सत्यमेव जयते

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

सं. उक्षेविस/ वाणिज्यिक/ 209/ आर पी सी (42 वीं)/2018/9181-9275 दिनाँक : 13 , August 2018
No. NRPC/ Comml/ 209/ RPC (42nd)/2018/ Dated: 13 , August, 2018

सेवा में / To,

उ.क्षे.वि.स. के सभी सदस्य
Members of NRPC/TCC

विषय: उत्तर क्षेत्रीय विद्युत समिति की 42 वीं तथा तकनीकी समन्वय उप-समिति की 39 वीं बैठक का कार्यवृत्त ।

Subject: 42nd meeting of Northern Regional Power Committee and 39th meeting of TCC – Minutes.

महोदय / Sir,

उत्तरी क्षेत्रीय विद्युत समिति की 42 वीं बैठक दिनांक 28 जून, 2018 को तथा तकनीकी समन्वय उप-समिति की 39 वीं बैठक दिनांक 27 जून, 2018 को होटल टिम्बर हॉल, परवानू, सोलन, हिमाचल प्रदेश में आयोजित की गयी थी । इन बैठकों के कार्यवृत की एक प्रति आपकी सूचना व आवश्यक कार्यवाही हेतु इस पत्र के साथ संलग्न है।

The 42nd meeting of Northern Regional Power Committee was held on 28th June, 2018 and 39th meeting of TCC was held on 27th June, 2018 at Hotel Timber Hall, Parwanoo, Solan, Himachal Pradesh. A copy of the minutes of the meetings is enclosed herewith for information and necessary action.

भवदीय/Yours faithfully,

(एम.ए.के.पी. सिंह)
(M.A.K.P. Singh)
सदस्य सचिव
Member Secretary

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List of NRPC Members

1. Sh. A. Venu Prasad, IAS, Chairperson NRPC and CMD, PSTCL, Patiala-147001, (Fax-0175-2307779)
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31. Director (Finance), NPCIL, Mumbai-400094, (Fax-022-25563350)
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43. Sh. Satish Jindal, Director and CEO (Trading), JSW Energy Ltd., New Delhi (Fax- 48178740)
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45. Sh. Anil Kumar Garg, General Manager(BD), AD Hydro Power Ltd., Noida-201301, (Fax: 0120-4323271/4278772)
46. Sh. C.N. Singh, COO, Talwandi Sabo Power Ltd. Distt: Mansa, Punjab-151302(Fax: 01659-248083)
47. Sh. R.S. Sharma, MD, Lalitpur Power generation Company Ltd., Noida-201301(Fax: 0120-4045100/555, 2543939/40)
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50. Prayagraj Power Generation Co. Ltd.
51. JSW Power Trading Company Ltd (Fax-01124115560)

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44. Sh. Harish Saran, ED (Marketing), PTC India Ltd., New Delhi (Fax- 011-41659144,41659145)
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उत्तर क्षेत्रीय विद्युत समिति

NORTHERN REGIONAL POWER COMMITTEE

MINUTES
OF
39th MEETING OF TECHNICAL COORDINATION SUB-COMMITTEE
&
42ndMEETING OF NORTHERN REGIONAL POWER COMMITTEE

The 39th meeting of Technical Coordination Sub-Committee (TCC) and 42nd meeting of Northern Regional Power Committee (NRPC) were held on 27th and 28th June,2018, respectively at Timber Trail, Parwanoo, Himachal Pradesh. The list of participants of the TCC and NRPC meetings is enclosed at **Annexure- I & II**, respectively.

P R O C E E D I N G S O F 3 9 t h M E E T I N G O F T C C

1. Chief General Manager, SJVNL, Sh. Romesh Kapoor welcomed all the members and other participants of TCC.
2. A short film covering information about SJVNL hydro generating stations, achievements, CSR activities was shown. The ventures of SJVNL in Wind and Solar power plants apart from hydro stations in Himachal Pradesh, Uttarakhand, Bihar and Gujarat in India as well as neighbouring countries viz. Nepal and Bhutan was highlighted.
3. Director (Electrical), SJVNL, Sh. Rakesh Kumar Bansal welcomed the participants. He thanked members of TCC to provide opportunity for hosting the TCC meeting. He emphasized the need for collective efforts to overcome the operational & Commercial issues to ensure supply of affordable and reliable power. He also suggested to adopt best practices by different utilities.
4. Member Secretary, NRPC, Sh. M. A. K. P. Singh welcomed the new Chairman, TCC and expressed hope that in his guidance the TCC would be able to resolve different operational & Commercial issues amicably. He informed that Sh. Ajay Kumar Kapur, Director (Tech.), PSTCL had taken over as Chairman, TCC for the year 2018-19.

5. He proposed following resolution in appreciation of the services rendered by Shri Asagar Ali Majaz, Development Commissioner, PDD J&K who had relinquished charge of Chairman, TCC after completion of his tenure on 31st March, 2018:

> "Technical Coordination Committee places on record its deep appreciation of the outstanding service rendered by Shri Asagar Ali Majaz, Development Commissioner, PDD J&K during his tenure as Chairman, TCC. Shri Asagar Ali Majaz, provided able guidance in various technical, commercial & administrative matters and made valuable contribution as Chairman of the Committee."

6. TCC adopted the resolution and placed on record its appreciation of the outstanding services rendered by Shri. Asagar Ali Majaz during his tenure as Chairman, TCC.
7. Chairman, TCC welcomed all the delegates attending the 39th TCC meeting and thanked SJVNL for hosting the meeting and making a nice comfortable stay arrangement for delegates.
8. He expressed satisfaction that during summer season Northern Region had been successful in meeting demand without any significant event affecting grid security, despite several incidents of thunder storm and failure of towers leading to long outages of some very important transmission lines. He mentioned that initial months of summer are very critical for grid security due to frequent thunderstorm resulting in a large number of sudden tripping of lines, large quantum of load throw off and incidents of tower failures in high capacity lines e.g. 765 and 400 kV lines. He urged all the DISCOMS and SLDCs to put all out efforts to minimize sudden load throw off as well as connecting of large blocks of load at a time. He cautioned that this practice makes grid operation very critical, which may lead to security threat for the grid. He stated that the issue of sudden connection and disconnection of load by DISCOMS had been under discussion in NRPC forum and MoP, since long, without much success. He called for immediate action for identifying loads which can remain connected during thunderstorm/rain etc. to avoid large sudden load variation. He also requested for taking steps for staggering of load, especially the agricultural load to avoid sudden variation of load in large quantum, which is violation of Indian Electricity Grid Code in normal day to day operation.
9. He emphasized the need to take immediate steps like review of design of 765 kV towers, strengthening of towers after vetting of modified design by an expert agency,

procurement of ERS and advance planning to handle the incidents of tower failure to avoid long outages of transmission elements. He mentioned that outages of transmission elements not only weaken the power system reliability but also many times causes adverse financial implications to power procuring agencies due to less flexibility in procuring power from cheaper sources on account of transmission system constraints.

10. Chairman, TCC, further stated that the hydro generation during current summer season had been significantly less as compared to last year, resulting in extra pressure on thermal generation. He highlighted issue of Coal availability, which is very vital for optimization of Coal based generation in view of depleting gas availability. He urged all the thermal generating stations to make efforts to arrange sufficient Coal stock for enhancing generation during paddy season. While mentioning the likely demand in NR more than 62000 MW during monsoon period, he urged all the generating stations to prepare themselves with adequate coal availability and strategy for minimizing generation loss in hydro stations especially outages due to silt. He suggested to ensure availability of adequate number of State sector/IPP generating machines with required reserves within the States. He also requested all the transmission utilities to take immediate steps for optimizing the availability of transmission system specially the inter-regional corridors to facilitate import of power by NR during high demand period.
11. Citing example of 21st June,2018, when the frequency was below 49.9 Hz. for 33% of time, Chairman, TCC, expressed concern about sustained overdrawal from grid by some utilities during last few months resulting in low frequency. He highlighted the fact that this low frequency prevalence in NR grid was in spite of frequent ancillary services support and requested all the SLDCs and Distribution Companies to improve load & generation forecasting and schedule power judiciously to economise overall cost of power as well as to ensure safe & reliable operation of power system.
12. While emphasizing the importance of the SCADA & telemetry systems as Eye & Ear of the power system, Chairman, TCC expressed concern about nonreliability of communication and telemetry system in NR. He stated that the crucial decisions of real time Grid operation are taken on the basis of information from this system only. He added that non-availability of complete and correct information may result in wrong decision resulting in compromise in grid safety as well as in financial

repercussions. He called for more concerted efforts to ensure the reliable telemetry, keeping in view it's operational as well as commercial importance.

13. He appreciated the action of NRPC secretariat for creating a system for protection data base and analytical tools, which would help in maintaining a healthy protection system. He suggested that many steps like audit & upgradation of protection system, training of the protection personnel etc. should be taken by state utilities. is required. While mentioning level-3 training program on protection organized by NRPC Sectt. as commendable action he advised State utilities to organize level-1 program for their protection personnel as agreed in NRPC. He also urged all the utilities to complete the activities for operational planning during ensuing monsoon period
14. He once again thanked all the members and other participants for sparing time to the mega event and urged all for fruitful discussions, which would facilitate safe, reliable and economic operation of NR power system.
15. Ex-Chairman, TCC, Sh. Asagar Ali Majaz, welcomed the TCC members and other participants. He thanked SJVNL for hosting the meeting and appreciated the hospitality & stay arrangement.
16. Member Secretary, NRPC welcomed the members and other participants. He informed that under the National Level Data Registry system all the existing and upcoming electricity generating units of the country of capacity 0.5 MW and above would have to get registered with CEA and get a unique registration from CEA. He added that for this purpose a detailed framework was prepared by CEA, which had been approved by MoP, GoI. He further intimated that after completion of e-registration Portal for National Level Data Registry System, all the stakeholders would be informed by CEA for registering and feeding the data.
17. He mentioned about the recent amendment, vide OM dated 15.06.2018 in methodology issued by MoP, for use of coal by State in Private Generating Stations (IPPs) under case-4 "Flexibility of Coal in IPPs station" and requested all the concerned utilities to ensure coal availability in coming peak season.
18. Member Secretary, NRPC highlighted the importance of flexibilization of existing coal fired power plants to ensure security, reliability and stability of electricity grids while maximizing integration of power from renewable energy sources into grid. He informed that a special Task Force under the chairmanship of Director (Operations), NTPC constituted under IGEF Sub Group for enhancing the Flexibilization of existing coal fired power plants has recommended for implementation of measures for

50%, 40% and 25% minimum load in thermal power stations including Central & State utilities and IPPs. He mentioned that action plan for implementation of the recommendations was being discussed in CEA.

19. He also mentioned the decision regarding some flexibility in Generation and scheduling of Thermal Power Stations so that DISCOMS are able to meet their RPO without facing any additional financial burden.
20. MS, NRPC congratulated NHPC for commissioning of 3X110 MW, Kishanaganga HEP in May,18. He added that after commissioning of Kishanganga HEP generation at Uri & Uri II power station would be increased by 41.2 MU.
21. He informed that POSOCO had carried out operational analysis of various hydro stations in the country and observed that out of 40.6 GW of peaking hydro capacity, only about 33 GW peak generations could be obtained on all India basis. He further stated that a committee, constituted by the MoP under Chairperson, CEA had recommended for harnessing about 2000 MW additional power generation from hydro stations during peak hours. He suggested that the matter of utilization of hydro stations in peaking mode may be discussed at the monthly OCC meetings while discussing operational planning for the month ahead and analyzing the operation in the previous month.
22. Regarding incentives to TPPS for early installation of pollution control equipment Member Secretary suggested that various options including Priority in scheduling, exemption in Excise & Customs duty/GST, relaxation in 30% equity norms, utilization of NCEF collected coal cess and reduction in Coal Cess for environmentally complaint TPPs may be discussed. He emphasized that environmental norms are to be complied for which ways and means are to explored by all the stakeholders.
23. He also advised all the generators having black start capability to carry out regular black start mock drill and give regular feedback to NRPC/ NRLDC/ NLDC for updations of black start procedure.
24. He informed the TCC about various other initiatives e.g. review of Targets fixed for Load Relief from operation of df/dt & UFR relays in NR region and Cyber Security Preparedness Monitoring etc.
25. He again thanked SJVNL for hosting and excellent arrangement for the meeting.

PROCEEDINGS OF 42nd MEETING OF NRPC

1. Director (Electrical), SJVNL, Sh. Rakesh Kumar Bansal welcomed members of NRPC and other participants.
2. Member Secretary, NRPC welcomed all the NRPC members and other participants. He especially welcomed Shri. A. Venu Prasad, CMD, PSTCL and Principal Secretary, Govt. of Punjab, who has taken over as Chairperson, NRPC for the period of 2018-19. He informed that Shri. Hirdesh Kumar, Commissioner and Secretary, PDD, Govt. of J&K had relinquished charge of Chairperson, NRPC after completion of his tenure on 31st March, 2018. On behalf of NRPC he proposed a resolution as given below in appreciation of the services rendered by Shri. Hirdesh Kumar:

   "Northern Regional Power Committee places on record its deep appreciation of the outstanding service rendered by Shri Hirdesh Kumar, Commissioner and Secretary, PDD, Govt. of J&K during his tenure as Chairperson, NRPC. Shri Hirdesh Kumar, provided able guidance in various technical, commercial & administrative matters and made valuable contribution as Chairperson of the Committee."

   Members adopted above resolution.

3. Chairperson, NRPC, Sh. A. Venu Prasad, welcomed the members of the Northern Regional Power Committee and other delegates of 42nd meeting of NRPC.
4. He urged that decisions taken in TCC on the issues related to operational and commercial aspects of Northern Regional Power System should be implemented in letter & spirit, in a time bound manner.
5. While expressing satisfaction about success fully meeting the peak load in summer season he emphasized the need for more effort to bring economy, reliability and quality in supplying power to consumers. Citing example of anticipated increase in demand of Punjab crossing 12300 MW from 11700 MW in previous year, he called for immediate, coordinated and collective action by all the utilities to meet increasing demand of power with quality & economy. He mentioned that consumer's expectation from the power utilities are increasing and accordingly 24X7 power to all category of consumers should be achieved. He stated that optimization of cost of power along with ensuring 24X7 power supply to all category of consumers is a challenge for State utilities. While mentioning the power purchase cost by Punjab as Rs. 25000 Cr. he

suggested to save this cost by better planning with improvement in forecasting and scheduling.

6. While highlighting the mandate to NRPC to deliberate upon and evolve consensus on the matters concerning the stable & smooth operation of the integrated grid as well as economy & efficiency in the operation of the power system in Northern Region, he stated that efforts should be made to fulfil this mandate. He mentioned that time has changed. He stated that few years ago, main concern was to minimize power cuts now focus has been shifted to economy and quality of power supply. He added that earlier safety & reliability of grid operation was the main concern for power system personnel but, after achieving this goal, to a large extent, successfully, these days, improvement in efficiency and economy are main issues.
7. He also stressed on ensuring safety of personnel as well as power system, while striving for achieving commercial goals. He stated that the commercial and technical aspects should be seen together in larger perspective for enabling sustainable growth of power sector. He suggested that the commercial interest of the individual utility must be seen but at the same time the collective responsibility for smooth operation of the grid must be kept in mind.
8. Chairperson, NRPC expressed concern on issues of Coal availability and outage of Hydro generators due to silt. He called for cohesive efforts by all the players including Coal Companies, Railways, generators etc.
9. While appreciating the reduction in cost of power from renewables, citing example of Rs. 2.52 per unit wind power purchased by Punjab, he alerted the power sector community about new challenges in managing integration of renewable on large scale into the grid. He suggested to be prepared to adopt new ways and means like Automatic Generation Control (AGC), flexing of Coal based generation, optimization of hydro and gas based generation for meeting peak loads, demand response, storage facilities, latest forecasting techniques etc. to manage the large quantum of renewable power.
10. While emphasizing the need for availability of proper, communication and telemetry facilities he mentioned that strict actionlike denial of charging/shutdown by Load Dispatch Centers is required to be taken.
11. Chairperson, NRPC had also mentioned the major changes in scheduling, metering and accounting in form of 5 minute time block instead of present 15 minute time block, which would be reality very soon. He suggested the generating especially

hydro utilities to gear up for reliable generation forecasting and the load serving utilities & Load Despatch Centers to improve the load forecasting by using latest technologies to enable fast decision making. He called for immediate action for using latest technologies for keeping pace with changing scenario.

12. He stated that availability of adequate and trained man power in power sector organizations is another major challenge. He mentioned that there had been efforts for training and certification for manpower in specific areas of power sector, but almost all the utilities are facing manpower crunch. He added that with ever increasing technical as well as financial and commercial complexities in power sector all agencies in power sector should take immediate steps to hire adequate manpower and train them. He appreciated the steps taken by NRPC sectt. for skill development by organizing several training courses and suggested to organize more of such training courses in future also, so that power sector personnel remain updated with current technology and best practices.
13. He opined that with increasing complexity the conflicts are bound to happen. He urged all the members to utilize NRPC forum, as a platform for resolving issues amicably and for reducing litigations, for benefit of all.
14. He thanked SJVNL and their officers for the efforts put by them in hosting the meeting and for excellent arrangements for the comfortable stay of the participants.
15. Member Secretary, NRPC thanked SJVNL for hosting the meeting and excellent arrangement for stay.

C O N F I R M A T I O N O F M I N U T E S (T C C)

A.1 Minutes of 38th meeting of TCC

Minutes of 38th meeting of TCC held on 27thFebruary, 2018, were circulated vide letter No. NRPC/Comml/209/RPC(41st)/2018/4182-4276 dated 11thApril, 2018. Received one comment from PTCUL for status updation of reactors at Srinagar and Kashipur substations, MS, NRPC stated that the minutes records only the statements and information provided during the meeting. As the comments of PTCUL pertain to the information furnished after the meeting, vide e-mail, there was no need of amendment in the minutes.

Members confirmed the minutes without any amendment.

C O N F I R M A T I O N O F M I N U T E S (N R P C)

A.2 Minutes of 41st meeting of NRPC

Minutes of 41st meeting of NRPC held on 28thFebruary, 2018, were circulated vide letter No. NRPC/Comml/209/RPC(41st)/2018/4182-4276 dated 11th April, 2018. Received one comment from PTCUL for status updation of reactors at Srinagar and Kashipur substations, MS, NRPC stated that the minutes records only the statements and information provided during the meeting. As the comments of PTCUL pertain to the information furnished after the meeting, vide e-mail, there was no need of amendment in the minutes.

Members confirmed the minutes without any amendment.

B. OPERATIONAL ISSUES

B.1 Revised System Protection Scheme (SPS) for 765 kV Agra-Gwalior line.

