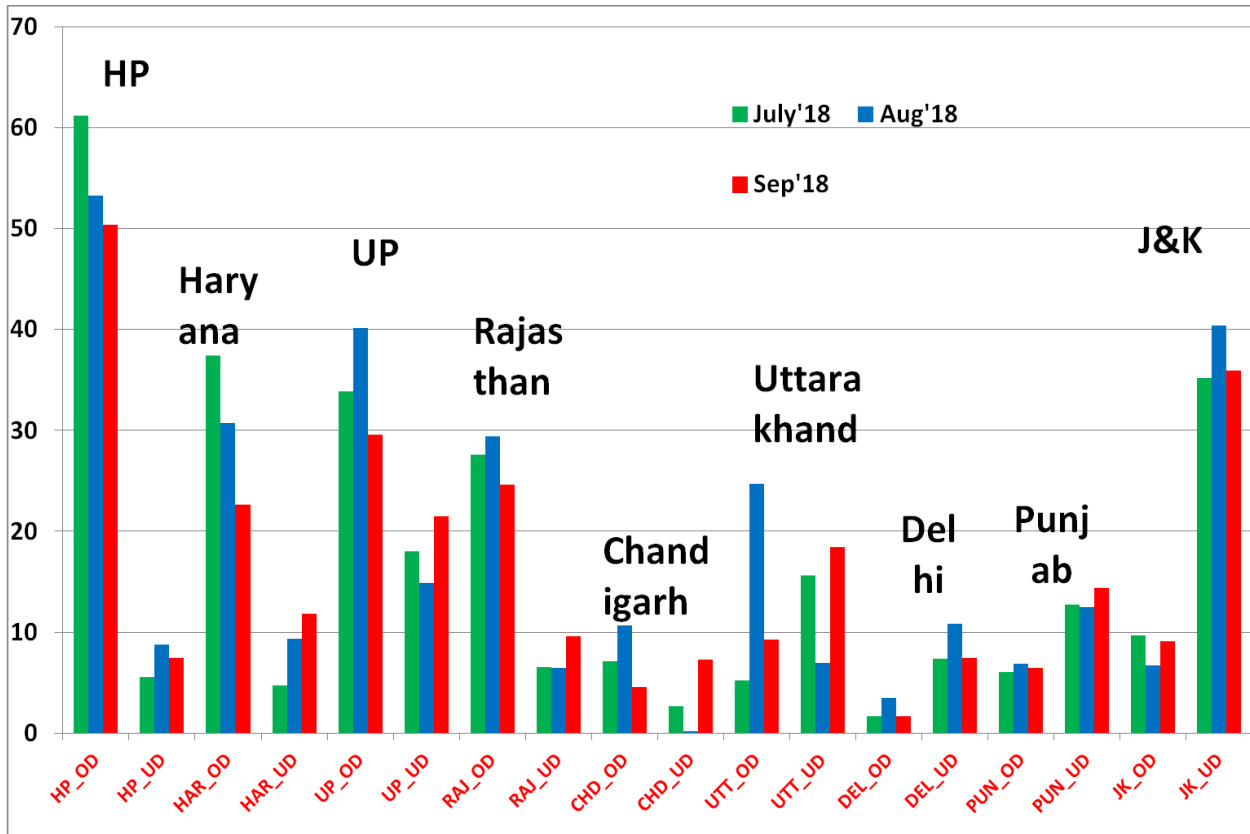
New designs of porcelain long rod and disc insulators have shown excellent performance under polluted conditions.