TCC Deliberation

B.1.1 MS, NRPC informed the committee that there were 2 issues involved in the implementation of revised System Protection Scheme (SPS) for 765 kV Agra-Gwalior line 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.

B.1.2 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.

B.1.3 POWERGRID representative informed that the material has been received at the site and for 2 locations viz. Dadri and Bhiwadi the scheme was almost complete. Regarding other locations which are 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).

B.1.4 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.

B.1.5 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.

B.1.6 MS, NRPC requested POWERGRID to go ahead with the decision of NRPC of the 41st meeting 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 not to cause any further delay in the implementation of the scheme, as such delay may lead to some unforeseen catastrophic incident in the grid.

B.1.7 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.

B.1.8 TCC advised POWERGRID to go ahead as per the decision of NRPC and complete the scheme in time.

NRPC Deliberation

B.1.9 NRPC concurred with the decisions of TCC.

B.2 System Study for Capacitor Requirement in NR for the year 2019-20.

TCC Deliberation

B.2.1 MS, NRPC informed the committee that as per the decision of 38th TCC and 41st NRPC meeting, the study for capacitor requirement in NR for the year 2019-20 has been decided to be conducted in two stages:

a) One at 220/132 kV level
b) Subsequently, down to 11/33 kV level

B.2.2 He further informed that after negotiation, CPRI has revised their Techno commercial offer to Rs. 32 Lakhs only (excluding Taxes) for the study for 2019-20 including charges for the study conducted for the period 2017-18. OCC had given their in-principle approval to the revised Techno commercial offer of CPRI at Rs. 32 Lakhs only (excluding Taxes). Copy of Techno commercial offer of CPRI is placed at ***Annexure- III.***

B.2.3 TCC recommended for the approval of NRPC for acceptaning the revised techno commercial offer of CPRI for capacitor requirement in NR study at the cost of Rs. 32 Lakhs only (excluding Taxes).

B.2.4 Representative of HPSEB stated that as this activity would involve huge task of data collection at the DISCOM level, some nodal officers shall be appointed by each DISCOM so as to ensure timely submission of data by the DISCOMS. He further stated that the details of already installed capacitor and their present condition shall also be incorporated in the data.

B.2.5 MS, NRPC informed the members that the format for submission of data was available on NRPC website (https://bit.ly/2zcIwLU) and requested the utilities to furnish the same within a month by 31st July 2018. Each utility would also be required to send their representative to CPRI, Bengaluru to validate the data for their control areas which would be used by CPRI in figuring out the requirement of the capacitor.

B.2.6 He further informed that CPRI had been provided with a completion schedule of 06 months for the study from the time of submission of the data by all the utilities and thereby it was the responsibility of the utilities to furnish the data within stipulated time so that the study may be completed in time.

B.2.7 MS, NRPC further informed the committee that based on the study conducted by CPRI for capacitor requirement of NR for 2017-18, NRPC had approved the proposal of installation of capacitor by some states through PSDF funding. However, due to the want of some clarifications by the Techno-economic Sub Group of PSDF, the proposal for PSDF funding was pending. He requested the concerned States to kindly furnish the clarifications sought by the TESG of PSDF for the funding expeditiously. (Refer details in **Agenda item No. B.2.7**)

B.2.8 PSTCL representative stated that they had submitted a proposal for capacitor installation for PSDF funding in 2015. Even though the requirement in the study conducted by CPRI was far greater than that proposed by PSTCL in their proposal, still they had not been allowed the funding for the same. He stated that based on the study conducted by CPRI, TESG of PSDF should have allowed them funding for capacitor installation.

B.2.9 Representative of NLDC as a member of TESG clarified that even after the submission of the report by CPRI, there were certain clarifications sought from the utilities which have not been furnished till date and the funding approval was pending due to the want of these clarifications. TESG committee was examining the proposal of utilities and once the clarifications are submitted to the committee, the decision regarding the funding will be finalized.

B.2.10 Representative of GM Division, CEA advised to incorporate the effect of the upcoming solar rooftop in the study to ascertain the requirement of capacitor in NR.

B.2.11 MS, NRPC also informed that SRPC has developed a python based algorithm to translate the capacitor requirement from 220/132 kV level to 11/33 kV.

B.2.12 TCC recommended NLDC to hold a separate meeting with the constituents to clarify issues related to PSDF funding for capacitor installations at the earliest.

NRPC Deliberation

B.2.13 NRPC concurred with the decisions of TCC.

B.3 Reactive compensation at 220/400 kV level.

TCC Deliberation

B.3.1 MS, NRPC apprised the forum that in view of the persisting high voltage conditions at Kurukshetra, 500 MVAr TCR was approved by Standing Committee and thereafter by NRPC. As the commissioning of TCR would take time, he informed that POWERGRID was installing an 80 MVAr and 125 MVAr reactor at Kurukshetra as a temporary measure to provide voltage relief.

B.3.2 Representative of POWERGRID informed that bids for 500 MVAr TCR to be commissioned at Kurukshetra have been opened and the LOA is expected to be placed by August 2018 with commissioning schedule of 2 years from the date of

award. Regarding 80 MVAr reactor, he stated that it is a filter bank reactor of Pole 3. The reactor has already been commissioned.

B.3.3 Regarding 125 MVAr reactor, POWERGRID informed that it is a spare regional reactor and its shifting from Manesar, commissioning and foundation laying cost would come out around **Rs. 60-70 lakhs**. The reactor would be commissioned by **August 2018**.

B.3.4 On the query of NLDC, POWERGRID representative informed that the Pole 3 and Pole 4 of Champa Kurukshetra HVDC link were scheduled to be commissioned by Dec`18 and Mar`19 respectively.

B.3.5 MS, NRPC informed the committee that a meeting was held at HVDC Kurukshetra to discuss the issue of frequent tripping of Pole 1 & 2 of Champa-Kurukshetra HVDC. In the meeting, POWERGRID informed that main cause for frequent tripping was software. He further informed the committee that as per POWERGRID submission in the meeting, the software was initially designed for simultaneous commissioning of both Pole 1 & 2, but as both the poles had some time gap between their commissioning, the software was modified to cater for single pole operation which might have led to such glitches.

B.3.6 Members felt that COD in this case should be declared after 06 months of operation in grid similar to some thermal plants as some tests in HVDC system are also to be done after commissioning.

B.3.7 POWERGRID was requested to get the final version of the software from the OEM which would lead to stabilized operation of Pole 1 & 2. They were also requested to submit a detailed study report about the software issues and other issues like random power order change due to TOVC, adequate loading of AC lines, No. of filter banks required for effective operation of link, Limit of RVO mode operation of link, VESDA operation, CLD protection maloperation, auxiliary supply failure, communication failure etc.

B.3.8 Citing the frequent tripping of Pole 1 & 2, POWERGRID was advised to commission Pole 3 & 4 simultaneously so as to avoid the situation which may require any modification in the software.

B.3.9 MS, NRPC informed that as per the action plan submitted by Delhi *(Annexure-B 3.3 of the Agenda)* they are going forward with installation of reactor at 6 No. of 220 kV substations and 1 No. of 400 kV (Mundka S/s) where space is available and have committed to make all possible steps to install all the approved reactors before winter of year 2020.

B.3.10 PTCUL representative informed that 125 MVAr reactor at Kashipur was under tendering stage and the final commissioning was expected to be completed by March 2019 and 80 MVAr reactor at Srinagar has been received at site and shall be commissioned by 10th July 2018.

B.3.11 Representative of Rajasthan informed that proposal for approval of 1x25 MVAr (at 220 kV level) reactors each at Suratgarh, Akal & Bikaner have been submitted for PSDF funding.

B.3.12 MS, NRPC informed that in 148th OCC meeting, Rajasthan had submitted a copy of letter which was a proposal for renewable energy integration-Reactive compensation

elements/equipments for reactive power management and voltage control for transmission grid under smart transmission network and asset management system for approval of CEA. The above reactors are also covered under this proposal.

B.3.13 Representative of PSTCL informed that the proposal for procurement of reactors has been submitted for PSDF funding and the Tender for the same is under technical evaluation.

NRPC Deliberation

B.3.14 Representative of POWERGRID apprised the committee that this ±800 kV Champa Kurukshetra HVDC was a new technology with dedicated metalliuc return first in the world at ±800 kV level and prior to its commissioning all the checks and tests were completed. He agreed with the frequent problems being encountered in the HVDC link and submitted that POWERGRID is committed to rectify each and every problem at the earliest so as to ensure stabilized operation of the link for safe and secure grid operation.

B.3.15 POWERGRID proposed to the committee that in view of frequent tripping of the poles and the danger to the grid due to sudden jerk which is caused by sudden outage of the poles, POWERGRID may be allowed to operate the poles at reduced power flow so that the impact of the jerk on the grid may be reduced.

B.3.16 Chairperson, NRPC stated that PGCIL being the largest transmission utility of the nation was being looked up to by all the state utilities and other transmission utilities. In order to live up to its name POWERGRID needs to ensure a robust and reliable network and shall take all the measures so as to stabilize the operation of Champa-Kurukshetra HVDC link. The proposal of operation at reduced power flow should be deliberated in detail at PSC level before reaching at any decision.

B.3.17 NRPC concurred with the deliberations of TCC and directed POWERGRID to take all possible steps to stabilize operation of Pole 1 and Pole 2 and ensure that the same issue do not arise after the COD of Pole 3 & 4..

B.4 Creation and maintenance of web based Protection Database Management and PC based Protection setting calculation tool for Northern Region Power System Network.

TCC Deliberations

B.4.1 MS, NRPC informed that the Monitoring Committee of PSDF has approved the proposal of NRPC for Protection Database Management System but the MoM of the Monitoring Committee is still awaited.

B.4.2 He further informed the committee that e-tendering process for Creation and maintenance of web based Protection Database Management and PC based Protection setting calculation tool for Northern Region Power System Network will be initiated on the receipt of MoM of Monitoring Committee.

B.4.3 Members noted the information.

NRPC Deliberations

B.4.4 MS, NRPC informed the committee that already PSDF funding has been approved for two Protection Database management projects of SRPC and ERPC. In line with the above, NRPC has approached for the PSDF Funding for Protection Database management project of NR.

B.4.5 He further informed the committee Monitoring Committee has approved the Protection Database Management System proposal and e-tendering process will be initiated on the receipt of MoM of Monitoring Committee.

B.4.6 The project timeline is of 18 months with 5 year support period preceded with one year defect liability period. He informed that modeling and data collection would be done up to 132 kV level for Uttarakhand , Himachal Pradesh and Jammu and Kashmir and up to 220 kV level for all other states of the region. Utilities will be provided with licenses so that studies can be carried out by them.

B.4.7 Members noted the information.

B.5 Downstream network by State Utilities from ISTS Stations (Agenda by POWERGRID)

B.5.1 Augmentation of transformation capacity in various existing substations as well as addition of new substations along with line bays for downstream network are under implementation at various locations in Northern Region. For utilization of these transformation capacities, implementation of downstream 220kV system needs to be commissioned:

S. No.	Substation	Downstream network requirement	Schedule	Planned system and Implementation Status
1	400/220 kV, 3x315 MVA Samba	2 nos. bays utilized under ISTS. Balance 4 Nos to be utilized	Commissioned	LILO of 220kV Bishnha – Hiranagar D/c line : **under tendering** (PMDP) (status as available with CEA) Anticipated – Nov'19 Status as updated by J&KPDD in 38th TCC/ 41st NRPC: LoA has been issued and Material has reached the site. Targeted Completion – Nov 2018
2	400/220kV , 2x315 MVA New Wanpoh	6 Nos. of 220 kV bays to be utilized	Commissioned	220kV New Wanpoh –Mirbazar D/c line: **under tendering (PMDP)** 220 kV Alusteng- New Wanpoh line Targeted Completion – Nov 2018 Anticipated – Nov'19
3	400/220kV , 2x315	2 Nos. of 220 kV bays to be	Commissioned	220kV Charor- Banala D/c line (18km) : **under construction**

S. No.	Substation	Downstream network requirement	Schedule	Planned system and Implementation Status
	MVA Parbati Pooling Station	utilized.		Targeted Completion- Oct'17 Anticipated – Aug'18
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	8 nos. of 220 kV bays to be utilized	Commissioned	LILO of one circuit of Kaul-Pehowa 220kV D/c line LILO of one circuit of Kaul-Bastara 220kV D/c line Work awarded with contractual completion date 02/01/2018. Target Completion-Mar'19
5	400/220kV, 2x500 MVA Bagpat GIS	3 nos. of 220 kV d/s lines to Shamli, Muradnagar and Bagpat commissioned. Balance 5 Nos. of bays to be utilized	Commissioned	Bagpat- Baraut 220kV S/c Line LILO of 220kV Muradnagar II - Baghpat (PG) at Baghpat UP Bagpat(PG)-Modipuram New 220kV D/c-exp. by Oct.18
6	400/220 kV, 2x315 MVA Saharanpur	2 nos. 220 kV downstream lines commissioned. (Saharanpur (UP) and Nanauta) Balance 4 Nos. of 220 kV bays to be utilized	Commissioned	Saharanpur(PG)-Sarsawa (new) 220kV D/c Target Completion – Apr'18
7	400/220kV, 2x315 MVA Dehradun	Out of 6 bays, only two bays used. Balance 4 bays to be utilised.	Commissioned	02 bays for Yamuna Basin (Mori substation) 2 bays for proposed S/s at Selakui
8	400/220 kV, 2x315 MVA Sohawal	6 Nos 220 kV bays to be utilized.	Commissioned	2 nos of bays utilized for Sohawal 220kV UP. 2 nos for Barabanki 220 kV s/s **Commissioned April 2018** 2 nos of bay of utilized for 220kV

S. No.	Substation	Downstream network requirement	Schedule	Planned system and Implementation Status
				New Tanda-Sohawal line and expected to be completed by April -2018.
9	Shahjahanpur, 2x315 MVA 400/220 kV	Partially utilized. Balance 5 Nos. of 220 kV bays to be utilized.	Commissioned	One bay used for 220 kV Shahjahnpur-Hardoi line commissioned. 2 no of bays for 220kV Shahjahnpur - Azimpur D/c line
10	Moga	Partially utilized. Balance 2 nos. of 220kV bays to be utilized.	Commissioned	**Moga–Mehalkalan 220kV D/c line** Work completed. Approval from NGT for tree cutting is awaited.
11	Hamirpur 400/220 kV 2x 315 MVA Sub-station (Augmentation by 3x105 MVA ICT)	04 nos. 220 kV downstream lines commissioned under ISTS. Balance two bays to be utilised by HPSEBL	Sep'18	2x220 kV bays to be utilized for connecting 220/132kV Kangoo substation of HPSEBL by 220 kV Kangoo-Hamirpur D/c line.
12	Kaithal 400/220 kV 1x 315 MVA Sub-station	July 2017 (Shifting of Transformer from Ballabhgarh).	Commissioned	220kV Kaithal(PG)- Neemwala D/c line - Work awarded on 25.10.2016. Tentative completion date is 23.05.2018. Contract cancelled, **retendering under process** 220kV S/s Neemwala-Tenders opened for NIT dated 23.05.2016. Tender enquiry under process
13	Sikar 400/220kV, 1x 315 MVA S/s	2 Nos. of 220 kV bays	Commissioned	-

S. No.	Substation	Downstream network requirement	Schedule	Planned system and Implementation Status
14	400/220kV Kota Sub-station (1 No. of 400 kV Bay)		Commissioned for Anta-Kota 400 kV S/c line of RRVPNL	Work order has been awarded to M/s GE and expected to be completed by March-18 **RRVPNL to update.**
15	Bhiwani 400/220kV S/s	6 nos. of 220kV bays	Commissioned	-
16	Jind 400/220kV S/s	6 nos. of 220kV bays	Commissioned	-

B.5.2 **Establishment of new 400/220kV substations in Northern Region:**

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States
1	400/220kV Dwarka-I GIS	4x 500	Oct'18	**DTL may update.**
2	400/220kVTughlakabadGIS	4x 500	Oct'18	
3	220/66kV Chandigarh GIS	2x160	Feb'19	Out of 8 nos. of 66kV bays 6 no. of bays shall be utilized as per the timeline given by POWERGRID.
4	400/220kV Jauljivi GIS	2x315	December 2019	2 bays for 220kV AlmoraJauljibi line 2 bays for 220kV Brammah-Jauljibi line
5	400/220kV Sohna Road GIS	2x500	May'19 (Under TBCB) (8 bays)	-
6	400/220kV Prithla GIS	2x500	May'19 (Under TBCB) (8 bays)	Two nos. of 220kV bays for Prithla(400)-Prithla (HVPNL) 220kV D/c line Four nos. of 220kV bays for LILO of existing 220kV Palwal–

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States
				RangalaRajpur D/c line at Prithla (400) (FY 2019-20) Two nos. of 220kV bays for 220kV Prithla (400)–Sector-78, Faridabad S/s D/c (FY-2020-21)
7	400/220kV Kadarpur GIS	2x500	May'19 (Under TBCB) (8 bays)	
8	400/220kV Kala Amb GIS	7*105	Commissioned (Jul'17)	HPSEBL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s. Details for remaining 4 nos. of line bays may be provided. .
9	400/220kV Amargarh GIS	7X105	Oct'18 (Under TBCB) (Sterlite Grid planning to prepone)	JKPDD to confirm for LILO of 220kV D/c Zainkote - Delina line at Amargarh. 20 ckm work completed June-18.

TCC Deliberation

B.5.3 Representative of HP informed the committee that they have filed a petition in CERC for consideration of those ISTS stations for which downstream network has not been constructed and are being utilized for system strengthening under PoC charges. It was informed that PGCIL also has filed reply wherein they have stated that they have no objection for recovery of charges through PoC mechanism. He further informed that all the utilities were respondent in the said petition which was listed for hearing on 5th July 2018. All the utilities were requested to furnish their reply in the said petition.

B.5.4 MS, NRPC requested all the utilities to update the status of their downstream network.

B.5.5 Members noted the information.

NRPC Deliberation

B.5.6 NRPC concurred with the deliberations of TCC.

B.6 LVRT compliance by wind generation

TCC Deliberation

B.6.1 MS, NRPC informed the committee that CERC in its order dated 05.01.2016 in Petition No. 420/MP/2014 directed that wind generators should comply with the provision of LVRT (Low Voltage Ride Through) and stated that in the 145th OCC meeting, representative of RVPNL informed about the office memorandum issued by MNRE ***(Annexure B.6 of the agenda).*** As per this OM WTG manufactures requires to obtain statement of Compliance (SoC)/Confirmatory Statement for demonstrating the compliance to applicable 'CEA Technical Standards for Connectivity to the Grid' for their WTG models which were unable to get LVRT compliance certificate from accredited testing agencies.

B.6.2 The said OM, stipulates that:

"Concerned WTG manufactures may apply for LVRT testing to any internationally accredited testing body or NIWE 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."

B.6.3 He highlighted that this OM covers only those manufacturers who have not been able to obtain statement of Compliance (SoC)/Confirmatory Statement for demonstrating the compliance to applicable 'CEA Technical Standards for Connectivity to the Grid' for their WTG models. It nowhere mentions about the wind turbine generators which have already been commissioned and have been in service.

B.6.4 It shall be the responsibility of the generating companies having the LVRT non-compliant turbines to take up with the OEM for LVRT for obtaining statement of compliance.

B.6.5 He stated that as per the OM, the manufacturer had to submit an affidavit before 15.03.2018 for the compliance with CEA Technical standards for connectivity to the grid by 31.03.2019 along with a bank guarantee of Rs. 1 Crore.

B.6.6 As per the OM, already commissioned wind generators should be either LVRT compliant or should have submitted affidavit by 15.03.2018 for compliance of 'CEA Technical Standards for Connectivity to the Grid' by 31.03.2019. The decision taken in 38th TCC & 41st NRPC meeting not to schedule all other LVRT non-compliant wind generators still holds. He further informed the committee that as per the decision of 41st NRPC meeting, Rajasthan had already issued a letter giving a one month notice to LVRT non-compliant wind generators.

B.6.7 He requested Rajasthan to implement the decision of NRPC of not scheduling such generators, as until and unless these generators were not commercially hit, the compliance to the regulations would not be ensured by them.

B.6.8 Representative of Rajasthan stated that a reminder letter stating the decision of NRPC has also been issued and a meeting is also scheduled to be held in 1st week of July 2018 in this regard with all the wind generators.

B.6.9 NLDC representative apprised the forum that the quantum of wind generators has picked up in recent times and such non compliance to the connectivity regulations may pose serious threat to the grid stability. In recent times there has been 3 incidents encountered which could have proved fatal for the grid because of these non-compliant wind generators. He informed that Andhra Pradesh and Gujarat have taken a decision and were not scheduling LVRT non-compliant wind generators.

B.6.10 TCC requested Rajasthan to take some strict measures and warned that only by writing letters and calling meeting the issue would not be resolved.

B.6.11 Rajasthan representative assured that some major decision would be taken in the coming meetings which was scheduled to be held in 1st week of July 2018.

B.6.12 MS, NRPC requested Rajasthan to give the details of the decision arrived at in the meeting in the upcoming OCC meeting.

NRPC Deliberation

B.6.13 NRPC concurred with the decisions of TCC.

B.7 Early commissioning of transmission lines (Agenda by POWERGRID)

TCC Deliberation

B.7.1 Representative of POWERGRID stated that the Inter-Regional System Strengthening WR-NR Part B consisting of the following elements have been implemented by POWERGRID

- 765 kV D/c Jabalpur Pooling station - Orai TL
- LILO of one circuit of 765 kV Satna-Gwalior TL at Orai Substation.
- 765kV D/C Orai-Aligarh Line
- 400kV D/C Orai-Orai (UPPTCL) line
- LILO of 765kV S/C Kanpur-Jhatikara Line at Aligarh.
- LILO of 765kV S/C Agra-Meerut Line at Aligarh
- Establishment of 765/400 kV Orai Substation.
- Extension of Substations and Line Reactors of the above line.

B.7.2 He informed that Jabalpur-Orai corridor is an important corridor and serves as an alternate to Agra-Gwalior corridor. It got commissioned on 1st April 2018. This line has helped the system by strengthening of the link between WR and NR. Since these elements have been commissioned before schedule, NRPC should approve for additional RoE.

B.7.3 In the 38th TCC & 41st NRPC meeting, in their presentation, as Grid operation NRLDC had requested POWERGRID to complete the work in time bound manner and not for early commissioning.

B.7.4 SE (C), NRPC informed the committee that as per the decision of 34th TCC and 38th NRPC meeting, no post facto approval for early commissioning of any element shall be given and had advised all Inter-state transmission licensees including POWERGRID to approach NRPC for such certification before Date of Commercial Operation (DoCO) of transmission element in accordance with the relevant regulatory provisions.

B.7.5 NRLDC representative informed that the commissioning of the said line has benefitted the system and has served as a very critical link between WR and NR during the outage of lines emanating from Agra end during severe thunderstorms.

B.7.6 Representative of all states except HP stated that additional ROE cannot be approved as prior ratification of NRPC was not taken which was an established procedure in NRPC and as per the decision of 38th NRPC no post-facto approval for early commissioning of any element can be given.

B.7.7 TCC decided not to recommend the early commissioning of the transmission system for payment of addition RoE, however, TCC appreciated the efforts of POWERGRID in early commissioning of these elements which has helped the system during collapse of many POWERGRID lines near by Agra HVDC s/s.

NRPC Deliberation

B.7.8 Representative of POWERGRID stated that even though there were some procedural issues which were missed but considering the importance of the transmission line and the extra efforts which were put in by POWERGRID so as to commission the line at the earliest before monsoon, additional RoE may be allowed to POWERGRID. He further stated that in case POWERGRID is not allowed additional RoE, they may approach CERC in this regard.

B.7.9 Chairperson, NRPC stated that it was the consumer who has to bear the ultimate charges and it may not be politically and economically feasible to pass on every cost to the consumers. Even though the commissioning of the line may have benefitted the system but because the states were not informed earlier and the approval of NRPC was not taken the issue shall now be settled with consensus among the members. Early commissioning by POWERGRID of the said transmission line was a very commendable job and the issue may be discussed in later meetings and approaching CERC may be avoided if consensus is reached.

B.8 Funding for the scheme "Provision of STATCOM at Nalagarh & Lucknow in Northern Region" (Agenda by POWERGRID)

TCC Deliberation

B.8.1 Representative of POWERGRID informed that earlier approved SVC in 2013 at Nalagarh & Lucknow substations of POWERGRID in Northern Region were changed as STATCOM in the 32nd Standing Committee meeting of NR and approved in 29th Northern Region Power Committee meeting. PSDF was not in existence at that time and therefore no proposal for PSDF funding was thought of by POWERGRID.

B.8.2 Subsequently, for the benefit of the constituent, POWERGRID in January 2016 approached for PSDF funding and the same was brought to NRPC for its approval in the 39th meeting. Funding of this scheme with an estimated cost of Rs 367.7 Cr (Aug'2015 price level) was proposed to be implemented using 80% of PSDF and remaining portion shall be funded by POWERGRID through internal resources.

B.8.3 Based on the advice of the 12th Appraisal Committee meeting, POWERGRID presented the proposal for NRPC approval in 39th meeting in which NRPC approved the funding of the scheme through PSDF.

B.8.4 Further, he informed that Appraisal Committee in its 18th meeting held on 05.02.2018, disallowed the PSDF funding proposal for the above said scheme as LOA for the same has already been placed and now the scheme "Provision of STATCOM at Nalagarh & Lucknow in Northern Region" would be funded by POWERGRID through internal resources. The commissioning schedule of the scheme is Feb'19.

B.8.5 Representative of Punjab stated that the reason for which PSDF funding was disallowed needs to be looked into. It is well known that PSDF funding is never allowed for projects for which LoA has already been placed. If it was only because of some hasty decisions taken by POWERGRID to place LoA before the approval of PSDF funding, the states should not be forced to bear the brunt for the same.

B.8.6 Representative of POWERGRID argued that initially the approval of the scheme was obtained from NRPC as a non PSDF funded scheme in 2013, however, for the benefit of the constituent states, proposal for PSDF funding was proposed by POWERGRID. Even after making all the efforts, PSDF funding has not been allowed and now the constituent states were creating hurdles for the already approved scheme which will now be forced to be funded through internal resources of POWERGRID.

B.8.7 Representative of Punjab further stated that had POWERGRID should have waited for some more time for issuing of LoA, the proposal might not have been rejected for the PSDF funding. So, now because of certain decisions of POWERGRID all the constituent states will be forced to bear the brunt.

B.8.8 SE (C), NRPC informed the committee that, Standing Committee only verifies technical aspects before recommending any project. It is the NRPC forum which looks into the economic aspects of the project recommended by Standing Committee as they are the one who will be forced to bear the charges for the same.

B.8.9 Representative of NRLDC & NLDC stated that the project was already approved in the standing committee and also in 29th NRPC meeting without any PSDF funding. POWERGRID on its own had brought the proposal for PSDF funding for the benefit of the constituent states and now if PSDF funding has been disallowed to POWERGRID, they should be allowed to fund the scheme through their internal resources as it was already approved in 29th NRPC meeting.

B.8.10 TCC agreed that due to the hasty actions of POWERGRID, the constituent states shall not be hurt economically. However, considering the huge investment involved in the scheme, TCC decided to request PSDF committee to allow funding for the scheme as a special case and if it is not allowed then the issue may again be discussed in next meeting.

NRPC Deliberation

B.8.11 NRPC concurred with the decisions of TCC and decided to request PSDF committee to allow funding for the scheme as a special case.

B.9 Phase nomenclature mismatch between BBMB and some interconnected stations of other power utilities

TCC Deliberation

B.9.1 MS, NRPC informed the committee about the mismatch of phase sequence nomenclature of BBMB system interconnected with other utilities The conditions prevailing at present are as follows:

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

B.9.2 To resolve the issue, BBMB in the meeting of the committee formulated to resolve the issue has proposed a plan to resolve the issue and as per the proposed plan, it would take around only 7-10 days to rectify the same. BBMB had informed in the meeting that the proposed exercise would be done during the lean season in **November- December 2018** with the due approval in their Power Sub-Committee and BBMB board meeting.

B.9.3 The plan was well appreciated by the committee members as it was out of the box thinking by BBMB engineers. **(Annexure – B.9 of the agenda)**

B.9.4 Representative of BBMB informed that the proposed work plan has already been formulated and was pending for approval from their Power Sub-Committee. Once the approval of the committee will be obtained, the proposal will be submitted to the committee formed for resolving the issue, for vetting.

B.9.5 TCC appreciated the efforts of BBMB in formulating the plan and requested for timely completion.

NRPC Deliberation

B.9.6 NRPC concurred with the deliberations of TCC.

B.10 Follow up of Major Decisions of NRPC.

S No.	Name of the Project /Decision taken	Meeting in which Approval was granted/ Decision was taken	Updated Status

S No.	Name of the Project /Decision taken	Meeting in which Approval was granted/ Decision was taken	Updated Status
1.	Automatic Meter Reading (AMR) for SEMs	13th NRPC meeting held on 24th June 2009.	Total SEM/locations as per LOA, phase-I:1250SEM/220 Locations phase-II:575SEM/150 DCU • No. of Energy meters for which AMR commissioned: 1320 SEM/266 DCU • Total locations for which data is received: 150 Locations • No. of Energy meters for which data is being received at NRLDC: 1065 SEM POWERGRID informed that they did not get any confirmation from NRLDC regarding testing. NRLDC confirmed that they would submit confirmation letter to POWERGRID on AMR testing over fibre. POWERGRID informed that on confirmation, they would prepare the estimate especially for kiosk station where optical fibre cable/LIU switches and FO-Ethernet converters needs to be laid and communication equipment is already available at control Centre.
2.	Provision of Bus Reactors in Northern Region to Control Over Voltages	Provision of Bus Reactors in Northern Region to Control Over Voltages	Out of 17 no. reactors at 15 locations, 12 no. reactors at 10 locations have been Commissioned. The status of remaining 05 reactors was as under;
			Nathpa-Jhakri (1x80 MVAr): SJVN had informed that bays would be ready by June,17. However, due to peak generation in that period, shut-down may not be available. Therefore, the reactor would be commissioned by June 2018.

S No.	Name of the Project /Decision taken	Meeting in which Approval was granted/ Decision was taken	Updated Status
			Chamera-I (1x125 MVAr): Commissioned in April`18 but due to some issues while charging will be charged by end of June`18.
			Parbati-II (1x125 MVAr) and Parbati-III (1x80 MVAr): NHPC informed that there is no space at Parbati-III and as such reactors will be installed at Parbati- II. Reactors at Parbati-II will be commissioned along with the commissioning of the project in 2018-19. The case for purchase of reactor is under tendering process.
3.	400 kV Reactors	29th NRPC meeting held in September 2013	• RVPNL: Reactor at Hindaun commissioned in March 2018
4.	2X63 MVAR Bus reactor and replacement of 250 MVA Trf. with 315 MVA Trf. at Dehar Power House by POWERGRID.	Approved in 30th Standing Committee of Power System Planning of NR held on 19.11.2011	Commissioned.

S No.	Name of the Project /Decision taken	Meeting in which Approval was granted/ Decision was taken	Updated Status
5.	Unified Real Time Dynamic State Measurement (URTDSM) Scheme.	Approved in 27th NRPC meeting held on 13th July, 2012 & 30th November, 2012	• Total scope is PMUs for 115 S/S. Out of which, for 113 S/S PMUs has been dispatched. • PMUs for 108 S/S are installed &commissioned. PMUs for 91 S/S are integrated with NRLDC. Out of 6 Analytic Software which are being developed by IIT Bombay, 4 have been already tested, 1 is under testing and 1 is under development which will be completed by March,2018. POWERGRID informed that SAVT was completed on 27.03.2018 and informed to HVPNL through mail and representative of HVPNL confirmed the mail receipt but requested POWERGRID to send official letter POWERGRID informed that as per discussion in last TeST meeting, survey for shifting of PMUs has been done at new location, however at DCRTPP is having 8 feeders and we are having 3 PMUs which can cater only 6 feeders.
6.	Transmission system associated with RAPP-7&8.		RAPP-Kota section commissioned

S No.	Name of the Project /Decision taken	Meeting in which Approval was granted/ Decision was taken	Updated Status
8.	Transmission system associated with Kishenganga HEP. Kishenganga – Amargarh 220 kV D/c Kishenganga – Wagoora 220 kV D/c	33rd Standing Committee Meeting held On 23/12/2013	POWERGRID had informed that completion schedule of Transmission system associated with Kishenganga HEP had been delayed due to unrest in Kashmir. The revised schedule was: • Kishenganga – Wagoora 220kVD/c line - (July,18) • Kishenganga – Amargarh 220kV D/c line – (commissioned 25.02.2018) **Kishenganga HEP:**commissioned **April, 2018**.
9.	Fiber Optic based communication system in NR and Additional OPGW connectivity in Northern Region under fiber optic expansion project	18th NRPC meeting held on 27th November, 2010 and 28th NRPC meeting held in 22nd March, 2013	POWERGRID informed that Work on all packages would be completed by August 2017.
10.	Rectification of deficiencies coming out of Basic Protection Audit carried out by CPRI in association with POWERGRID	27th NRPC meeting held in November 2013	-
11.	Third party Protection audit of intra-state system / balance system not covered in Basic Protection Audit	27th NRPC meeting held on 30th November, 2012.	Only UPPTCL had not submitted their action plan. UPPTCL: the action plan would be submitted shortly.

S No.	Name of the Project /Decision taken	Meeting in which Approval was granted/ Decision was taken	Updated Status
12.	Planning, procurement and deployment of Emergency Restoration System.	In the 34th NRPC meetings 20th March, 2015	**Updated status:** **DTL :** - 02 nos. of ERS procured and Training imparted in September 2017. **PSTCL:** - ERS received. **UPPTCL:** - 02 nos. of ERS have been received. **RRVPNL:** - Will not be procuring ERS instead they would be procuring the spare towers. RRVPNL management was requested to review their decision. **HVPNL:** - Technical specification is in the process of being finalized. **PTCUL:** - ERS procurement under process. **HPSEBL:** –Discussions being held with vendor. Suitability of ERS for critical locations is being explored. No update on the status of procurement **BBMB:** - Partner states have agreed to provide the ERS as and when required by BBMB. Since partner states of BBMB does not have ERS , BBMB was requested to kindly review their decision and procure ERS for their own system. **J&K:-** Order has been placed for 2 nos. ERS. No further update.

B.11 Connectivity to Naitwar Mori HEP (NMHEP) (2x30MW) of SJVN Ltd. in Uttarakhand (Agenda by SJVNL)

TCC Deliberation

B.11.1 Regarding the aforementioned issue PTCUL representative informed the committee that the search for land was under finalization. Private land was not available for substation in Mori area and it was advised by the SDM, Purola to look for land in forest area.

B.11.2 He further informed that land at three places near Mori (all in Forest area) has been identified, out of which one which is about 2 kms from Mori HEP is suitable for construction of substation. He committed that the land shall be finalized by the end of August 2018.

B.11.3 SJVNL representative stated that the tentative schedule for completion of their project was September 2021. PTCUL which has the responsibility for construction of the transmission line from Mori substation to Dehradun for evacuation of power from NMHEP has not even finalized the location of Mori substation. He stated that PTCUL was asking them for connection agreement and LTA which is issued by CTU for initiating the construction work. Connection agreement is issued at the time of charging of an element and can only be furnished at the time of completion of the project. In view of the above the requirement of PTCUL regarding the connection agreement for initiating the construction work was not justified.

B.11.4 CTU representative clarified that there was no need of connection agreement as it is only required at the time of charging of new element. Regarding the LTA agreement he stated that until the changed location of Mori substation is finalized LTA cannot be issued.

B.11.5 Regarding the confusion of PTCUL about the Mori – Dehradun transmission line to be "deemed dedicated line", CTU representative clarified that in any of their correspondence the line has not been mentioned as a dedicated line.

B.11.6 TCC requested PTCUL for early finalization of the land for Mori substation so that the LTA can be granted and the construction of the transmission line can be done before the NMHEP commissioning.

NRPC Deliberation

B.11.7 NRPC concurred with the decisions of TCC and advised PTCUL to finalize the location of Mori substation within 02 months i.e. by the end of August 2018.

B.12 Replacement of S900 RTUs :

TCC Deliberation

B.12.1 MS, NRPC informed that AMC of S900 RTUs, installed under ULDC is valid till July 2018. During 12th TeST meeting, it was decided that PGCIL would replace S900 RTUs at stations owned by PGCIL and for other members/constituents who have

given their consent for replacement of their RTUs through POWERGRID, by July 2018.

B.12.2 He added that in 13th TeST meeting POWERGRID informed that they had sent MoU/Agreement for replacement of old S-900 RTUs to all constituents in first week of Feb' 2018. However, only two constituents namely SJVNL & THDC Limited had signed MoU/Agreement. POWERGRID had also informed that award shall be placed only after signing of MoU/Agreement between POWERGRID & respective constituents of Northern Region & deposit of advance payment.