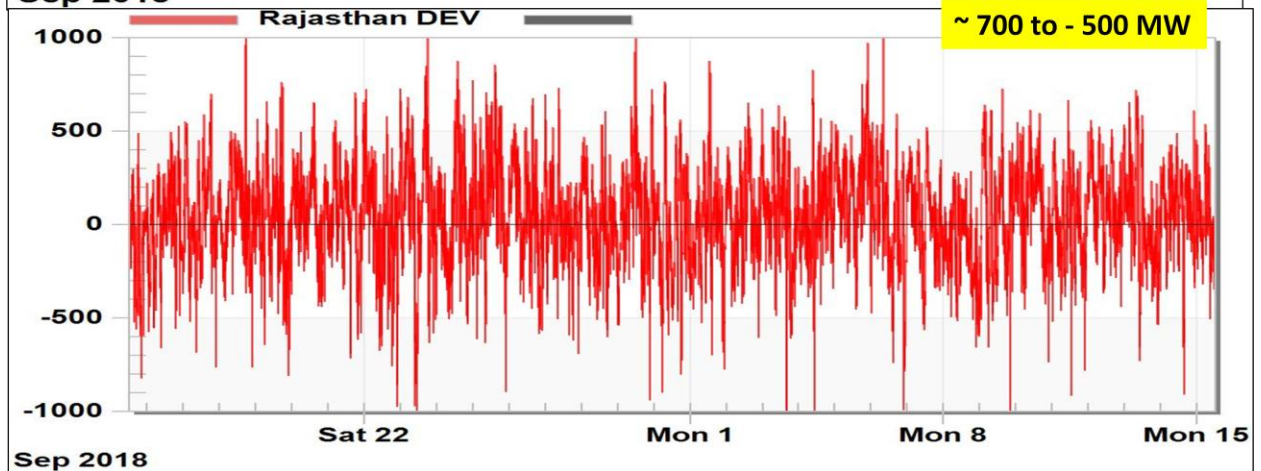
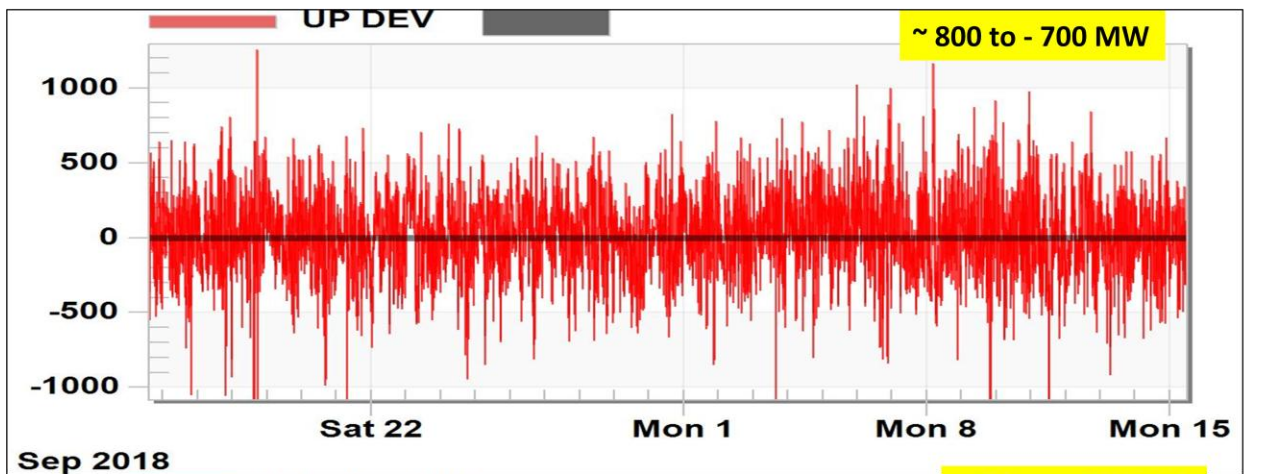
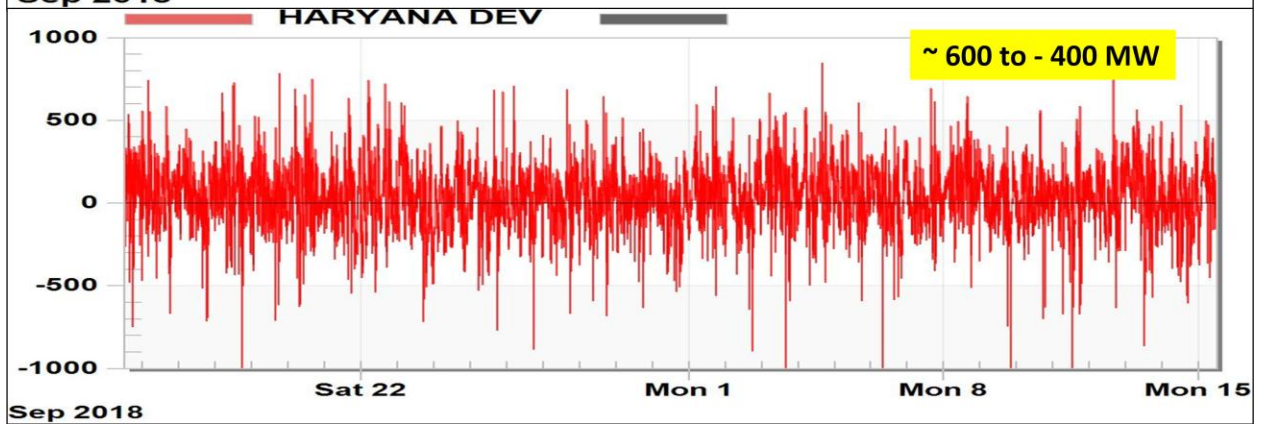
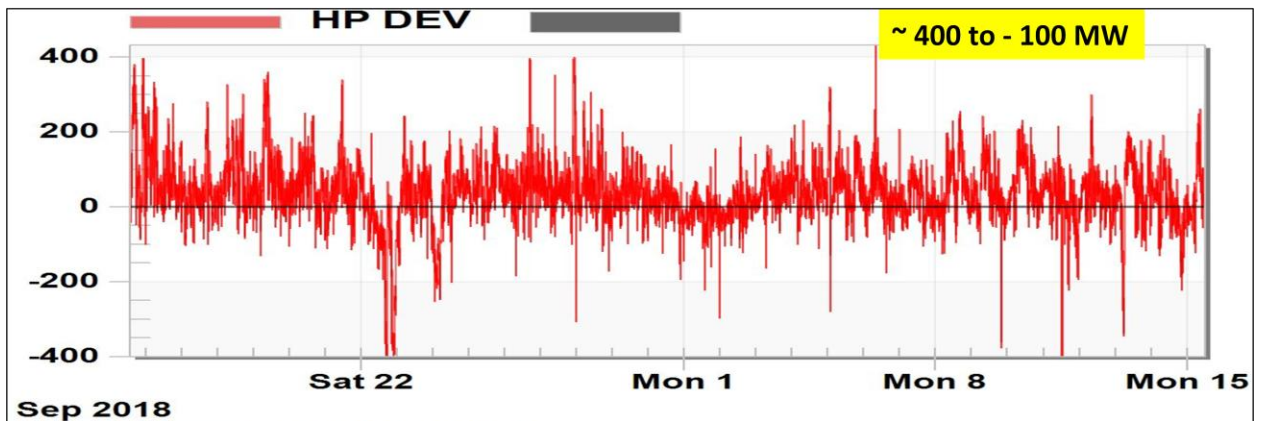
The choice of polymeric insulators or porcelain insulators is left to the board.