B.12.3 He mentioned that the TeST sub-committee had expressed concern over delay in procurement process and advised all the concerned constituents to submit the signed copy of MoU to POWERGRID latest by 15th May 2018. It was also decided by the sub-Committee that if any Constituent doesn't submit the signed copy of MoU by 15th May 2018, it will be the concerned Utility's responsibility to make necessary arrangement for procurement on their own, so that their RTUs are replaced before expiry of AMC.

B.12.4 He further informed that as per information provided by POWERGRID, they had not received the signed agreement from HPSEB, DTL, NPCIL and IPGCL, till 07.06.2018.

B.12.5 POWERGRID representative informed that they were in process of procurement of 93 Nos. S 900 RTUs as per requirement given by different utilities. HPSEB informed that they would replace S900 RTU on their own.

NRPC Deliberation

B.12.6 NRPC noted the deliberations held in the TCC meeting and advised all the concerned utilities to ensure timely replacement of S 900 RTUs.

B.13 Guidelines for calculation of "Availability of Communication System"

TCC Deliberation

B.13.1 MS, NRPC informed that as per the sub-regulation 7.3 (ii) of CERC Regulations on communication, the RPC Secretariat has to certify the availability of communication equipment for CTU, ISGS, RLDCs, NLDC, SLDCs based on the data furnished by RLDC. He added that as per sub-regulation 7.3 (i) of these Regulations, NPC is responsible for issuance of the guidelines with the approval of the Commission on "Availability of Communication System" in consultation with RPCs, RLDCs, CTU, CEA and other stakeholders within a period of two months from the date of notification of these regulations.

B.13.2 He mentioned that RLDC needs to keep records of the communication outage based on requirements of the guidelines to be decided by NPC and approved by Commission since 1st July, 2017.

B.13.3 Representative of NRLDC requested that guidelines may be made available, so that the necessary records could be collected from the communication service provider for calculating the "Availability of the communication System".

B.13.4 He further stated that the matter was deliberated in the 13th TeST sub-committee meeting held on 24th April,2018, wherein, the sub-committee had advised all the members to send their views on the availability determination to the NPC for consideration.

B.13.5 TCC noted the deliberations and advised all the members to send their comments, if any, to NRPC Sectt. or NPC within one month.

NRPC Deliberation

B.13.6 NRPC noted the deliberations held in the TCC.

B.14 Issuance of Technical Standards for the communication system

TCC Deliberation

B.14.1 MS, NRPC informed that as per sub-regulation regulation 7.1 (ii) of CERC Regulations on Communication, CEA has to formulate and notify technical standards, cyber security requirements in accordance with the Cyber Security Policy of the Government of India from time to time, protocol for the communication system for Power Sector within the country including the grid integration with the grid of the neighboring countries. Guideline for interfacing requirements needs to be formulated within 60 days from the issuance of the technical standards to be issued by CEA.

B.14.2 He added that draft "Technical Standards" on Communication was available on CEA website for comments from the stake holders. Cyber security requirement for communication system are also to be finalized and documented for compliance. NLDC has to prepare the guideline on interface requirements for the communication system based on the above two documents.

B.14.3 He mentioned that the TeST sub-committee had requested all the members to submit comments on the draft regulations, directly to CEA or to NRPC secretariat by 26.05.2018 for onward transmission to CEA. However, no comments had been received from any utility.

B.14.4 TCC noted the information and advised all the members to send comment, if any, to CEA or NRPC Secretariat immediately.

NRPC Deliberation

B.14.5 NRPC noted the deliberations held in the TCC meeting.

B.15 Formulation of planning criteria for the communication system

TCC Deliberation

B.15.1 MS, NRPC informed that as per sub-regulation 7.1 (i) of CERC Regulations on Communication, CEA has to formulate communication planning criterion and guidelines for development of reliable communication system for power system of

India duly considering requisite route redundancy, capacity, as well as requirements of smart grid and cyber security."

B.15.2 He added in the 13th TeST sub-committee meeting held on 24th April,2018, the sub-committee advised all members to submit their views on planning criteria and guidelines, directly to CEA or to NRPC secretariat for onward transmission to CEA.

B.15.3 TCC noted the information and advised members to send comments, if any, directly to CEA or to NRPC secretariat, within one month.

NRPC Deliberation

B.15.4 NRPC noted the deliberations held in TCC meeting.

B.16 Non-Availability / Reliability of Telemetry

TCC Deliberation

B.16.1 MS, NRPC informed that many times the telemetry is provided before charging of a new elements but the reliability of telemetry is not being ensured after the charging. He gave example of some 400 kV sub-stations with poor reliability of telemetry, which was mentioned in the Agenda.

B.16.2 He added that the issues of poor telemetry of these stations was discussed in TeST meeting and all the concerned utilities were advised to take immediate action for resolving the issues and submit action taken report to NRLDC and NRPC by 31st May,2018. But no progress was observed.

B.16.3 He further informed that keeping in view the poor performance of telemetry in many stations , the TeST sub-committee had taken a decision to restrict approval of charging or shut down by Load Dispatch Centres (LDC), in case of non-availability of telemetry. He stated that according to the decision, the Load Despatch Centers may deny issuance of code for charging /shutdown of an element in Grid station or Generating Station, if the reliable telemetry for the element is not available at the concerned LDC.

B.16.4 TCC endorsed the decision of TeST sub-committee for approval of NRPC.

NRPC Deliberation

B.16.5 NRPC approved the recommendation of TCC for denial of issuance of code for charging /shutdown of an element in Grid station or Generating Station, if the reliable telemetry for the element is not available at the concerned LDC.

B.17 Telemetry of digital status

TCC Deliberation

B.17.1 MS, NRPC informed that in 12thTeST Sub-committee meeting it was decided that the constituent will furnish the availability status of 220 kV and above stations and improvement thereof, but no improvement was observed since then.

B.17.2 He added that in the 13th TeST sub-committee meeting held on 24thApril 2018, it was decided by TeST sub-committee that the respective Load Dispatch Centers may deny

issuance of code for charging /shutdown control center for the element, if the reliable telemetry of digital status of the element is not available to the concerned LDC

B.17.3 TCC endorsed the decision of TeST sub-committee for approval of NRPC.

NRPC Deliberation

B.17.4 NRPC approved the recommendation of TCC for denial of issuance of code for charging /shutdown of an element in Grid station or Generating Station, if the reliable telemetry for the element is not available at the concerned LDC.

B.18 Communication plan for channel redundancy and to back-up

TCC Deliberation

B.18.1 MS, NRPC informed that in 13th meeting of TeST sub-committee held on 24th April,2018, representative of POWERGRID informed that 88 RTU out of 124 were reporting on dual channel and informed that they would provide redundant channel for pending 29 Stations (POWERGRID-12, NHPC-06, NTPC- 07. NPCIL-2, SJVNL-1, THDCL-1) within 30 days.

B.18.2 He added that TeST Sub-committee advised NTPC to take necessary action to provide redundant ports at Jhajjar, Rihand-NTPC, Rihand 3, Unchahar, Anta, Auraiya, Koldam and Badarpur, where ports are not available.

B.18.3 All other utilities were also advised by TeST Sub-committee to take necessary action to ensure channel redundancy.

B.18.4 He further added that the TeST Sub-committee had also decided about modalities for providing redundant communication channel to NRLDC by IPPs needs to be decided. Information for status /issues from IPPs have been sought. A meeting is proposed with IPPs and other concerned agencies in July,18

B.18.5 TCC noted the information and advised members to take necessary action to ensure 100% telemetry to RLDC with channel redundancy.

NRPC Deliberation

B.18.6 NRPC noted the deliberations held in TCC meeting.

B.19 Training for EMS application:

TCC Deliberation

B.19.1 MS, NRPC informed that in the 37th TCC and 40th NRPC meeting held on 27th and 28th October 2017, EMS training was approved. NRPC secretariat had placed order on SIEMENS for hands on Training on EMS applications at respective NR SLDCs. Training for Delhi, BBMB, HP, UP, Punjab Haryana and Rajasthan SLDCs have been completed. Training at J&K SLDCs is scheduled to be completed by July/August 2018.

B.19.2 TCC noted the information

NRPC Deliberation

B.19.3 NRPC noted the deliberations held in TCC meeting.

B.20 Training programme on Power System Protection for Protection System Engineers (Level 3)

TCC Deliberations

B.20.1 MS, NRPC informed the committee that training on Protection system (Level -3) was successfully conducted for 25 participants from NR utilities from 19th to 23rd March, 2018 at Udaipur and similar training program (Level 2 & Level 3) for second batch of Protection Engineers will be taken up

B.20.2 He also told that utilities have requested for the training on load forecasting as well as POC mechanism, which will be organized in near future in association with NLDC and POWERGRID.

NRPC Deliberations

B.20.3 MS, NRPC informed that NRPC Sectt has conducted Level-3 training for Protection System Engineers from 19th to 23rd March, 2018 with this the first batch for Level-2 and level-3 training has been successfully completed. He told that NRPC Secretariat would be going for another batch of Protection System Engineers Level-2 and Level-3 training for which no. of participants might be increased from 25 to 50.

B.20.4 He requested utilities to nominate the engineers working in the field of power system protection and make sure that nominated individual is available for entire duration of the training. He also insisted that as the participants are being trained as trainer, they should further transfer the knowledge within their own utility so that additional trained manpower can be deployed.

B.20.5 He further informed that utilities have requested for the workshop on load forecasting, POC/GNA mechanism as there many utilities were not fully conversant with POC mechanism He informed that a 3 days workshop in association with NRLDC, NLDC and POWERGRID was conducted to disseminate information on POC mechanism, and still if there was confusion amongst utilities about current POC mechanism as well as the upcoming GNA mechanism, then additional workshop would be organized at the utility site itself..

B.20.6 He suggested that 2 days workshop can be conducted at each utility in co-ordination with NRLDC and POWERGRID on POC mechanism. He further told that workshop on GNA will be conducted in near future.

B.20.7 MS, NRPC also highlighted the need for training on scheduling and load forecasting in India as well as abroad in a country having similar climate to India so that engineers may be benefited from their expertise. He also told that this training would gain further importance as the power sector would be shifting to 5 min scheduling/forecasting.

B.20.8 He informed the committee that program will be planned by NRPC and funding from PSDF will be sought. He further told that participation from DISCOMs, SLDCs, NRLDC, NLDC and NRPC Secretariat will be considered in the training program**.**

B.21 Maintaining of temperature at control centers:

TCC Deliberations

B.21.1 MS, NRPC informed in the 13th meeting of TeST sub-committee held on 24th April 2018, POWERGRID representative informed that as per discussion during Management Review Meeting, they had collected data from AMC vendor for availability of AC system at sub-station premises where DCPS with battery banks were installed. It was observed that around 40-45% locations, AC system was not provided / not adequate to maintain room temperature at 25-27^{o}C. SCADA/URTDSM servers have inbuilt feature for Auto shutdown to prevent loss of data in case of over temperature (set at 33^{o}C).

B.21.2 He added that life span of installed VRLA type batteries depends on maintenance of temperature maintained in battery room. If properly designed, built, and maintained, a battery can provide many years of reliable service. A reduction to 80% of the rated capacity is usually defined as the end of life for a lead-acid battery. Below 80%, the rate of battery deterioration accelerates, and it is more prone to sudden failure resulting from a mechanical shock (such as a seismic event) or a high discharge rate. Even under ideal conditions, a battery is expected to eventually wear out in 5-7 years.

B.21.3 He mentioned that the TeST sub-committee had advised all the constituents to send their views on expected life of battery to NRLDC and NRPC sect. by 31.05.2018.

B.21.4 All the constituents were also requested to send a report to NRPC and NRLDC by 31.05.2018 regarding conditions of the batteries installed in their premises, under ULDC project, so that action plan for timely replacement of batteries, based on their healthiness and life cycle may be prepared to ensure real time data communication without any interruption.

B.21.5 MS, NRPC informed that for better life of the batteries proper temp. control should be there in the control centers as due to deterioration of Battery life SCADA may go off and hamper the Grid operation.

B.21.6 TCC advised all utilities to send the report to NRPC and NRLDC regarding conditions of the batteries installed in their premises. All Constituents were advised to have adequate numbers of Air conditioners to maintain the temperature of 27 degree Celsius in Communication, Server room, Battery room.

NRPC Deliberations

B.21.7 The committee noted the deliberations held in TCC and advised all utilities to take action as recommended by TCC within one month.

B.22 Draft Communication Audit Procedure

TCC Deliberations

B.22.1 MS, NRPC informed the CERC had issued Central Electricity Regulatory Commission (Communication System for inter-State transmission of electricity) Regulations, 2017 which were to come if force w.e.f. 1.7.2017. As per Regulation 10 of these Regulations, RPC Secretariat has to conduct performance audit of communication system annually as per the procedure finalized in the forum of the concerned RPC.

B.22.2 The draft procedure prepared by NRPC Secretariat was deliberated in the 13th TeST meeting held on 24.04.2018 and was attached in agenda note. The sub- committee had

recommended that the draft procedure may be approved by TCC/NRPC subject to any comments from constituents by 31.05.2018.

B.22.3 It was noted that no comments were received. Therefore, TCC recommended for the approval of the draft procedure.

NRPC Deliberations

B.22.4 NRPC approved the Communication Audit Procedure.

B.23 OPGW connectivity at NHPC Power Stations under Central Sector scheme

TCC Deliberations

B.23.1 Representative of POWERGRID informed that for Uri-I the work would be completed within 10 days.

B.23.2 Regarding Uri-II, it was informed that compensation demanded for RoW was more than the cost incurred in the project. NHPC representative stated that the RoW issue was on account of some compensation pending for the work done in the past. POWERGRID was advised to resolve the compensation issue at the earliest. NHPC and PDD J&K were advised to extend help to POWERGRID in completing the work.

B.23.3 Representative of POWERGRID informed that OPGW connectivity for Bairasiul and Sewa II had been completed. The data connectivity would be completed by July 2018. For Parbati-III, the work would be completed by June 2018.

B.24 Data Telemetry at Kishanganga HE Project

TCC Deliberations

B.24.1 During 13th TeST meeting held on 24/04/2018, POWERGRID informed that Kishanganga- Wagoora line is expected to be completed by June 2018 and fibre will be available accordingly.

B.24.2 NHPC asked POWERGRID to confirm regarding installation of Terminal Equipment at Kishanganga HE project once Fibre is available to which POWERGRID replied that regarding terminal equipment they will confirm later.

B.24.3 TCC noted the information.

NRPC Deliberations

B.24.4 NRPC noted the TCC deliberations.

B.25 (A) Early Commissioning of 400/220 KV Tughalakabad Substation and associated lines (Agenda by POWERGRID)

TCC Deliberations

B.25.1 Representative of POWERGRID stated that the commissioning of the substation was delayed as the clearance from forest department was awaited. He further told that after obtaining the clearance the work shall be completed within 3 weeks.

B.25.2 Delhi SLDC and NRLDC representative stated that since the earlier approval of NRPC was for early commissioning of Tughalakabad S/s by March,18, the previous approval of early commissioning shall be withdrawn.

B.25.3 Representative of POWERGRID also informed that Tughalakabad S/s is expected to be commissioned by October, 2018. Further, representative of Delhi SLDC requested for seeking extension of running of 2*210 MW generation from BTPS till Oct, 2018.

B.25.4 TCC recommended that in the absence of readiness of 400/220 kV Tughlaqabad substation, BTPS may be given an extension to continue generation till the end of October 2018 in order to smoothly meet the power requirements of Delhi and the approval of early commissioning shall be withdrawn.

NRPC Deliberations

B.25.5 NRPC concurred with the decisions of TCC.

(B) Change of Scope of 400/220 KV Tughlakabad Substation between POWERGRID & DTL (Table Agenda by POWERGRID)

TCC Deliberations

B.25.6 Representative of POWERGRID informed that scope of 400/220 kV Tughlakabad S/s has been changed and accordingly 220kV assets including line bays shall be owned by DTL. Therefore, he requested to remove the 220 kV side of 400/220kV Tughlakabad S/S from the ISTS scheme.

B.25.7 He further told that on the same line, there was change in the scope of Dwarka substation.

B.25.8 TCC agreed with the proposal of change of scope of 400/220 kV Tughlakabad s/s as well as Dwarka s/s however, as this is the ISTS scheme approved in the standing committee of CEA, the change needs to be ratified in the next standing committee meeting.

NRPC Deliberations

B.25.9 NRPC concurred with decisions of TCC.

B.26 Monsoon Preparedness

TCC Deliberations

B.26.1 NRLDC representative gave presentation about grid operation in past few months attached as **Annexure-IV**. It was highlighted that:

- Maximum demand met of NR was 61952MW on 23.06.18 at 23:28hrs. (frequency remained in band for 80% of time &average frequency was 49.98Hz on that day)
- Maximum Consumption of NR was 1394MUs on 25.06.2018 (frequency remained in band for 85% of time & average frequency was 50.00Hz on that day)
- Coal shortages issues continued although thermal generation increased.(as on 27.06.18 coal shortage was reported in APCPL Jhajjar)
- Low reservoir levels lead to less hydro generation. Hydro generation declined by 82MUs/ day in May 18 compared to May17.

- Inter-regional import increased by 47MUs/ day in the month of May compared to previous year. (Simultaneous NR import capacity was enhanced by 3600MW due to commissioning of new inter-regional lines). Maximum inter-regional exchange 313MUs was recorded on 25.06.18. TTC violations were observed in NR import for past few days.

- There has been less gas availability/generation this year.

- Frequency remained in the operating band only for 70% of time in May'18.

- Reliability ingrid operation was affected due to frequent tripping of HVDC links. NRLDC requested POWERGRID to look into frequent tripping of Champa-Kurukshetra as tripping of Champa-Kurukshetra lead to high loadings on all other inter-regional elements. NLDC representative requested POWERGRID to take remedial measures for the existing two poles (Pole 1 & 2).

- MS NRPC referred to meeting held at Kurukshetra to reduce trippings of Champa-Kurukshetra wherein one month time was given to OEM. He asked POWERGRID to resolve this issue of frequent tripping of Champa-Kurukshetra as early as possible.

- POWERGRID representative stated that 800kV HVDC technology is being used for the first time in world and as a result new challenges are coming while operating the HVDC.

- Large deviations by utilities from schedule were observed (overdrawl as well as underdrawl). NLDC representative highlighted that HP, Rajasthan, Haryana are continuously from the grid overdrawing most of the time even when they (Rajasthan & Haryana) could have scaled up internal generation.

TCC asked utilities to restrict deviations from schedule.

B.26.2 NRLDC representative presented common issues encountered during monsoon months such as:

- Less thermal generation on account of coal shortage. Private thermal generation representatives (Jhajjar, Bara, Lalitpur) stated that coal is provided on priority to government plants than private plants which results in coal shortages.

- Lack of gas/ liquid fuel availability. NRLDC stressed on importance of gas generation in meeting high demand and also its prime importance when hydro starts to deplete from September onwards.

    - NTPC representative stated that they have been asking states since past many months for providing their requirement of RLNG. He stated that firm commitment from beneficiaries may be provided so that GAIL could be persuaded for supply of RLNG because they are having take or pay clause. NTPC informed that sufficient liquid fuel stock is available at Dadri and

Faridabad while limited stock is available at Anta and Auraiya. Liquid fuel is now being received from Vizag which takes 10-12 days.

TCC asked utilities for providing their requirements well in advance to NTPC so that they can further tie-up with GAIL. Also, in upcoming months when coal shortage and wet coal issues would be there, there would be requirement of gas/ liquid fuel generation.

- Sudden outage of hydro units due to silt. Advance information about silt outages shall be provided to LDCs for better preparedness and outage to be carried out as per agreed protocols. NRLDC asked HP to make pre-arrangements so that effect of sudden outage of hydro units could be minimized.
- Incidents of tower collapses, tower damage, multiple element trippings etc.
- Overdrawl by states & poor frequency profile
- Load crash events; high demand/ overdrawl by states afterwards
- Maintaining ICT & line loadings up to N-1 contingency limit

TCC asked utilities to be prepared for situations that may arise in the upcoming monsoon months and take necessary preventive actions.

NRPC Deliberations

B.26.3 NRPC agreed with the deliberation held in the TCC.

B.27 Outage of lines on tower collapse and long outage of transmission elements

TCC Deliberations

B.27.1 NRLDC representative highlighted that this year also transmission lines went on breakdown on tower collapse and few of them are still out thereby, affecting the reliability of the system and aggravated constraints in meeting high demand reliably. Number of lines in NR were/are out on tower collapse, damage & other elements are under long outage resulting in depletion of inter-regional links and hence reducing inter-regional transfer capability. 15 lines which were out on tower collapse this year of 400 kV & above voltage level are ISTS lines.

B.27.2 NLDC representative informed that expected dates provided for revival of these elements were changed frequently. Thus, ATC/TTC limits had to be changed many times during this period since most of the lines out were inter-regional elements. These frequent revisions also posed challenge to states in planning their portfolio.

B.27.3 Further, on account of inclement weather conditions mostly, recent incidents of multiple lines tripping in hydro generation complexes have been observed. Outages in Baspa-Karcham-Jhakri-Rampur complex and Tehri-Koteshwar complex have resulted in loss of generation in many incidents. These need to be minimized especially

considering the importance of high hydro generation in meeting demand safely in upcoming months.

B.27.4 **TCC advised that there should be timely (pre-monsoon) maintenance activities and sufficient line clearances shall be maintained because windstorm and thunderstorm would be seen in future as well. Thus, it is necessary to be more serious about timely preventive actions.**

NRPC Deliberations

B.27.5 NRPC agreed with the deliberation held in the TCC.

B.28 Load crash events in Northern Region

TCC Deliberations

B.28.1 NRLDC representative highlighted the number of load crash events that were observed in Northern region on account of thunderstorm/ dust storm in past month. Summary of such events was presented in the meeting. Practice of manual opening of feeders by utilities is still continuing which aggravates the quantum of load crash.

B.28.2 It is well known fact that states shall maintain their drawl as per schedule, keep sufficient reserves, units on bar and restrict deviation from schedule as it poses challenge to grid operation. Multiple element tripping events including complete station outages need to be taken care by utilities so that grid operation is smooth. It may be required that state generation needs backing down under load crash scenarios, which needs to be meticulously followed.

B.28.3 **TCC requested utilities to follow above highlighted measures and also prepare list of feeders having safety concern and without safety concern so that load crash during such events could be reduced. The list with safety concern shall be progressively reduced.**

NRPC deliberations

B.28.4 NRPC agreed with the deliberation held in the TCC.

B.29 Reliability issues in the grid

TCC Deliberations

B.29.1 NRLDC representative presented reliability issues observed for states as described below:

- In Punjab, demand has crossed 12000MW figure &N-1 violations were observed at Amritsar, Dhuri and Rajpura. Punjab was requested for early revival of ICT at Dhuri which would provide relief in constraints at Dhuri as well as Rajpura. Punjab representative stated that inspection is going on and ICT would be revived at the earliest.

- In UP, N-1 violations were observed at Azamgarh, Lucknow(PG), Meerut, Gr. Noida, Obra etc.NRLDC requested UP to shift load from Azamgarh; plan new ICT or enhance capacity at Meerut and expedite underlying network at 765/400 Gr.

Noida.Timelines provided by UP were July 2018 for Obra ICT and Dec 2018 for Azamgarh ICT.Constraints of Lalitpur TPS, Paricha TPS and Bara TPS under N-1/N-1-1 compliance need to be worked on. Upgradation of switchgear at Greater Noida/Nawada needs to be expedited.Interconnection facility between 400 kV Muradnagar(old) and 400 kV Muradnagar (New) was asked to be explored as shifting of 400kV Dadri line to Muradnagar (New) from Muradnagar (old) is aggravating loading on 400kV Dadri Gr. Noida.

- In Delhi, N-1 violations were observed at Maharanibagh, Bamnoli, Mundka.
- In Rajasthan, as wind injection increases, voltage becomes extremely low at Akal and Barmer. Constraint for evacuation of power from Rajwest& N-1-1 non-compliance of Kawai-Kalisindh-Chhabra complex evacuation were highlighted.
- In J&K, Amargarh and Kishenganga stations have been commissioned in recent past. Loading of Wagoora ICTs and 220kV Wagoora-Ziankote has reduced but loading of 220kV Wagoora-Pampore is still high. Shifting of load from Pampore to Ziankote may be expedited.There have been events of loss of generation at Baglihar as buses were not coupled.
- In Uttarakhand, when gas generation is present at Shravanti & Gamma Infra loading of Kashipur ICTs is reduced. The two buses at Koteshwar (4*100MW) are kept isolated from each other i.e. the bus coupler is kept open. Even after repeated requests to resolve the bus coupler issue Koteshwar is still operating in bus split mode which may lead to loss of generation at Koteshwar.

B.29.2 **TCC asked utilities to manage line and ICT loadings upto their N-1 contingency limits.**

NRPC Deliberations

B.29.3 NRPC agreed with the deliberation of the TCC.

B.30 Implementation of IEGC 5th Amendment provisions

TCC Deliberations

B.30.1 NRLDC apprised TCC about implementation of IEGC 5th amendment and SOR dtd. 13.04.18. It was presented that:

- For calculation of PAF, DC declared by the generator is not to be reduced. Ensuring proper incentive for the generator for keeping units in readiness.
- Schedule to the beneficiaries would be restricted to Installed Capacity (IC) minus normative auxiliary consumption or the DC by generator whichever is less.
- Primary response would be closely observed for different events in the system and failure to provide the same despite declaring a DC higher than normative DC would be recorded and periodically reported.

B.30.2 TCC noted down the same.

NRPC Deliberations

B.30.3 NRPC noted down the same.

B.31 Frequency response characteristic of NR control area

TCC Deliberations

B.31.1 NRLDC representative stated there have been Twenty one (21) FRC based events in year 2017-18. Submission of FRC report and responses observed in FRC based events was also presented. It was highlighted that:

- Among the State control area, HP, J&K and Chandigarh have very less median FRC of less than 5% of ideal response.
- Among the Hydro generators, Karcham (JSW) has highest FRC of more than 40%. The response of almost all other hydro stations is less than 20% of ideal response.
- In thermal generating stations, only Dadri TPS (NTPC) and Jhajjar TPS(APCPL) have FRC response of more than 30% of ideal response.
- FRC submissions by utilities are also not consistent with no FRC based calculation received from most of utilities.

B.31.2 **TCC directed utilities to ensure anticipated FRC response and timely submission of FRC reports received from each generators.**

NRPC Deliberations

B.31.3 NRPC agreed with the deliberation held in the TCC.

B.32 Grid Events in Northern Region during Jan-May 2018 period:

TCC Deliberations

B.32.1 NRLDC representative stated that total 101 number of CEA standard based Grid Events have occurred in Northern Region in Jan'18 to May'18 period. The number is 21 (17%) less than the last year (2017) figure of same period. Monthly GD/GI summary for events in 2018 was presented. It was highlighted that

- During the past five month period there is a grid event occurrence almost every 2 out of three days.
- Grid events increased in the month of May and June due to thunderstorm events.
- In 46% of the events in 2018 delayed fault clearance was seen while in 16% of events maloperation was seen.
- Fault duration was more than stipulated time for every second event.

B.32.2 NRLDC presented preliminary report submission, DR/EL submission, detailed report submission by utilities for monthly grid events in year 2018.

B.32.3 **TCC directed utilities for timely DR/EL submission to NRLDC so that analysis of event could be done and availability of transmission elements may be issued timely by NRPC/ NRLDC.**

NRPC Deliberations

B.32.4 NRPC agreed with the deliberation held in the TCC.

B.33 Pending issues with PTCUL

TCC Deliberations

B.33.1 NRLDC representative asked PTCUL about the pending payment of Video Conference system amounting to Rs. 20,65,562/-.PTCUL representative assured that due amount would be submitted within a week.

B.33.2 NRLDC stated that payment of old AMC of Alstom system is still pending with PTCUL. There is some mismatch in outstanding as per PTCUL and NRLDC. Despite repeated requests reconciliation has not been done.

B.33.3 **TCC advised PTCUL and NRLDC for joint meeting so that reconciliation be done.**

NRPC Deliberations

B.33.4 NRPC agreed with the deliberation held in the TCC.

B.34 Real Time data telemetry from Renewable

TCC Deliberations

B.34.1 NRLDC representative stated that Telemetry of Wind and Solar is very poor from Rajasthan. Telemetry of Renewable generation is required for real time visibility &forecasting of renewable generation. Wind generation is available at SLDC in an isolated system to be integrated with SCADA system for real time visibility across control centers. Rajasthan was asked to arrange for Telemetry from Wind and Solar for better visibility.

B.34.2 **TCC asked utilities to ensure better data telemetry of renewables to NRLDC.**

TCC Deliberations

B.34.3 NRPC agreed with the deliberation of the TCC.

B.35 Non redundancy in wideband network to NRLDC

TCC Deliberations

B.35.1 NRLDC representative stated that most of the data to NRLDC is being routed through Ballabgarh / Badarpur which is linear section and failure in this section results in major telemetry loss from RTUs/PMUs to RLDC resulting in difficulty in smooth grid operation/monitoring. Repeated failureswere observed either at Badarpur or at Ballabhgarh.In 2018 failures were reported on 17th June, 13th May, 2nd March. PGCIL was requested to take up on priority providing secondary path between NRLDC and Ballabgarh.

B.35.2 **TCC directed PGCIL to expedite for providing redundant path between Ballabgarh and Badarpur.**

NRPC Deliberations

B.35.3 NRPC agreed with the deliberation held in the TCC.

B.36 Reliability of Telemetry

TCC Deliberations

B.36.1 NRLDC representative highlighted that reliability of data from newly integrated sub-stations is very poor. Though the telemetry integration is ensured before charging the new element, the reliability of telemetry is not at all ensured. Also though the telemetry is available correct Digital telemetry is not available. Proper status of CBs and Isolators is required so SE can form network model resembling to actual Power System Model via Topology Processor. Summary of percentage availability of telemetry utility wise on 21st June at 1000hrs was presented by NRLDC. Telemetry available for the month of May 2018 stationwise was presented by NRLDC.

B.36.2 Presently 87 RTU out of 124 central sector/ IPP RTUs are reporting on dual channel. It was requested to ensure redundant communication channel to all RTUs.

B.36.3 **TCC asked utilities to take measure to ensure better telemetry availability for better grid management and to ensure that utilities do not face issues for shutdown requests.**

NRPC Deliberations

B.36.4 NRPC agreed with the deliberation of the TCC.

B.37 The group to formulate Detailed Talent Recognition Mechanism for the Protection Engineers

TCC Deliberations

B.37.1 SE (O), NRPC informed the committee that a committee comprising of members from utilities was constituted to formulate Detailed Talent recognition mechanism for the Protection Engineers which has proposed annual monetary reward to be given from NRPC fund for best performing utility as well as protection engineers in the Northern region which are as followed:

- Best performing utility in the region (01 prize worth Rs. 5,00,000/-)
- Best Performing Protection Engineer(s) in the Northern Region:
    - For Executive Engineer and below level (03 prizes worth Rs. 1,00,000/- each)
    - For Superintending Engineers and above level (03 prizes worth Rs. 1,00,000/- each)

B.37.2 MS, NRPC stated that most of the time Protection Engineers work in the shadows who require motivation and encouragement for their continuous efforts. TCC recommended approval of Detailed Talent recognition mechanism for the Protection Engineers as finalized ***(Annexure - V)***.

NRPC Deliberations

B.37.3 MS, NRPC informed that monetary reward is recommended for utility as well as individual. He further told that monetary reward given to the utility shall be only used for manpower development.

B.37.4 NRPC approved the recommendations of TCC.

B.38 Periodicity of Third Party Protection Audit

TCC Deliberations

B.38.1 SE(O), NRPC informed that issue of periodicity of third party protection audit was deliberated in 35th Protection Sub Committee where members recommended that Third Party Protection audit can be carried out periodically either by a team of Protection Engineers of the utilities as per the list finalized by the Protection Sub-Committee or by any reputed agency working in the field of Power System. The periodicity of the protection audit is to be 5 years as decided by 35th PSC held on 20.06.2018.

B.38.2 MS, NRPC told that the work involved in the Protection audit is huge, hence restricting to CPRI only would delay the process. He informed that the many agencies are coming up in the field of Protection and it is up to the utility to get it done from any reputed agency.

B.38.3 He requested all the utilities to share the feedback of the Protection audit carried out from other agencies so that agencies can be rated which will help other utilities to select the agencies for their Protection audit.

B.38.4 SE (O), NRPC informed the members that decisions of TCC/NRPC will be further communicated to NPC for the uniformity and finalization at National level. TCC recommended for the approval the decisions of 35th Protection Sub Committee.

NRPC Deliberations

B.38.5 MS, NRPC apprised the committee about the deliberations held in the TCC. NRPC approved the periodicity of the protection audit to be 5yrs and same can be carried out beside CPRI from any other reputed agency also.

B.39 Hydro Generation and Silt Monitoring (Agenda by HPSEBL)

TCC Deliberations

B.39.1 Representative of HPSEBL gave the detailed presentation about the Hydro generation forecasting and Silt Monitoring. (Presentation Enclosed as **Annexure - VI**)

B.39.2 He raised the following concerns:

i. Gaps being encountered on daily basis w.r.t. LGBR, day ahead forecast and the real time drastic downward revisions may be filled in by RRAS.
ii. Availability of RRAS may be shared by the nodal agencies through web portal.
iii. Committee constituted for silt forecasting may hire specialists including expertise of IMD, ISRO, SASE etc. to develop the full proof mechanism for better hydro generation forecasting to take care of weather beggaries.

B.39.3 Representative of NRLDC informed that Gate closure of DC revisions is already under the discussion in the CERC after which issue would be resolved. He further told that states have the primary responsibility to manage their loads and NRLDC can only support the efforts with RRAS.

B.39.4 MS, NRPC told that objective of RRAS is frequency correction and managing the congestion in the Grid. He further clarified that quantum of power available under

RRAS depends on Un-requisition power that can also be recalled by the beneficiaries at any time and issue clarified in the Regulations should not be discussed in this forum.

B.39.5 He also told that these issues are already under the consideration of the Committee at the National level. He also assured that the committee constituted as per the recommendation of 35th TCC/ 39th NRPC will further deliberate the issues as per its TOR.

B.39.6 He informed the committee that NHPC and BBMB has appointed ISRO and DHI, Denmark (2012) respectively as the consultants to look into the issues however none of them was able to develop accurate forecasting model so far.

B.39.7 He told that silt forecasting is very complex issue and needs regular collection of data from weather stations which should have accurate locations that are also not available.

NRPC Deliberations

B.39.8 MS, NRPC appreciated the concern raised by HPSEBL. He further clarified that RRAS was to be utilized for maintaining frequency and avoid congestion in Gird which further depends on URS that may be recalled by the beneficiaries at any time.

B.39.9 He further told that utilities should make their own arrangements for power supply on their own by making overarching arrangements, banking or by any other arrangements.

B.39.10 Representative of CEA stated that the problem for silt is faced every year in the month of June, July and August, hence the necessary arrangements should be made in advance to tackle the situation.

B.39.11 Representative of NTPC told that the arrangements can be made with RLNG during the silt period provided utility facing the problem gives firm commitment as it has huge financial implications.

B.39.12 Chairperson, NRPC clarified if there was any specific issue for particular utility, it should be dealt at state level. He told that to meet the demand of Punjab in paddy season, the coal is imported which has its own financial implications and further banking arrangements has been done.

B.39.13 He also stated that other option was going for renewable energy like rooftop solar, wind energy, hence utilities should be responsible for finding out the remedy.

C. COMMERCIAL ISSUES

C.1 Default in payment of outstanding dues and surcharge by beneficiaries

TCC Deliberations

C.1.1 Representative of NHPC, SJVNL, THDC, POWERGRID and NPCIL informed the TCC members regarding the status of their outstanding dues. The details of the same were enclosed in the Agenda note of this meeting.

C.1.2 Utility-wise updated status as intimated during the meeting was mentioned below:

NHPC

C.1.3 Representative of NHPC informed that the total outstanding dues of more than 60 days as on 24.06.2018 were Rs 500.22 crore for PDD, J&K, Rs 118.29 crore for UPPCL, Rs 35.62 crore for PSPCL and Rs 9.56 crore for JdVVNL.

C.1.4 Representative of PDD, J&K informed that they had approved the bills, but were pending with the treasury for the release of payment. He further informed that PDD, J&K had made requisition to the Govt. to clear the dues by July 2018.

C.1.5 Representative of UPPCL informed that payment of Rs 280 crs had been made to NHPC and their remaining dues would be cleared soon.

C.1.6 Representative of PSPCL informed that a payment of Rs 15 crs had been made on 25th June 2018 and reconciliation of Rs 4.25 crs was pending. He added that Rs 72.32 crs would be released by July 2018.

C.1.7 Representative of JdVVNL was not present. NHPC informed that they had dues with Jodhpur discom and for Ajmer and Jaipur, there was no outstanding.

C.1.8 TCC expressed concern over non-payment of dues by defaulting entities and advised all members to present in the meeting to clear the dues at the earliest. Regarding JdVVNL, NHPC was advised to take up the issue with the utility.

SJVNL

C.1.9 Representative of SJVNL informed that an agreement had already been made with BYPL for payment of outstanding dues.