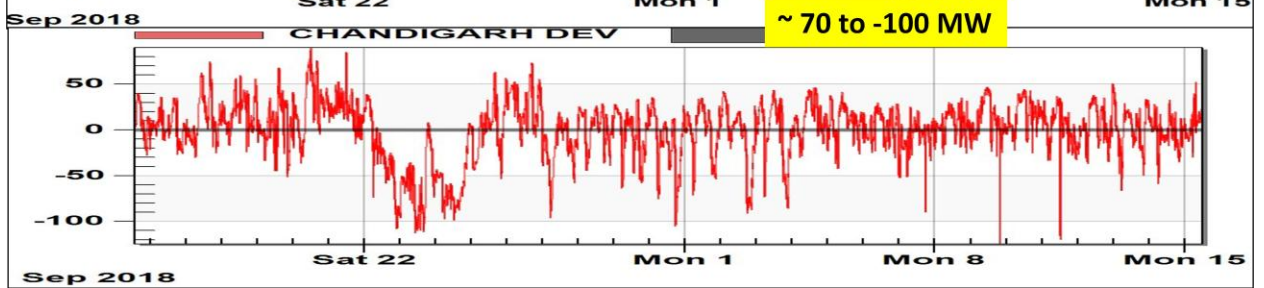
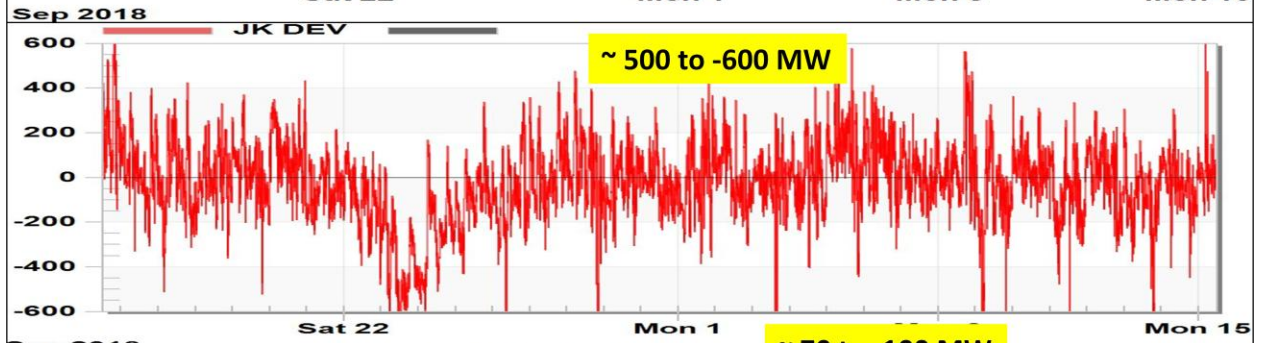
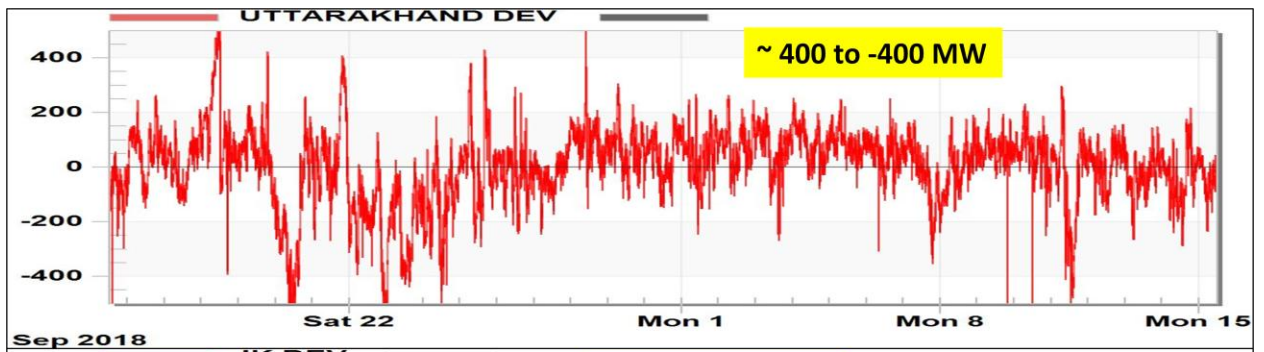
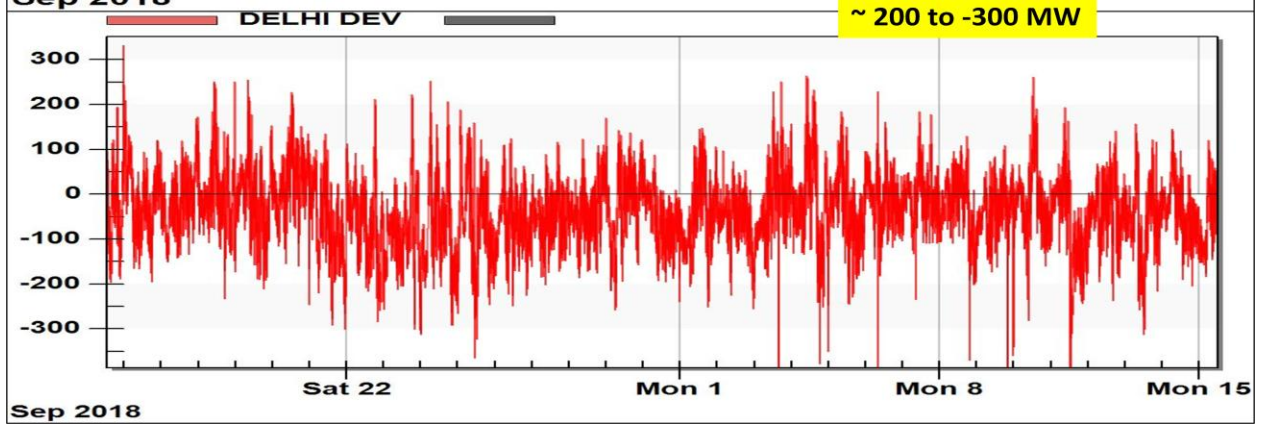
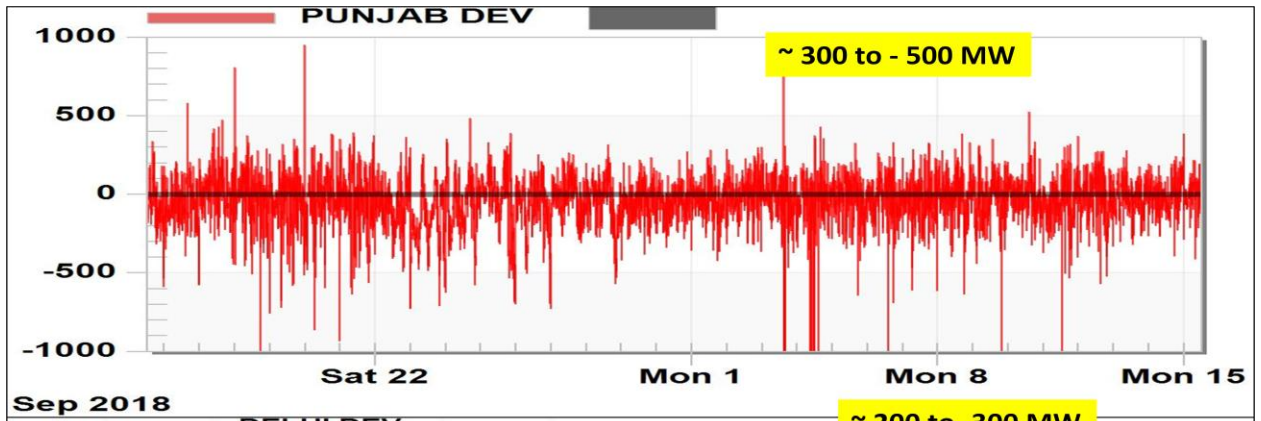
Thanks and regards,