C.1.10 SJVNL also informed that payment from Punjab was being delayed by 20-25 due to which Punjab became liable to pay LPS. He requested Punjab to avoid this delay so that LPS can be avoided.

C.1.11 Representative of UPPCL stated that they had made a payment of Rs 117.07 crs.

C.1.12 Representative of HPSEBL informed they had reconciled dues worth Rs 179.31 crs out of which Rs 38 crs had been paid and for the rest they would take up the matter with Government of HP. He mentioned that the payment against current bills were being made regularly and LPS would be reconciled within one month.

THDCIL

C.1.13 Representatives of BRPL and BYPL were not present in the meeting.

C.1.14 Representative of THDCIL stated that their PPA agreement had a provision of nominating a nodal officer for all payment related issues. He requested all the members to provide names of nodal officers who will serve as a single point of contact for all such issues. Representative of NHPC also endorsed the views of THDCIL in this regard.

C.1.15 Representative of PDD, J&K stated that a new Trading Company was in the process of formation and a cabinet note has already been approved in this regard. He added that all dues would be cleared by August 2018.

C.1.16 Representative of UPPCL informed that they had released payment of Rs. 503 crore.

C.1.17 Representative of THDCIL stated that an amount of Rs. 0.89 Cr. towards Late Payment Surcharge was outstanding with PSPCL, Punjab for a long time.

C.1.18 TCC advised THDCIL to reconcile the matter of outstanding dues with PSPCL mutually.

PGCIL

C.1.19 Representative of PGCIL stated that outstanding dues of more than 90 days was Rs 60 crore and between 60 to 90 days at Rs 38 crore for PDD, J&K as on 24.06.2018.

C.1.20 Representative of UPPCL informed that Rs 149.5 crore had already been made last week.

NPCIL

C.1.21 Representatives of PSPCL, UPPCL and PDD J&K stated that they would check the current status and payment would be made at the earliest.

NRPC Deliberation

C.1.22 MD, UPPCL stated that they had cleared most of their dues and the payment against remaining dues would be made shortly. Regarding LPS, she stated that it would be cleared in installments.

C.1.23 NRPC expressed concern over non-payment of dues by defaulting entities and advised all members to clear the dues timely to avoid LPS and other penal provisions.

C.1.24 It was agreed that each utility would provide names of nodal officers to all central generating companies and PGCIL for effective coordination in payment related matters.

C.2 Opening of Letter of Credit (LC)

TCC Deliberations

C.2.1 Representative of SJVNL stated that as per mutually signed Power Purchase Agreement, beneficiaries have to submit a confirmed, revolving, irrevocable Letter of Credit in favour of SJVNL for an amount equivalent to 105% of average monthly

billing of preceding 12 months with appropriate bank as mutually acceptable to parties. The LC should be kept valid at all the time during the validity of the Power Purchase Agreement. However, many utilities had not opened LC of the requisite amount which is a violation of CERC regulations.

C.2.2 Representative of PDD, J&K informed that the issue of LC would be resolved after formation of the Trading Company, which is in advanced stage.

C.2.3 Representative of HPSEB stated that there was no pendency of any running bills. However, due to financial constraints there were some delays in opening of LC. He agreed to open LC at the earliest

C.2.4 SJVNL informed that for RHPS, there is a provision of escrow account in the PPA which had also not been opened by the beneficiaries so far.

C.2.5 TCC advised all constituents to open the LC as per provisions in PPA and CERC regulations.

NRPC Deliberation

C.2.6 Committee noted the TCC deliberations and advised concerned utilities to expedite to opening of LC.

C.3 Execution of Tri-partite Agreement (TPA) as proposed by Ministry of Power, Govt. of India.

TCC Deliberations

C.3.1 Representative of SJVNL stated that Ministry of Power through its letter dtd 21.07.2017 had informed that the states of Punjab and Uttar Pradesh were yet to sign / execute the TPA.

C.3.2 Representative of UP informed that they had already signed the TPA.

C.3.3 Representative of PSPCL informed that they would take up the matter with Government of Punjab. NTPC representative agreed to extend help to PSPCL for expediting the process.

C.3.4 TCC advised PSPCL to expedite the signing of the TPA.

NRPC Deliberation

C.3.5 Committee noted the TCC deliberations and advised PSPCL to sign the TPA at the earliest.

C.4 Payment of Late Payment Surcharge by the Beneficiaries of SJVN:

TCC Deliberations

C.4.1 Representative of SJVNL stated that CERC regulations provide for charging of LPS on any delayed payment released by the beneficiaries beyond the due date. Since, LPS is an integral part of energy bill, which is imposed/charged in view of CERC regulations and provisions contained in the Power Purchase Agreement, non-payment of the same is a violation of CERC regulations & PPA terms, which would attract

penal provisions like encashment of letter of credit and regulation of power. He added that while releasing the payment of energy bill, the amount of late payment surcharge was being excluded by the beneficiaries despite the fact that they had delayed the payments.

C.4.2 On the issue of waiving off some part of the LPS, it was informed that as per directives of Ministry of Power, Govt. of India, LPS could not be waived off.

C.4.3 It was clarified by NRPC Sectt. that LPS is part of the bill as per CERC Tariff Regulation 2014-19 and non- payment of the same would invite penal provisions as per CERC regulations.

C.4.4 SJVNL further informed that they were facing issues with regard to LPS payment from PSPCL as there was a lack of coordination between PSPCL and its finance department.

C.4.5 TCC advised all states to improve coordination among various departments.

C.4.6 It was agreed that the primary responsibility for making payment including LPS lies with the procuring utility in the state. The procuring utility will coordinate with all concerned departments for payment of bills including LPS.

NRPC Deliberation

C.4.7 Committee noted the TCC deliberations and advised all utilities to pay all outstanding dues along with LPS at the earliest.

C.5 Status of DSM Charges:

TCC Deliberations

C.5.1 Representative of NRLDC informed that Deviation Pool Account Fund of NR was being maintained & operated by NRLDC, in accordance with the CERC Regulations. As per Regulations 10 (1) of "Deviation Charges Related matters" the payment of charges for Deviation shall have a high priority and the concerned constituents shall pay the indicated amounts within 10 days of issue of statement of Charges for Deviation including Additional Charges for Deviation by the Secretariat of the respective Regional Power Committee in to the "Regional Deviation Pool Account Fund" of the concern region.

C.5.2 The details of DSM Charges status as on 07 June 2018 considering week no-07 was enclosed in the Agenda note of this meeting.

He further informed that as the outstanding of PDD J&K, EPPL & Himachal Sorang was more than 90 days, non-clearance of the outstanding by 30th June 2018, NRLDC shall be constrained to invoke denial of STOA as per the provisions stipulated in the regulation and CERC order dated 02.09.2015 in Petition No. 142/MP/2012.

C.5.3 TCC advised all defaulting entities to clear the outstanding charges at the earliest to avoid delay payment interest on the same.

NRPC Deliberation

C.5.4 Committee noted the TCC deliberations and advised concerned utilities to expedite the clearance of all outstanding charges as per CERC Regulations.

C.6 Long pending outstanding of PDD J&K and UPPCL

TCC Deliberations

C.6.1 Representative of NRLDC stated that PDD J&K had not cleared their dues despite repeated reminders and commitment in the last TCC/NRPC meeting to clear the same by 31st March 2018.

C.6.2 He added that NRLDC vide dated 11th May 2018 had issued a notice for denial of STOA with effect from 00:00 Hrs of 15th May 2018. However, in view of assurance by J&K, of making 50% payment of due amount by 31st May 2018 and balance outstanding by end of June 2018, NRLDC had withdrawn the notice.

C.6.3 He informed out of the total outstanding of 110 crores, PDD J&K had made some payment. However, dues of Rs 40.62 crore were still pending with PDD, J&K. In case of non-clearance of the outstanding as per the commitment by 30.06.2018, NRLDC would be constrained to invoke denial of STOA in line with CERC regulation, with effect from 00:00 Hrs of 01.07.2018

C.6.4 TCC suggested that NRLDC should not invoke denial of STOA for the time being keeping in view the disturbed condition in the valley and requested PDD, J&K to clear the dues at the earliest.

NRPC Deliberation

C.6.5 NRPC advised PDD J&K and UPPCL to clear all outstanding charges at the earliest to avoid any action as per CERC regulations.

C.7 Status of LC against Deviation Charges delayed payment:

TCC Deliberations

C.7.1 Representative of NRLDC informed that NRLDC vide letter no NRLDC/MO/2018-19/974-988 dated 30th April 2018, had informed all concerned entities to open the LC based on the commutation for financial year 2017-18. Details of LC status were given in the agenda.

C.7.2 Representative of HPSEBL informed that they have already opened an LC of Rs 2.42 crore for the period of 01.07.2018 to 30.06.2018.

C.7.3 Representative of DTL requested NRLDC to exempt it from opening of LC as it was making regular payments. Representative of NRLDC stated that opening of LC is a regulatory requirement and NRLDC cannot exempt any utility from it.

C.7.4 TCC requested all defaulting entities to open LC of the requisite amount at the earliest in compliance to CERC regulations.

NRPC Deliberation

C.7.5 Committee noted the TCC deliberations and advised all defaulting entities to open LC of the requisite amount as per CERC regulations.

C.8 Reactive Energy charges status as on 07.06.2018, considering week-07:

TCC Deliberations

C.8.1 Representative of NRLDC informed the status of Reactive Energy Charges, details of which were enclosed in the agenda. He informed that as the outstanding of PDD J&K and DTL was more than 90 days, in case of non-clearance of the outstanding within two weeks NRLDC would be constrained to invoke denial of STOA as per the provisions stipulated in the regulation and CERC order dated 02.09.2015 in Petition No. 142/MP/2012.

C.8.2 Representative of DTL informed that they had made a payment of Rs 2.25 crore and the balance payment would be made shortly.

C.8.3 Representative of NRLDC informed that J&K had also made most of their payment and only a small amount was outstanding.

C.8.4 Representative of HPSEBL stated that since it is a receivable entity for Reactive Energy Charges, NRLDC should expedite the payment of the receivable amount at the earliest.

C.8.5 NRLDC informed that in case of any delay in payment of receivables, interest would be applicable as per CERC regulations.

C.8.6 TCC requested all payable entities to make payment at the earliest so that payment can be made to receivable entities.

NRPC Deliberation

C.8.7 Committee noted the TCC deliberations and advised all defaulting entities to make payment at the earliest.

C.9 Congestion Charges:-

TCC Deliberations

C.9.1 Representative of NRLDC informed the status of outstanding against Congestion Charges, details of which were enclosed in the agenda.

C.9.2 Representative of NRPC Sectt. informed that in the 34th CSC meeting, it was decided that the due date of payment for the congestion charge account issued on 14.07.2017 for the week 01-06-2015 to 07-06-2015 would be 30th June 2018. Accordingly, the interest calculation towards congestion charges would be revised.

C.9.3 Representative of PDD J&K and SJVNL stated that they had already made the payment.

C.9.4 Representative of HPSEBL requested for reconciliation. NRLDC agreed for the same.

C.9.5 TCC noted the information and advised all payable entities to make payment at the earliest.

NRPC Deliberation

C.9.6 Committee noted the TCC deliberations and advised all defaulting entities to make payment at the earliest.

C.10 Capacitor Installation in Jammu and Kashmir Region

TCC Deliberations

C.10.1 NRLDC representative informed that NRPC in its 6th meeting had approved the proposal for reimbursement of Rs. 2200 Lakh to PDD, J&K for installation of shunt capacitors. For which , Rs. 2200 Lakh was retained by NRLDC in Reactive Pool Account. Total amount of Rs. 1949.19 Lakhs had been released to PDD, J&K against the installation of shunt capacitor as per NRPC advisory. He added that PDD, J&K had refunded Rs. 18.03 Lakhs on 10.04.18 as a balance out of Rs. 1949.19 Lakhs.

C.10.2 He mentioned that the balance amount of Rs. 250.81 Lakhs (i.e. Rs. 2200 Lakhs - 1949.19 Lakhs) and refund amount of Rs. 18.03 Lakhs refunded by J&K in Reactive pool account was retained in the NR Reactive Energy Pool Account. He proposed that this balance amount i.e. Rs. 268.84 Lakhs (Rs. 18.03 Lakhs and Rs. 250.81 Lakhs) may be transferred to PSDF account.

C.10.3 Representative of PDD, J&K stated that they would utilize the balance amount of Rs. 2.68 crs as per the scheme within 6 months.

C.10.4 TCC recommended that PDD, J&K may utilise the balance amount and NRLDC may not transfer the money to PSDF account till further communication from PDD, J&K.

NRPC Deliberation

C.10.5 The Committee concurred with the TCC recommendation.

C.11 NRLDC Fee & Charges:

TCC Deliberations

C.11.1 NRLDC representative informed that considering up to Mar-2018 bills (due date of which is 31.05.2018) an amount of Rs. 12.82/- lakhs was outstanding against PDD, J&K towards NRLDC Fee & Charges.

C.11.2 J&K representative informed that they had released some payment in the month of April 2018.

C.11.3 TCC advised PDD, J&K to clear its outstanding dues at the earliest.

NRPC Deliberation

C.11.4 The Committee noted the TCC deliberations.

C.12 Reconciliation of Pool Accounts (Jan-18 to March 18):

TCC Deliberations

C.12.1 NRLDC representative informed that reconciliation statement of Deviation Charges and Reactive Energy Charges had been forwarded to entities and were uploaded on website by NRLDC on 10.04.2018. The constituents were requested to verify /check the same & comments if any on the same were to be reported to NRLDC by 30.04.2018.

C.12.2 He added that in case of non-receipt of any communication it would be presumed that reconciliation statement stands reconciled.

C.12.3Representative of HPSEBL informed that they had already submitted a statement for reconciliation of charges with NRLDC.

C.12.4 TCC advised all the members to reconcile the statements of all the accounts issued by NRLDC to avoid any future dispute.

C.12.5 It was also advised that in case an entity does not send any comment on reconciliation statement within the time given by NRLDC, then it should raise any issue on that statement at a future date.

NRPC Deliberation

C.12.6 The Committee noted the TCC deliberations.

C.13 Reconciliation of STOA (Short Term Open Access) Charges disbursement:

TCC Deliberations

C.13.1 NRLDC representative informed that NRLDC had sent the reconciliation statement of open access disbursement for the Quarter- 4 of financial year 2017-18 on 16th April 2018. The applicants/STU/SLDCs were requested to verify /check the reconciliation statement & comment if any on the same by 15th May 2018. He added that in case of non-receipt of any communication it would be presumed that reconciliation statement stands reconciled.

NRPC Deliberation

C.13.2 The Committee noted the TCC deliberations.

C.14 Status of AGC & Ancillary Services:

TCC Deliberations

C.14.1 NRLDC representative shared the status from week 01 to 52 of financial year 2017-18 and week 01 to 08 of financial year 2018-19. The details were given in the Agenda. He informed that all dues were settled against RRAS and AGC from pool account up to week -8.

C.14.2 TCC noted the information

NRPC Deliberation

C.14.3 The Committee noted the TCC deliberations.

C.15 TDS Certificates against STOA Charges:

TCC Deliberations

C.15.1 NRLDC representative informed that STOA charges are being deposited by the applicants in the STOA account maintained by the Nodal RLDCs. Applicants are deducting TDS in the PAN of POWERGRID for PoC Charges and in the PAN of POSOCO for STU/ SLDC/ RLDC charges. The major portion of bilateral transaction charges pertains to CTU (POWERGRID), STUs & SLDCs as compared to RLDCs operating charges.

C.15.2 He added that applicants had been requested vide letter ref no: POSOCO/NRLDC/2017/1084-1131 dt: 21.09.17 to deduct TDS in PAN of concerned PoC Charges (POWERGRID PAN), STU/SLDC Charges (concerned STU/SLDC PAN) & operating charges / application fee (POSOCO PAN) for approvals issued on and after 1st October-2017. Applicants had started deducting the TDS accordingly except BRPL and BYPL.

C.15.3 TCC advised that applicants should submit the TDS details Monthly & Quarterly as per formats available at NRLDC website.

NRPC Deliberation

C.15.4 The Committee noted the TCC deliberations.

C.16 TDS Reconciliation:

TCC Deliberations

C.16.1 NRLDC representative informed that TDS verification for FY 2010-11 to FY 2016-17 had been done by NRLDC. After Verification of TDS from Form-26AS, NDPL, HNGIL and Provestment were requested to pay the short deposited TDS amount in NRLDC STOA account, as per details given in the Agenda:

C.16.2 TCC advised these entities to deposit the balance amount immediately in NRLDC STOA account.

NRPC Deliberation

C.16.3 The Committee noted the TCC deliberations.

C.17 Status of Outstanding STOA Delay Payment Interest:

TCC Deliberations

C.17.1 NRLDC representative informed that as per Regulations 19(2) of Open Access Inter State Regulations 2008, the person committing default in payment has to pay simple interest @ of 0.04% for each day of default. Applicant wise outstanding interest amount (computed till 31.03.2018) was given in the Agenda.

C.17.2 He added that Punching of Application Portal was blocked for Provestment and RPPC. Letter dated 17.05.18 was sent to UPCL for follow up.

C.17.3 TCC advised defaulting constituents to clear all the outstanding towards STOA delay payment interest.

NRPC Deliberation

C.17.4 The Committee noted the TCC deliberations.

C.18 STATUS of AMR as on 07.06.2018

TCC Deliberations

C.18.1 NRLDC representative informed that LOA for installation and commissioning of AMR system for Northern Region was awarded by POWERGRID to M/s Kalkitech in February 2012. SAT (Site Acceptance Test) of 205 locations was completed in year 2016 since then no progress has been made. As on date 1342 SEMs/277 DCU had been integrated. Even in those 165 locations, 22-27 location data was received after Tuesday due to which there was delay in the issuance of account by NRPC.

C.18.2 However out of 205 locations through AMR only around 164 locations the data can be used for preparation of regional energy account due to various reasons as deliberated earlier also. The main reason for such as informed by representative of Kalkitech were

- Replacement/addition of meters with Elstermake.
- Communication issues
- ORU of the SEMs sometime removed /not placed properly
- DCU not working

C.18.3 He emphasised that the data from all locations are required for calculation of losses and preparation of weekly regional energy account. Non-availability of data from so many stations is making it difficult for NRLDC to process the meter data for loss

calculation and timely submission of data to NRPC for preparation/issuance of weekly energy accounts.

C.18.4 POWERGRID informed that they had commissioned 1341 SEMs out of which 1202 are reporting.

C.18.5 HPSEBL representative pointed out that AMR issue was pending since long. He suggested for time bound action in the matter by POWERGRID.

C.18.6 MS, NRPC pointed out that power grid should take up the matter with M/s Kalkitech and make sure that data from all sites is made available to NRLDC latest by every Tuesday. So that RPC accounts are issued timely.

C.18.7 Representative of POWERGRID pointed out that faulty L&T meters were being replaced with Elster meters as they were the ones that were complying with the technical specifications of these meters. Integration of these meters had been tested but there were some glitches which will be sorted out shortly. He also highlighted the ORU issue and requested all the members to co-operate with POWERGRID for resolving the issue.

C.18.8 TCC expressed concern over the long delay in the implementation of AMR project and directed POWERGRID to implement the project by July 2018 in all respects.

NRPC Deliberation

C.18.9 The Committee noted the TCC deliberations and directed POWERGRID to complete the project by July 2018.

C.19 Integration of AMR System with Elster Meters:

TCC Deliberations

C.19.1 NRLDC representative informed that as per the decision taken in the 38th TCC/41st NRPC meeting held on 27th & 28th February 2018 the integration of AMR with Elster Meter was to be completed within a week. However, integration of Elster Make meters by M/s Kalkitech had not even started till date.

C.19.2 MS, NRPC asked POWERGRID to demonstrate the integration of Elster made SEMs by 15th July 2018.

C.19.3 TCC expressed concern over the long delay in the matter and directed POWERGRID to demonstrate the integration by 15th July 2018.

NRPC Deliberation

C.19.4 The Committee noted the TCC deliberations and directed POWERGRID to adhere to the timeline give by TCC for integration.

C.20 AMR data through Fibre Optic Network

TCC Deliberations

C.20.1 NRLDC representative informed that the pilot project taken up by POWERGRID for transmission of AMR data from MaharaniBagh to NRLDC on wide band network had been completed successfully with necessary configuration through optical fibre link on 9th February 2018.

C.20.2 He added that during 38th TCC/41st NRPC meeting held on 27th and 28thFeb, 2018, it was agreed in principle to switchover to optical fibre network for meter data transmission, wherever feasible. TCC had requested POWERGRID to intimate the estimated cost implication for shifting of AMR data on OPGW network, wherever feasible. POWERGRID had agreed for the same. However, no such estimates have been provided by POWERGRID till date.

C.20.3 Representative of POWERGRID informed that the cost would be site specific and they would need data from each site. He requested each utility to forward details of coordinators from each site to POWERGRID so that the installation and integration work can be completed.

C.20.4 TCC advised POWERGRID to submit the cost for shifting of AMR data on OPGW network to NRPC Secretariat within by August 2018. All utilities were advised to send details of the coordinators for each site for AMR to GM(AM), NR-1, POWERGRID and NRPC Sectt. within 15 days.

NRPC Deliberation

C.20.5 Committee noted the TCC deliberations and directed POWERGRID and other utilities to adhere to the timelines given by TCC for shifting of AMR of AMR data on OPGW network.

C.21 Time drift Correction in SEMS:

TCC Deliberations

C.21.1 Representative of NRLDC informed the discrepancy report indicating the likely time drift in meters and also replacement/rectification required in special energy meters is being uploaded on the NRLDC website on a weekly basis. All constituents in whose premises the meters are installed are required to take corrective action for time correction based on the weekly discrepancy report of NRLDC. However, no improvement was observed. The details regarding utility wise SEM meters due for time correction was given in the agenda note.

C.21.2It was noted that more than 550 meters were due for time correction in April 2018.

C.21.3 MS, NRPC suggested that as decided earlier in 26th NRPC meeting, POWERGRID should replace all meters having a time drift of more than 10 minutes.

C.21.4 Representative of POWERGRID agreed to replace the meters as per the decision taken in the 26th NRPC meeting. He further informed that they would correct the time drift through AMR system but it would be limit to 1-minute correction per week.

C.21.5 Representative of NRLDC enquired whether removed SEMs can be reused after time drift correction. Representative of POWERGRID confirmed that it can be reused.

C.21.6 Representative of NRLDC requested all constituents to send the time correction report on monthly basis in the format given in the agenda at email Id: nrldcos@yahoo.com, nrldcos@hotmail.com.

C.21.7 TCC advised POWERGRID and other concerned utilities to take immediate action for correction of time drift and/or replacement of the meters.

NRPC Deliberation

C.21.8 Committee noted the TCC deliberations and directed POWERGRID and other utilities to initiate the process of time drift correction/ replacement immediately.

C.22 Compensation for part load operation of CCGT:

TCC Deliberations

C.22.1 A presentation on compensation for part load operation of CCGTs was made by NRPC Sectt. A copy of the presentation is enclosed in **Annexure - VII**. It was informed that as per the Detailed Operating Procedure on Reserve Shutdown and Compensation Mechanism issued by CERC vide order dated 15-05-2017, RPCs had been mandated to work out a mechanism for compensation for station heat rate and auxiliary energy consumption for low unit loading of CCGTs on monthly basis in consultation with generators and beneficiaries at RPC forum.

C.22.2 It was mentioned that as decided in the 33rd CSC meeting, a sub group was constituted under the chairmanship of Member Secretary, NRPC with representatives from NRLDC, TE&TD Division-CEA, TPDDL and NRPC Sectt. for finalization of the degraded SHR and APC values for gas based generating stations operating in part load operation.

C.22.3 The sub group recommended that a PG test may be conducted to ascertain the degraded SHR and APC values. Pending results of the PG test, billing on the basis of values derived from HBD diagrams may be started. This billing would be subject to adjustment based on the results of PG test. It was emphasized that since more than one year has passed since the CERC issued the DOP, to avoid accumulation of compensation charges, it would be prudent to start such provisional billing.

C.22.4 Representative of NTPC informed that WRPC has already referred the matter to CERC for final values of degraded SHR and APC to be used for compensation calculation. Therefore, it would be better if NRPC also does the same so that there is uniformity in the methodology followed throughout the country. In the meantime, billing based on provisional values finalized by the sub-group may be carried out.

Representative of NTPC also highlighted that an interest component may be applicable since the billing is getting delayed. He stated that constituents should keep in mind the interest liability while taking a decision on the issue.

C.22.5 Constituents were apprehensive about provisional billing. It was stated by many constituents that their regulators may not permit them to pass on the costs which they would incur due to such provisional billing. They were of the opinion that the matter should be referred to CERC in line with WRPC.

C.22.6 TCC recommended that the matter may be referred to CERC and financial obligations, including interest if any, based on the decision of CERC will be borne by the states.

NRPC Deliberation

C.22.7 Committee concurred with the recommendations of TCC for referring the matter to CERC.

D. ITEMS FOR NRPC

D.1 Outsourcing of Technical and Non-Technical Consultants in NRPC Secretariat

D.1.1 MS, NRPC informed that as per the decision taken in the 17th NRPC meeting held on 17.07.2010, a committee was constituted for finalizing the modalities for selection of officers on short term contract, their salary structure, other terms & conditions of the service etc. Details of the finalized Terms & Conditions for appointment of technical and non-technical consultant on short terms contract in the NRPC secretariat were given in the agenda note.

D.1.2 He added that as per decision in the 26th NRPC meeting held on 13.07.2012, the upper limit of monthly fee for technical and non-technical consultant fixed in 2010 was increased by 20%. Subsequently, in the 29thNRPC meeting held on 13.09.2013 following was decided:

(a) The enhancement in upper limit of monthly fee for technical and non-technical consultant fixed in 2010 by 50%.

(b) The payment of Rs. 5000/- per month towards conveyance to Senior Consultant/ Consultant/ Junior Consultant and Rs. 2500/- per month to Accountant/ Administrator/ Junior Administrator.

(c) It was also decided that above could be implemented from 1st October, 2013.

D.1.3 He proposed to review the fee structure of the consultants since there had been significant increase in the cost of living. He suggested that the upper limit of monthly fee for technical and non-technical consultant fixed in 2010 and the payment towards conveyance charges fixed in 2013 may be increased by 100% w.e.f. 1st April, 2018.

D.1.4 On enquiry by Chairman, NRPC; MS, NRPC confirmed that funds were available to bear the financial implications arising from the increase in salary.

D.1.5 NRPC approved the proposal to increase the upper limit of monthly fee for technical and non-technical consultant fixed in 2010 and the payment towards conveyance fixed in 2013 by 100% w.e.f. 1st April, 2018.

D.2 Reimbursement of Expenditure of NRPC Sectt. for the FY 2018-19 by the members of NRPC

D.2.1 MS, NRPC informed that keeping in view the budget estimates approved by GoI for the financial year 2018-19 and expenditure likely to be incurred towards outsourcing of staff, conduct of various meetings, leasing of vehicle, petrol for vehicles, AMC of software, training etc through NRPC fund and balance amount available in the NRPC Fund, the per member contribution for the year 2018-19 was worked out to be Rs.7.0 lakh.

D.2.2 However, he proposed that the per member contribution may be kept as Rs 10.0 lakh as in case of 2017-18 keeping in view the deliberations in the 35th NRPC meeting. As

decided in the meeting, additional funds, if any, may be used for arranging capacity building programmes, workshops, brainstorming sessions and other purposes.

D.2.3 Accordingly, Rs. 10 Lakh per member was approved as the contribution for the financial year 2018-19.

D.3 Reimbursement of Expenditure of NRPC Sectt. by the members of NRPC for the year 2017-18

D.3.1 MS, NRPC stated that in the 40th NRPC meeting held on 28.10.2017, for FY 2018-19 contribution of Rs. 10.0 Lakh per member was approved for reimbursement of expenditure of NRPC Sectt. by the members of NRPC.

D.3.2 List of members from which contribution was still awaited was given in the agenda.

D.3.3 It was noted that PSPCL, Punjab and Adani Power had already paid their contribution. NRPC advised that since FY 2017-18 was already over, members should expedite the payment of their contribution.

D.4 Reimbursement of Expenditure of NRPC Sectt. by the members of NRPC for the previous years

D.4.1 MS, NRPC informed that contribution for previous years was still awaited from some members as per details given in the agenda note.

D.4.2 It was noted that from the list, Lanco Anpara had now paid their contribution.

D.4.3 NRPC expressed concern over long pending payments and advised concerned member to make payment immediately.

D.5 Membership in NRPC for Rotational Members

D.5.1 MS, NRPC proposed that the following utilities may be considered for membership for the year 2018-19

State owned distribution companies

Haryana : Dakshin Haryana Bijli Vitaran Nigam Ltd.

Rajasthan : Jaipur Vidyut Vitran Nigam Ltd.

Uttar Pradesh : Dakshinanchal Vidyut Vitaran Nigam Ltd.

Private distribution companies

Tata Delhi Power Distribution Co. Ltd.

Generating companies (installed capacity < 1000MW)

AD Hydro Power Ltd.

Inter-state Electricity Traders

JSW Power Trading Company Ltd.

D.5.2 It was informed that name of JSW Power Trading Company was recommended for membership on NRPC for the year 2018-19 by CEA. Representative of JSW Energy informed that JSW PTC is not existence any more and the membership of NRPC for inter-state electricity trader may be offered to some other trader.

D.5.3 Representative of CEA stated that the revised nomination for membership of electricity trader in NRPC for the year 2018-19 would be communicated to NRPC Secretariat.

D.5.4 Members noted the information.

D.6 Verification of NRPC Fund Account

D.6.1 MS, NRPC informed that as per the Bye-laws for NRPC Fund, the "NRPC Fund" account was required to be audited annually for each financial year. Accordingly, the NRPC fund account for financial year 2016-17 was audited by the officers nominated by Chairperson, NRPC.

D.6.2 Audit of NRPC Fund account was also carried out through the Chartered Accountant appointed with the approval of Chairperson, NRPC. The statement of audited accounts of NRPC Fund for the Financial Year 2016-17 duly audited by the Chartered Accountant was enclosed in the agenda at Annexure-D.6

D.6.3 NRPC approved the audited account.

D.7 Verification of Regional Board Fund

D.7.1 MS, NRPC informed that as per Bye-laws for Regional Board Fund (RBF), the account for each financial year was required to be audited annually by the officers nominated by Chairperson, NRPC. The auditing of expenditure of RBF account for the year 2016-17 was carried out by the officers nominated by Chairperson, NRPC and statement was placed in the agenda at Annexure-D.6.

D.7.2 NRPC approved the audited account.

D.8 HOSTING OF NEXT MEETINGS OF NRPC / TCC

MS, NRPC informed that as per agreed roster for hosting of meetings, the next meetings of TCC (40^{th}) & NRPC (43^{rd}) which is to be hosted by Punjab would become due in October 2018. Representative of Punjab agreed to host the meeting and stated the date and venue would be informed in due course.

Annexure-I

List of Participants of 39th Meeting of TCC on 27.06.2018 at Solan, Himachal Pradesh

S.No.	Name of Officer	Designation	Organization
A	**Members of TCC**		
1.	Sh. A. K. Kapur	TCC Chairman and Director (Tech)	PSTCL
2.	Sh. Asgar Ali Majaz	Dev. Commissioner (Power)	PDD-J & K
3.	Shri. R.K. Bansal	Director (E)	SJVNL
4.	Shri B.M. Sud	Director(Tech.)	HPSEBL
5.	Shri. Ajmer Singh Gill	Director(Tech.)	HVPNL
6.	Shri Rakesh jolly	Chief Engineer/SO&C	HVPNL
7.	Sh. Keshav Singh	Dir(P&C)	HPPTCL
8.	Sh. N K Sharma	Dir (Dist)	PSPCL
9.	Shri Prem Prakash	Director(O)	DTL
10.	Sh.V.B.Bomal	Director	HPGCL
11.	Shri Harjiwan Vyas	Executive Director(T)	SLDC, Delhi
12.	Shri. Chandra Mohan	Director (Op)	UPPTCL
13.	Shri S.P.Chaubay	Chief Engineer (TO)	UPRVUNL
14.	Shri Janardan Choudhary	Executive Director(O&M)	NHPC
15.	Shri K.P. Singh	Chief Engineer (E&T)	NPCIL
16.	Sh. Anil Kumar Garg	GM	ADHPL
17.	Sh. Parveen Verma	Add. GM	TPDDL
18.	Shri. D.K. Jain	General Manager	NRLDC
19.	Sh. S.S. Barpanda	General Manager	NRLDC
20.	Shri. Jagdish Kumar	Director (T)	IPGCL
21.	Sh. Karunakar Jha	GM(Comml.)	JPL
22.	Sh. N.N. Mishra	CEO	APCPL
B	**Other Participants**		
I	**NRPC, Secretariat**		
23.	Shri. M.A.K.P. Singh	Member Secretary	NRPC
24.	Shri Upendra Kumar	Superintending Engineer	NRPC
25.	Shri Hemant Kumar Pandey	Superintending Engineer	NRPC
26.	Shri B.S. Meena	Executive Engineer (P)	NRPC
27.	Shri. Ratnesh Kumar	Executive Engineer (O)	NRPC
28.	Shri Akshay Dubey	Asst. Executive Engineer(O)	NRPC
29.	Shri Vikrant Singh Dhillon	Asst. Executive Engineer(C)	NRPC
30.	Shri. Kaushik Panditrao	Asst. Engineer(P)	NRPC
II	**CEA**		
31.	Sh. Vikram Singh	Director (GM)	CEA
III	**BBMB**		
32.	Shri. Anil Gautam	Director (PR)	BBMB
33.	Sh. J. K. Gupta	CE	BBMB
IV	**DELHI**		
34.	Shri S.M. Verma	Executive Director (T)	IPGCL/PPCL

35.	Sh.Naveen Goel	Manager	SLDC, Delhi
V	**HARYANA**		
36.	Sh. Ajay kr Bansal	AEE	UHBUN
37.	Sh. N.K. Makkar	PC	SLDC/HVPNL
38.	Sh. Atul Khanna	XEN	HPGCL
VI	**HIMACHAL PRADESH**		
39.	Shri Deepak Uppal	Dy. Chief Engineer (ALDC)	HPSEBL
40.	Sh. V.P. Singh	Dir(Op.)	HPSEBL
41.	Sh. Sunil Grover	CE (Syo. Op)	HPSEBL
42.	Sh. Rajender Kumar Verma	AE	SLDC
VII	**J&K**		
43.	Sh. Sanjay Sharma	Er	PDD-J & K
VIII	**PUNJAB**		
44.	Sh. Harmesh Kumar	CE/SLDC	PSTCL
45.	Sh. Sanjeev Gupta	CE/TS	PSTCL
46.	Sh. Parmjeet Singh	CE/PPR	PSPCL
IX	**RAJASTHAN**		
47.	Sh. A. K. Arya	SE/SLDC	RVPNL
48.	Sh. C. L. Koli	SE(PP)	RVUNL
49.	Sh. B. P. Sharma	CE/PP&D	RVPNL
X	**UTTAR PRADESH**		
50.	Sh. Ashutosh Kumar	Ex. Director	UPPCL
51.	Sh. Brijesh Kr. Singh	EE	UPRVUNL
52.	Sh.S.P.Gupta	SE	UPSldc
53.	Sh. V.K. Singh	SE	DVVNL Agra
54.	Shri Mithilesh K Gupta	Executive Engineer	UPSLDC
55.	Sh. C. K. Shukla	CE	UPSLDC
56.	Sh. Amit Narain	EE	UPSLDC
XII	**NHPC**		
57.	Shri Chander Mohan	Executive Director (Comml.)	NHPC
58.	Sh.S.K.Mishra	Sr.Mgr(E)	NHPC
XIII	**NTPC**		
59.	Shri Rakesh Chopra	General Manager (Comml)NRHQ	NTPC
60.	Sh.K.K.Sinha	GM©	NTPC
61.	Sh. S.P.Kesarwani	DGM(Comml)	NTPC
62.	Sh. Shailesh Dheman	DGM(OS-RCC)	NTPC
XIV	**PGCIL**		
63.	Sh. Mukesh Khannna	GM(CTU-Plg)	Powergrid
64.	Sh. R.K. Arora	GM(AM)	Powergrid