Yours faithfully,

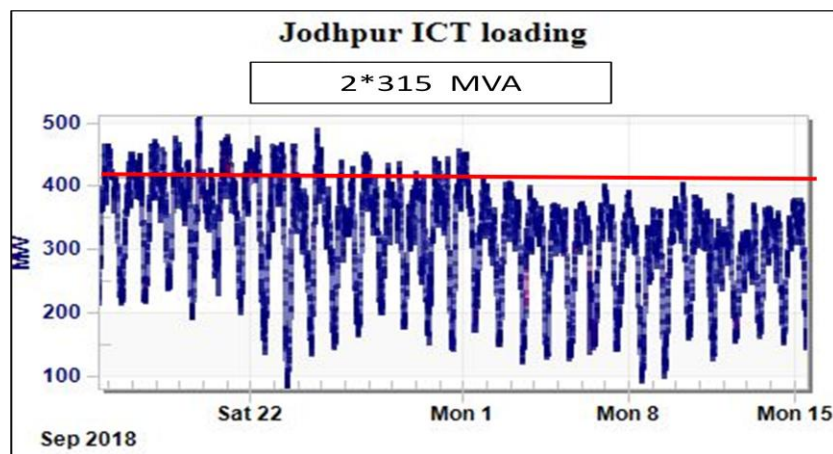
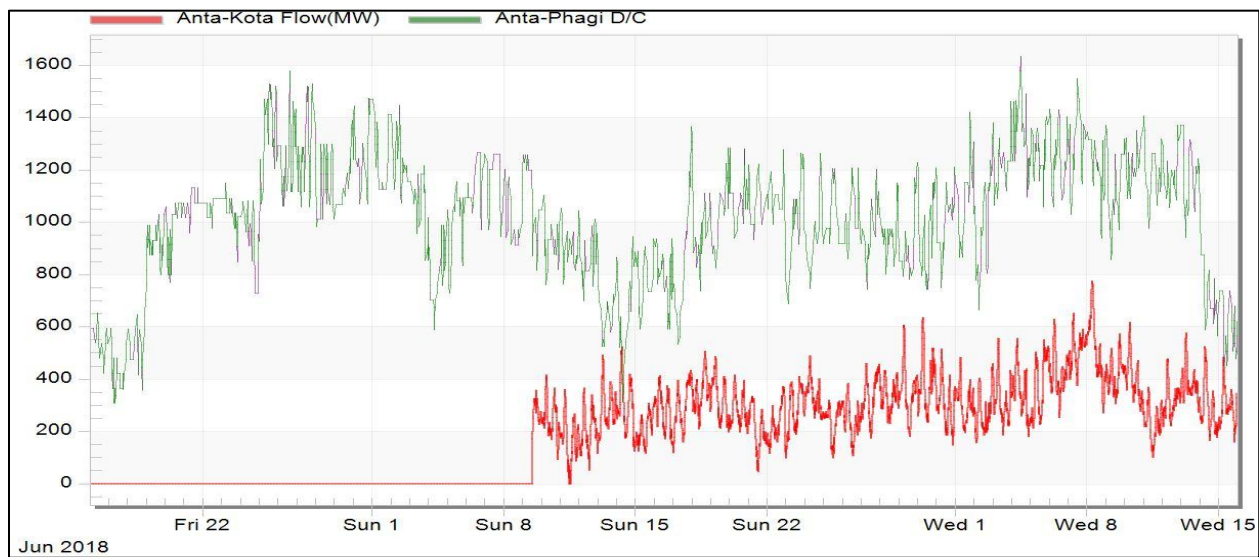
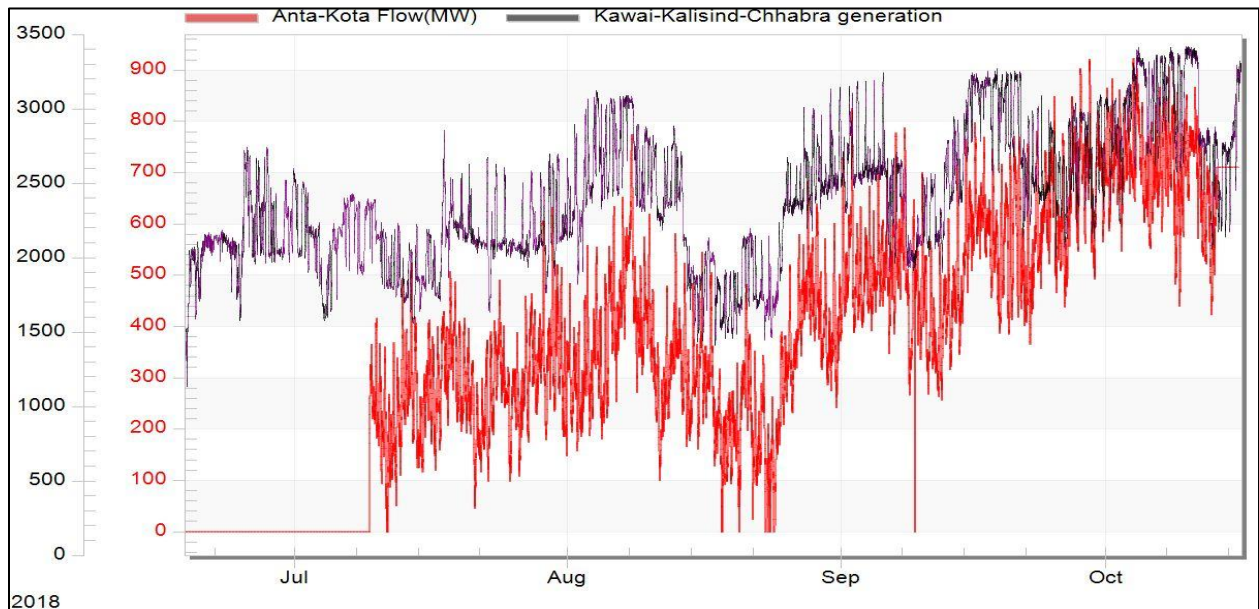

(Dr N Vasudev)
Additional Director
High Voltage Division
Mobile No.: 9845379043



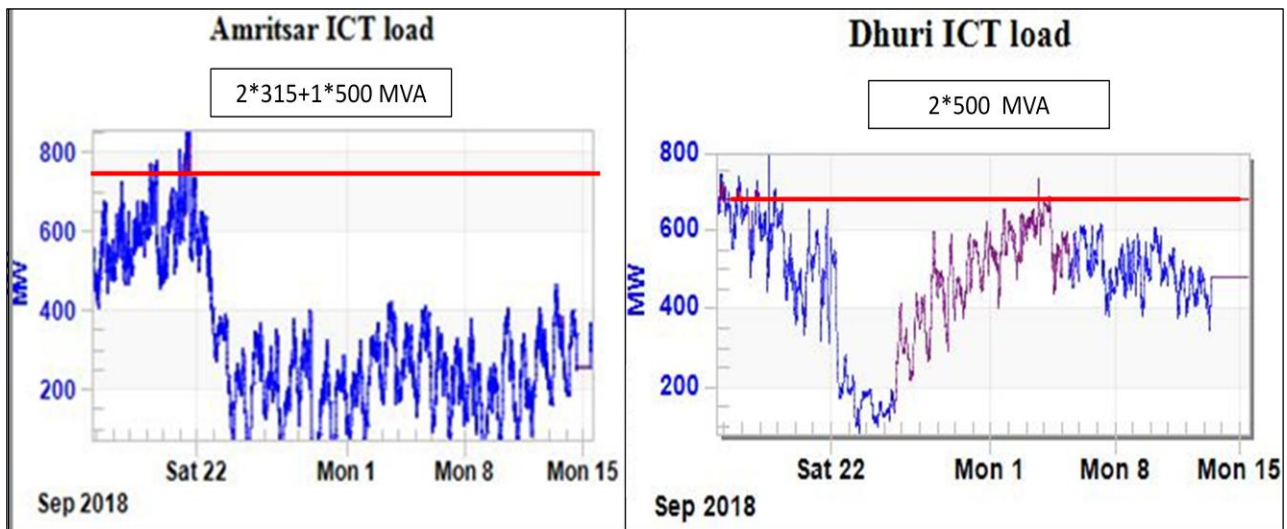
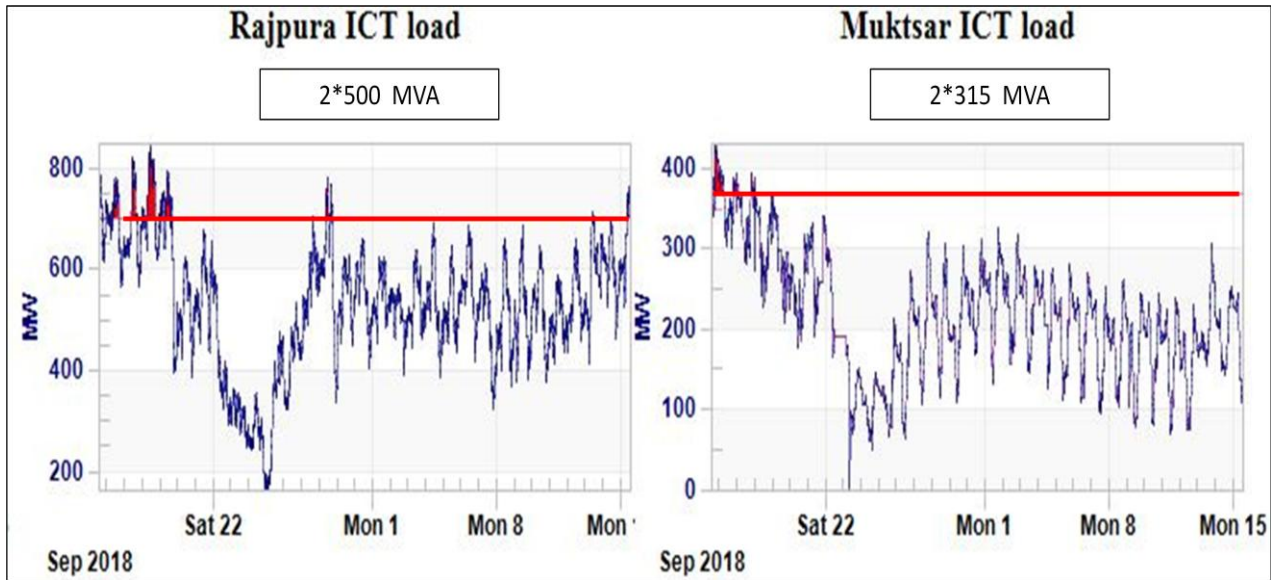




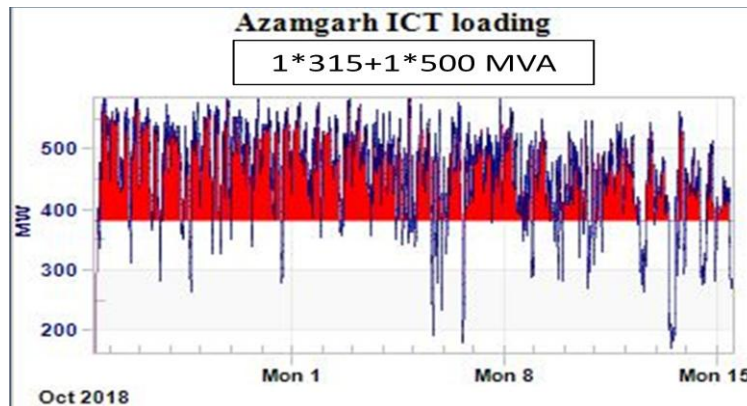
Rajasthan:



Punjab:

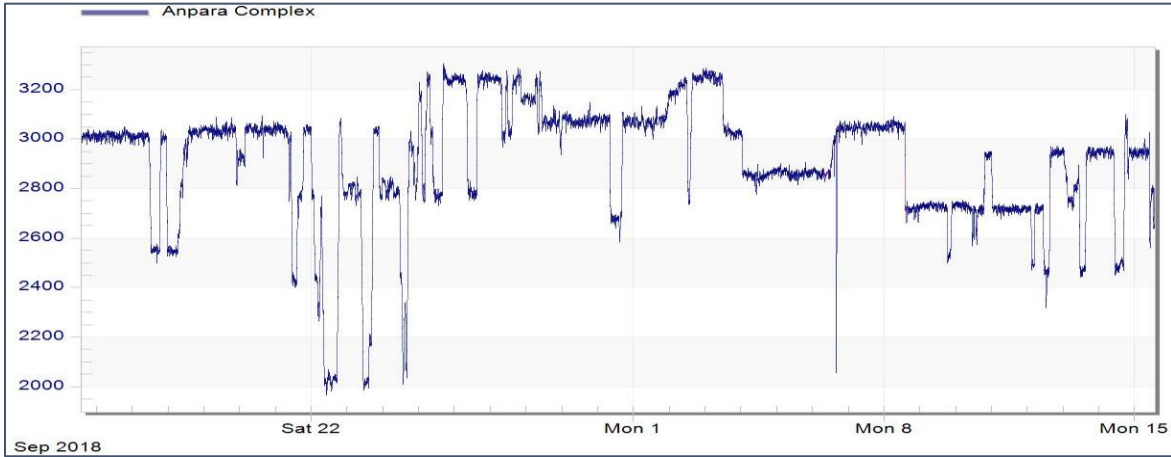


UP:

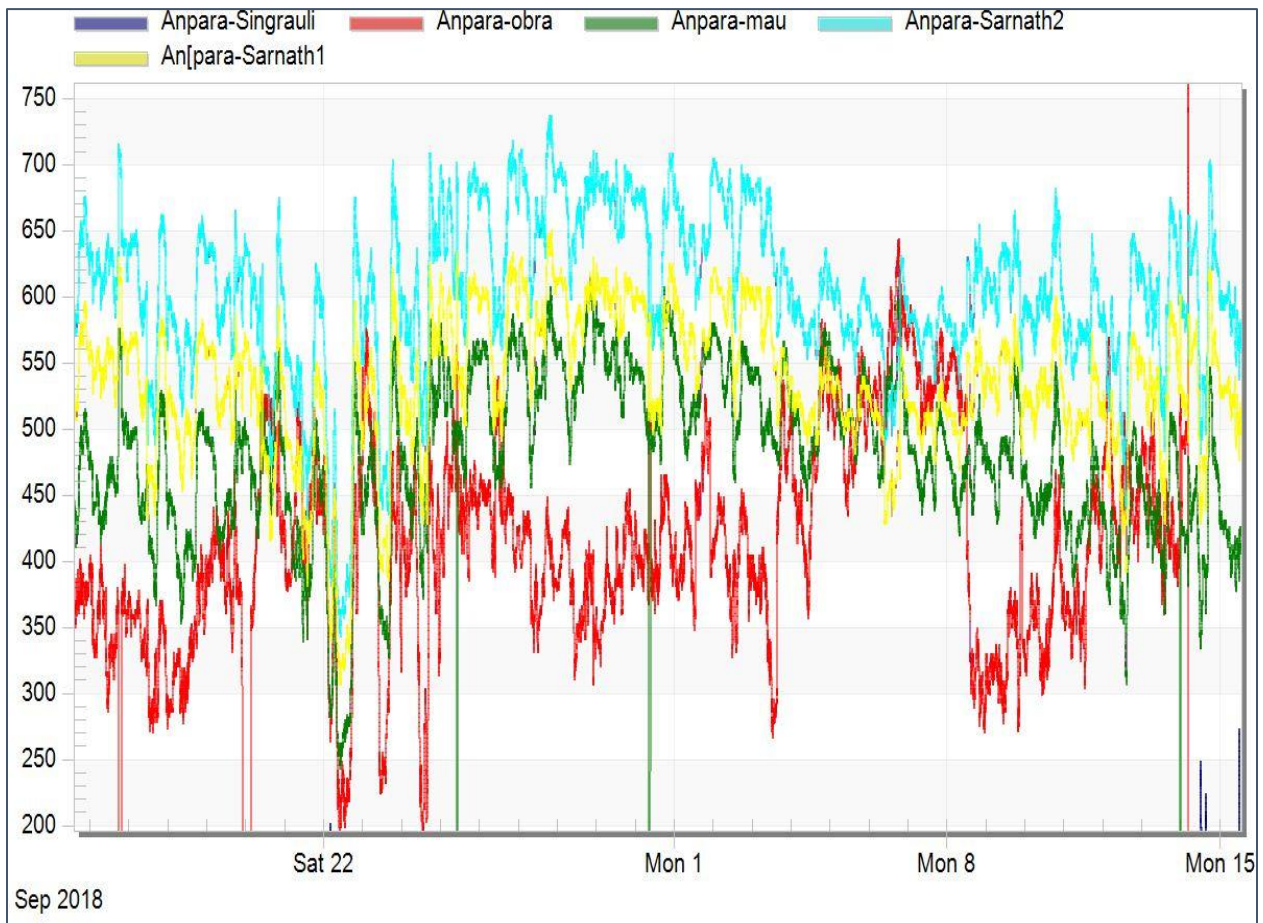


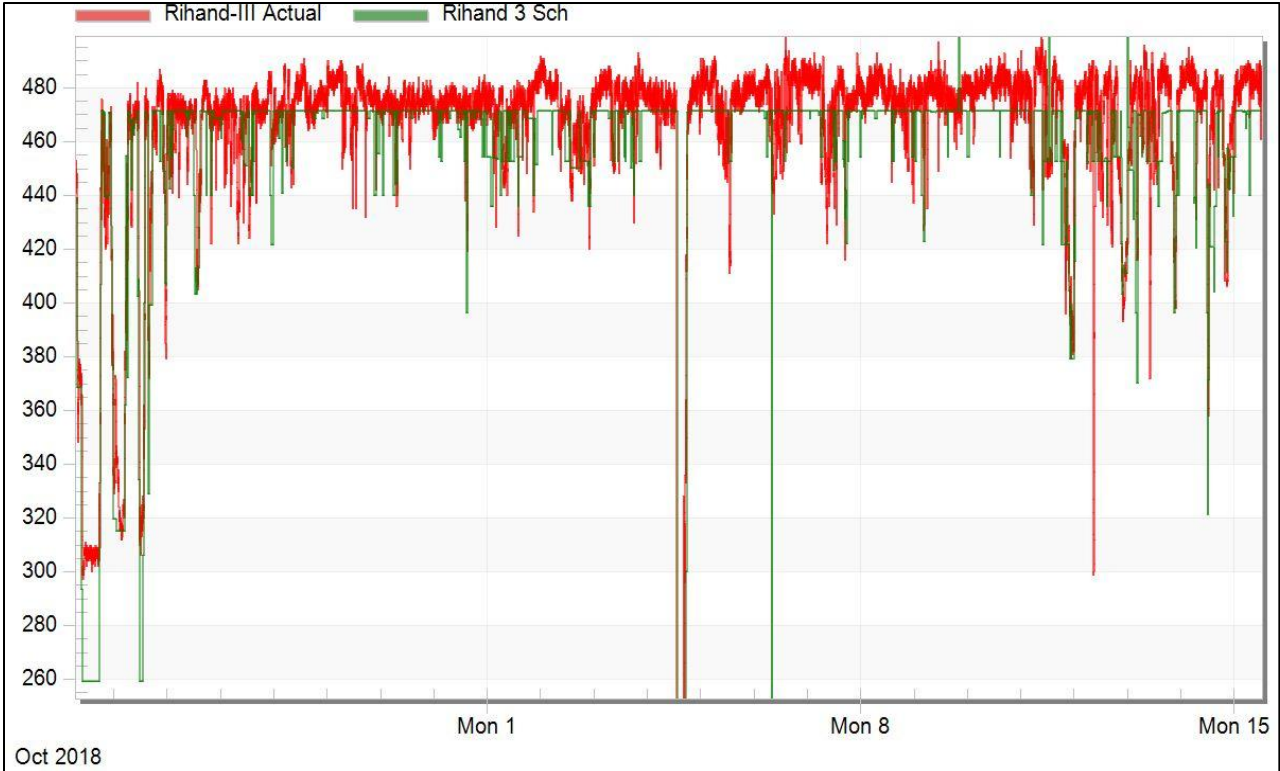
High Generation at Anpara complex

- N-1 non compliance of line evacuating from Anpara complex.
- Suggesting UP to shift some Generation to other nodes such as Lalitpur etc under security constraint merit order operation.

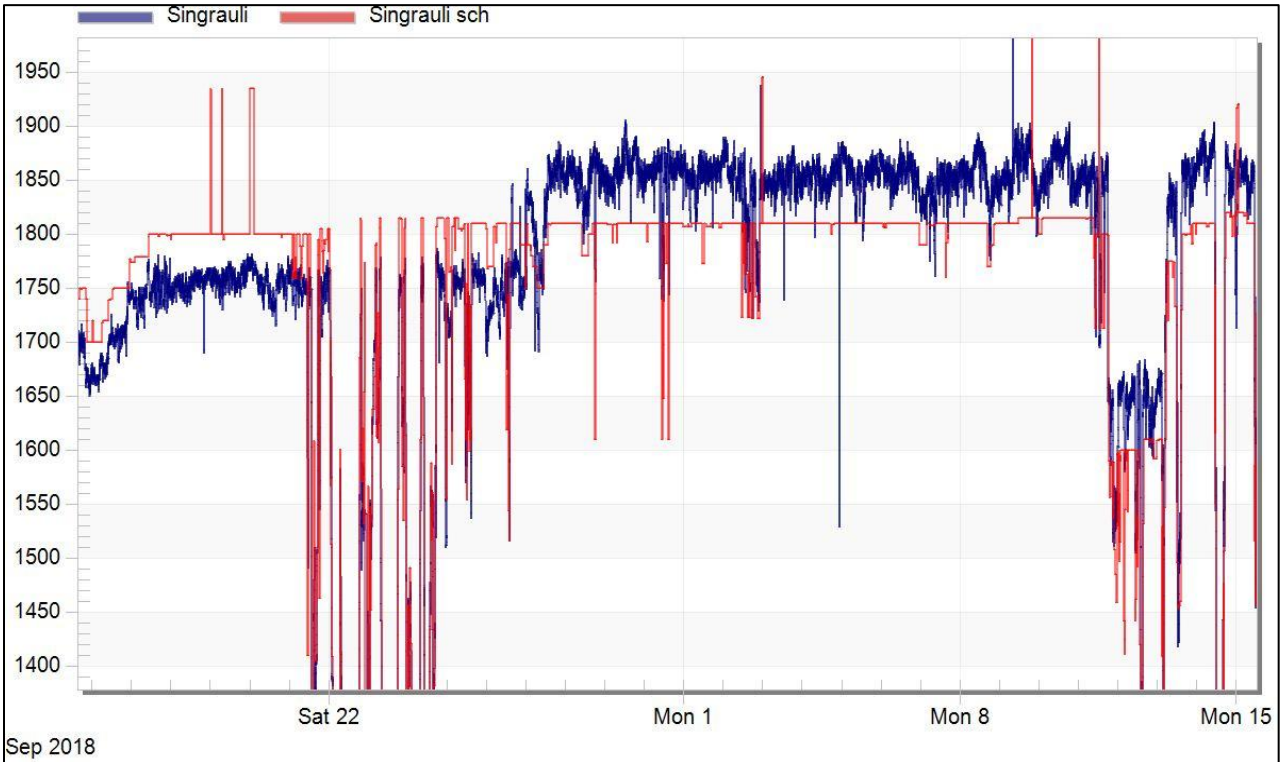


Under N-1 contingency of Anpara-Sarnath S/c, other ckt flow would reach 850-900MW (thermal limit of twin moose is 880 MVA)

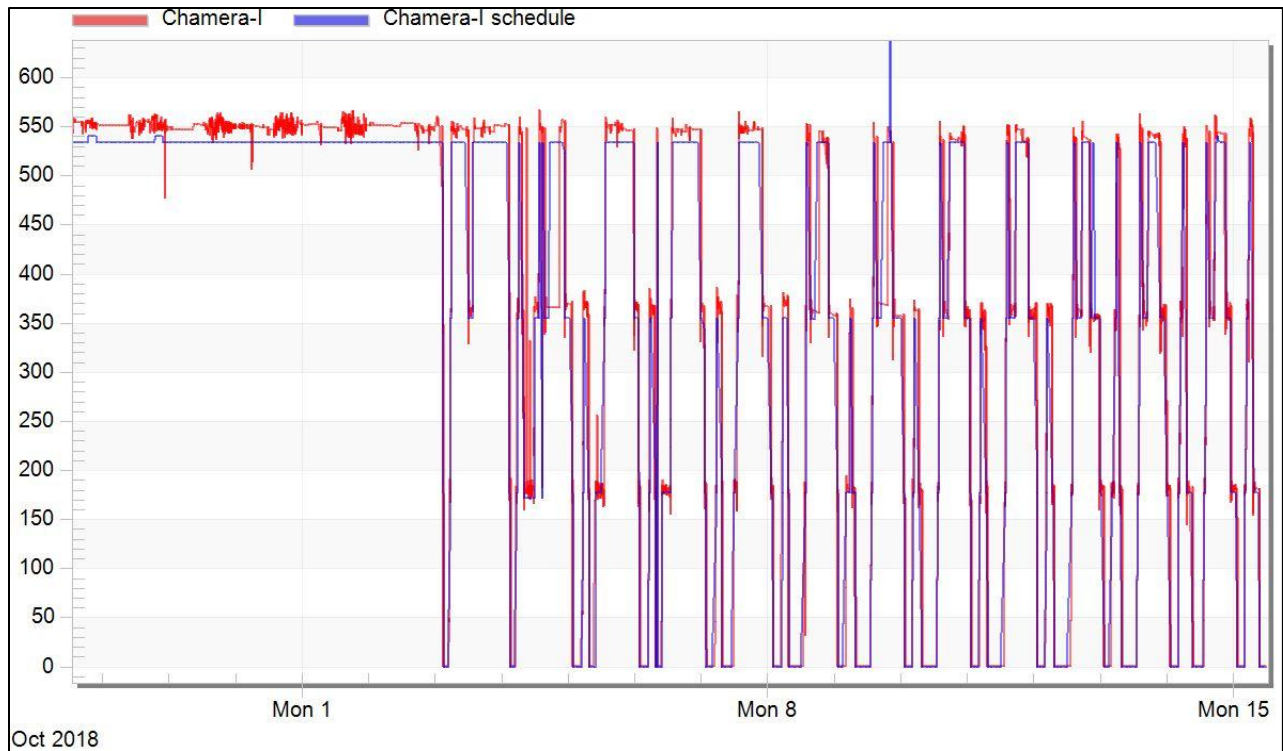




Rihand-III schdl v/s actual



Singrauli schdl v/s actual



Chamera-I schdl v/s actual

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.
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