65.	Sh. R.K. Tyagi	GM(AM)	Powergrid
66.	Sh. H.H. Sharan	AGM(LD&C)	Powergrid
XV	**SJVNL**		
67.	Sh. Ashok Kumar	DGM(C&SO)	SJVN
68.	Sh. Pramod Behera	DM(C&SO)	SJVN
69.	Sh. Avinash Jakhar	DM(C&SO)	SJVN
70.	Sh. Naveen Yadav	DM(C&SO)	SJVN
71.	Sh. Rajeev Agarwal	DGM	SJVN
72.	Sh. B.B. Kashyap	Sr. Mgr	SJVN
XVI	**THDCIL**		
73.	Sh. Rajeev Jain	Manager	THDCIL
XVI.	**NRLDC**		
74.	Sh. Gaurav Malviya	Engineer	NRLDC,POSOCO
75.	Shri H. K. Chawla	Deputy General Manager	NRLDC, POSOCO
XVII I	**Adani Power Raj. Ltd.**		
76.	Shri Manoj Taunk	General Manager	Adani Power Ltd.
XIX	**NLDC**		
77.	Sh. N.Nallarasan	DGM	NLDC,POSOCO
78.	Sh. M.M. Mehendale	DGM	NLDC,POSOCO
XX	**APCPL**		
79.	Shr. Dheeraj Jain	DGM (Cmml)	APCPL
XXI	**Uttarakhand**		
80.	Sh. Sanjay Kumar Tamta	CE Coml	UPCL
81.	Sh. Pankaj Kumar	SE	PTCUL
XXII	**UT of Chandigarh**		
82.	Sh. Subhash Chand Saini	XEN-PC	CED Chandigarh
83.	Sh. Samir Kumar	AAE	CED Chandigarh

Annexure-II

List of Participants of 42nd Meeting of NRPC on 28.06.2018 at Solan, Himachal Pradesh

S.N	Name of Officer	Designation	Organization
A	**Members of NRPC**		
1.	Shri A. Venu Prasad	Chairperson, NRPC and CMD	PSTCL
2.	Shri. Amit Gupta	Managing Director	UPPTCL
3.	Smt. Aparna U	Managing Director	UPPCL
4.	Shri Harjiwan Vyas	Executive Director(T)	SLDC, Delhi
5.	Shri Rakesh Jolly	Chief Engineer /SO&Comml.	HVPNL
6.	Shri Rajesh Kapoor	Chief Engineer	SLDC,HP
7.	Shri M.A.K.P. Singh	Member Secretary	NRPC
8.	Shri. R. K. Sharma	MD	HPPTCL
9.	Sh. Karunakar Jha	GM(Comml.)	JPL
10.	Sh. N.N. Mishra	CEO	APCPL
11.	Sh. Anil Kumar Garg	GM	ADHPL
12.	Sh. Satish Jindal	CEO (Trading)	JSW Energy Ltd.
B	**Members of TCC**		
13.	Sh. A. K. Kapur	TCC Chairman and Director (Tech)	PSTCL
14.	Sh. Asgar Ali Majaz	Dev. Commissioner (Power)	PDD-J & K
15.	Shri. R.K. Bansal	Director (E)	SJVNL
16.	Shri B.M. Sud	Director(Tech.)	HPSEBL
17.	Shri. Ajmer Singh Gill	Director(Tech.)	HVPNL
18.	Shri Rakesh jolly	Chief Engineer/SO&C	HVPNL
19.	Sh. Keshav Singh	Dir(P&C)	HPPTCL
20.	Sh. N K Sharma	Dir (Dist)	PSPCL
21.	Shri Prem Prakash	Director(O)	DTL
22.	Sh.V.B.Bomal	Director	HPGCL
23.	Shri Harjiwan Vyas	Executive Director(T)	SLDC, Delhi
24.	Shri. Chandra Mohan	Director (Op)	UPPTCL
25.	Shri S.P.Chaubay	Chief Engineer (TO)	UPRVUNL
26.	Shri Janardan Choudhary	Executive Director(O&M)	NHPC
27.	Shri K.P. Singh	Chief Engineer (E&T)	NPCIL
28.	Shri. D.K. Jain	General Manager	NRLDC
29.	Sh. S.S. Barpanda	General Manager	NRLDC
30.	Shri. Jagdish Kumar	Director (T)	IPGCL
C	**Other Participants**		

S.N	Name of Officer	Designation	Organization
I.	**NRPC, Secretariat**		
31.	Shri Upendra Kumar	Superintending Engineer	NRPC
32.	Shri Hemant Kumar Pandey	Superintending Engineer	NRPC
33.	Shri B.S. Meena	Executive Engineer (P)	NRPC
34.	Shri. Ratnesh Kumar	Executive Engineer (O)	NRPC
35.	Shri Akshay Dubey	Asst. Executive Engineer(O)	NRPC
36.	Shri Vikrant Singh Dhillon	Asst. Executive Engineer(C)	NRPC
37.	Shri. Kaushik Panditrao	Asst. Engineer(O)	NRPC
II.	**CEA**		
38.	Shri Vikram Singh	Director	CEA
III.	**BBMB**		
39.	Shri Anil Gautam	Director (PR)	BBMB
40.	Sh. J. K. Gupta	CE	BBMB
IV.	**DELHI**		
41.	Sh. S.M.Verma	E.D(T)	IPGCL/PPCL
42.	Sh. Naveen Goel	Manager	SLDC Delhi
43.	Sh. S. K. Das	(O&M)	Tata Power Delhi
V.	**HARYANA**		
44.	Sh. N.K. Makkar	PC	SLDC/HVPNL
VI.	**HIMACHAL PRADESH**		
45.	Shri Deepak Uppal	Dy. Chief Engineer (ALDC)	HPSEBL
46.	Sh. V.P. Singh	Dir(Op.)	HPSEBL
47.	Sh. Sunil Grover	CE (Syo. Op)	HPSEBL
VII.	**J&K**		
VIII.	**PUNJAB**		
48.	Sh. Harmesh Kumar	CE/SLDC	PSTCL
49.	Sh. Sanjeev Gupta	CE/TS	PSTCL
50.	Sh. Parmjeet Singh	CE/PPR	PSPCL
IX.	**RAJASTHAN**		
51.	Sh. A. K. Arya	SE/SLDC	RVPNL
52.	Sh. C. L. Koli	SE(PP)	RVUNL
53.	Sh. B. P. Sharma	CE/PP&D	RVPNL

S.N	Name of Officer	Designation	Organization
X.	**UTTAR PRADESH**		
54.	Sh. V.K. Singh	SE	DVVNL Agra
55.	Sh. C. K. Shukla	CE	UPSLDC
56.	Sh. V.K. Singh	SE	DVVNL Agra
XI.	**NHPC**		
57.	Shri Chander Mohan	Executive Director (Comml.)	NHPC
XII.	**NTPC**		
58.	Shri Rakesh Chopra	General Manager (Comml)NRHQ	NTPC
59.	Sh.K.K.Sinha	GM©	NTPC
60.	Sh. S.P.Kesarwani	DGM(Comml)	NTPC
61.	Sh. Shailesh Dheman	DGM(OS-RCC)	NTPC
XIII.	**PGCIL**		
62.	Sh. Mukesh Khannna	GM(CTU-Plg)	Powergrid
63.	Sh. R.K. Arora	GM(AM)	Powergrid
64.	Sh. R.K. Tyagi	GM(AM)	Powergrid
65.	Sh. H.H. Sharan	AGM(LD&C)	Powergrid
XIV.	**SJVNL**		
66.	Sh. Ashok Kumar	DGM(C&SO)	SJVN
67.	Sh. Pramod Behera	DM(C&SO)	SJVN
68.	Sh. Avinash Jakhar	DM(C&SO)	SJVN
69.	Sh. Naveen Yadav	DM(C&SO)	SJVN
70.	Sh. Rajeev Agarwal	DGM	SJVN
71.	Sh. Romesh Kapoor	CGM (C&SO)	SJVN
XV.	**THDCIL**		
72.	Sh. Rajeev Jain	Manager	THDCIL
XVI.	**NRLDC**		
73.	Sh. Gaurav Malviya	Engineer	NRLDC,POSOCO
74.	Shri H. K. Chawla	Deputy General Manager	NRLDC, POSOCO
XVII.	**Adani Power Raj. Ltd.**		
75.	Shri Manoj Taunk	General Manager	Adani Power Ltd.
XIX	**NLDC**		
84.	Sh. N.Nallarasan	DGM	NLDC,POSOCO
85.	Sh. M.M. Mehendale	DGM	NLDC,POSOCO

S.N	Name of Officer	Designation	Organization
XX	**APCPL**		
86.	Shri. Dheeraj Jain	DGM (Cmml)	APCPL
XXI	**Jhajjar PL**		
87.	Sh. Karn Pratap Singh	DM	JPL
XXII	**Uttarakhand**		
88.	Sh. Sanjay Kumar Tamta	CE Coml	UPCL
89.	Sh. Pankaj Kumar	SE	PTCUL
XXIII	**UT of Chandigarh**		
90.	Sh. Subhash Chand Saini	XEN-PC	CED Chandigarh

Annexure - III

केन्द्रीय विद्युत अनुसंधान संस्थान
(भारत सरकार की सोसाइटी, विद्युत मंत्रालय)
प्रो सर सी. वी. रामन रोड़, सदाशिवनगर डाक घर, पो. बा. सं. 8066, बेंगलूर - 560 080
CENTRAL POWER RESEARCH INSTITUTE
(A Govt of India Society under Min. of Power)
Prof. Sir C.V. Raman Road, Sadashivanagar P.O., P.B. No. 8066, Bangalore - 560 080, India
वेबसाइट/website : http://www.cpri.in

No. 2/9/PSD/2018/NRPC/03

27. April., 2018

To,
Shri Upendra Kumar,
Superintending Engineer (operation),
Northern Regional Power Committee,
Central Electricity Authority,
18-A, Shaheed Jeet Singh Marg,
Katwaria Sari,
Delhi -110016

Dear Sir,

Sub: System Study for capacitor requirements in Northern Region for 2019-20
Ref: No. NRPC/OPR/104/05/2018/1274 dated 24/01/2018
NRPC/OPR/104/05/2018/2301 dated 13/02/2018
NRPC/OPR/104/05/2018/4107 dated 10/04/2018

Referring the letter no. NRPC/OPN/104/1/2016/5512 dated 15/06/2016, Power systems Division of Central Power Research Institute (CPRI) carried the capacitor bank requirement studies at 220/132 kV level for northern region for year 2017-18 and submitted the report for same studies. Studies for year 2018-19 was pending as data was due from utilities However during deliberation held at NRPC, where it was proposed to extend the study for distribution levels for year 2019-20. NRPC approached CPRI for detailed study for capacitor bank requirements year 2019-20 in two phases.

In view of this, Power systems Division (PSD) of CPRI is pleased to revise the earlier offer no. 2/9/PSW/NRPC/2016-17/1 dated 25/05/2016.

Revised Techno Commercial Offer for System Studies for Assessment of Capacitor requirements in Northern region for year 2019-20 for a peak loading condition

1.0 INTRODUCTION:

Government of India has established the Northern Regional Power Committee (NRPC) Comprising of power systems and generating units of union territory of Chandigarh, states of

5	Compilation of data in simulation software	04	14
6	Base case Load flow	03	17
7	Cap. Requirements at 220/132 kV level-Stage-1	04	21
8	Stage-1:draft report(Only Results in Tabular form)	02	23
9	Comments on Stage-1 draft report	02	25
10	Cap. Requirements at 66/33/11 kV level-Stage-2	08	33
11	Stage-2:draft report(Only Results in Tabular form)	02	35
12	Comments on Stage-2 draft report	02	37
13	Final report	03	40
15	Total execution time		40

NRPC has to furnish the readily PSSE operational load flow file from NLDC for transmission level upto 220/132 kV and same will be used as base file for carrying out the cap. Bank requirement for stage-1 and stage-2 studies.

4.0 CONSULTANCY CHARGES

The consultancy charge for carrying out above scope of work will be as under:

S. No	Activity	Consultancy charges in Lakhs (INR without GST)
1	Stage-1 studies	20 **(As per PO no *NRPC/OPN/104/1/2016/5512 dated 15/06/2016)***
2	Stage-2 studies	12 **(Additional Consultancy charges)**
Total Consultancy charges		**32**

The CPRI has already raised two bills of worth (i) Rs 2.0 lakhs plus taxes dated 23/2/2017 (ii) Rs 12 lakhs plus taxes on 31/05/2017. The total value of the both the bills amounts to Rs 14.00 lakhs plus taxes. These bills corresponds to partial work executed under **PO no *NRPC/OPN/104/1/2016/5512 dated 15/06/2016.*** NRPC is requested to clear these bills from the stage-1 consultancy charges mentioned above.

5.0 TERMS OF PAYMENT

Terms of payment towards consultancy charges are as follows:

1. 2.0 lakhs (Bill raised 23/2/2017) after released of revised PO.
2. 12 lakhs plus tax (bill raised 31/05/2017) of the total consultancy charges on submission of draft result for stage-1 studies
3. 12 lakhs on submission of draft result for stage-2 studies
4. 06 lakhs on submission of final report.

The consultancy charges is to be paid in favour of "CPRI, through online transaction mode as per following details:

Name of beneficiary-Central Power Research Institute
Branch SBI, CPRI
IFSC Code: SBIN0010370
Account No: 10356553310.

Please note that CPRI is declared by Department of Revenue, Ministry of Finance, Government of India as Scientific Research Association (SRA) under Section 35(1)(ii) of the IT Act 1961 entailing thereby CPRI to exemption of tax under Section 10 (21) of the Income-Tax Act 1961. Therefore, no income tax shall be deducted on source while doing the payment.

6.0 SOFTWARE:

CPRI will use the licensed PSSE software for the power system studies mentioned in the scope of work.

7.0 DELIVERABLES FROM CPRI

- Load flow report for the year 2019-20 for inter-regional, intra region, inter stage tie line active and reactive power plow.
- Aggregative Cap. Bank requirement for each stage transmission/distribution utility.
- Substation wise cap. Bank requirements for each stage transmission/distribution utility.
- Final Report in duplicate after incorporating feedback from NRPC within 03 weeks of submission of Provisional Report.
- Customized data format for collection of systems data from transmission/distribution utilities. Mailed to NRPC.
- Training to transmission/distribution utilities how to fill the data in CPRI prepared data format at NRPC/transmission utilities only.

CPRI study team will address all the comments on draft report (maximum two revision only on each stage-1 and stage-2 draft report).

8.0 RESPONSIBILITIES OF NRPC

- NRPC should identify at least one officer with whom CPRI can interact regarding the studies
- NRPC shall identify one officer to provide all data regarding the studies and other data as and when required and sought by CPRI in the PSSE format required for the assessment of capacitor requirements
- It is complete responsibility of NRPC to collect all necessary data from transmission/distribution utilities in CPRI/NRPC finalized data .Excel formats only. Not pdf/scanned/word format data will be accepted by CPRI.
- NPRC shall provide the peak load PSSE operational file from NLDC.
- Input data and the network connectivity will be certified by NRPC before carrying out the studies
- NRPC shall provide concurrence of the Load flow results for further study of capacitive requirement.
- NRPC shall provide the comments on the draft report within 03 weeks of receipt of the same.
- NRPC shall provide the guest facility to CPRI study team during execution of work
- Travel and boarding and lodging beyond the contract period shall be borne by NRPC on actuals.

9.0 VALIDITY OF OFFER

This offer is valid for duration of Two (2) months from the date of submission of this offer. Beyond this period it will be subject to confirmation from CPRI.

We once again thank NRPC for proposing CPRI for this study and looking forward to work in association with NRPC for this consultancy work which is of National interest. We hope the offer suits the requirement of NRPC and do inform us for any clarification from your end. We assure you for the best of our services for this Consultancy work.

Thanking you,

Yours sincerely,

09th May 18

(K. S. Meera)
Additional Director, Power Systems Division

39th TCC and 42nd NRPC Meeting

Solan (H.P.)

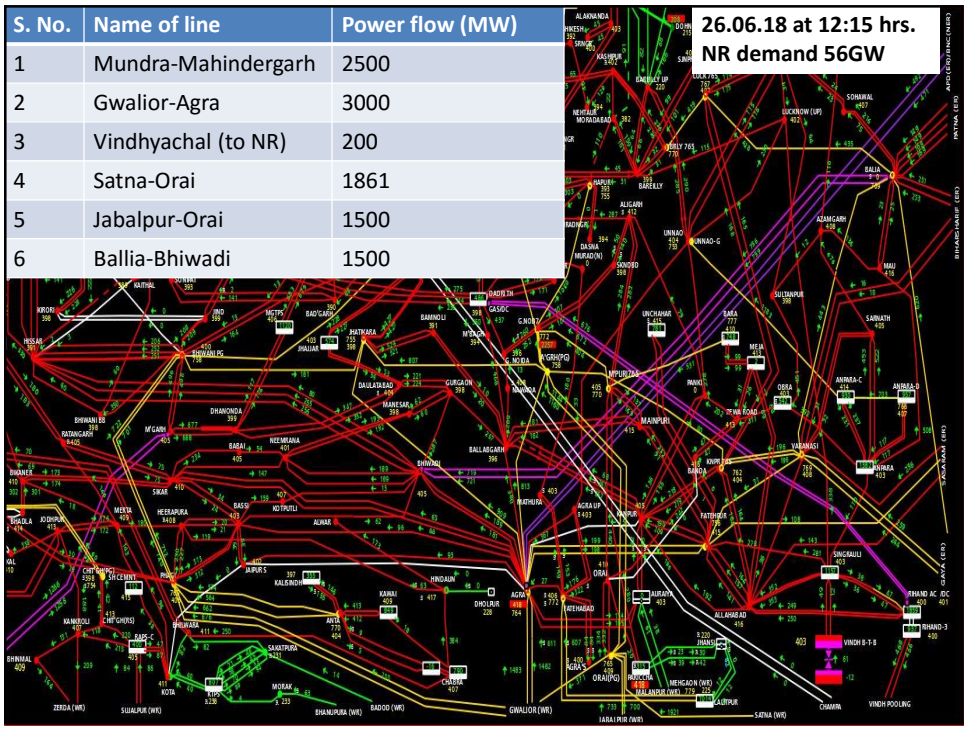
NRLDC , POSOCO

Highlights of Grid Operation

- Maximum demand met of 61952MW on 23.06.18 at 23:28hrs. (frequency in band for 80% of time & avg. frequency 49.98Hz)
- Maximum Consumption of 1394MUs on 25.06.2018 (frequency in band fo 85% of time & avg. frequency 50.00Hz)
- Coal shortages issues continued although thermal generation increased.
- (Presently, coal shortage in APCPL Jhajjar, Chhabra TPS)
- Low reservoir levels: less hydro generation
- Increased inter-regional import (capacity enhanced by 3600MW (simultaneous NR import) due to commissioning of new inter-regional line
- Maximum inter-regional exchange 313MUs on 25.06.18

- Frequent tripping of HVDC links
- More load crash events due to bad weather compared to previous years
- Prolonged line outages on tower collapse, bad weather
- Less gas availability/generation this year
- Large deviations from schedule (overdrawl as well as underdrawl)
- Frequency in the operating band only for 70% of time in May'18.
  - hourly boundary frequency excursions continued

S. No.	Name of line	Power flow (MW)
1	Mundra-Mahindergarh	2500
2	Gwalior-Agra	3000
3	Vindhyachal (to NR)	200
4	Satna-Orai	1861
5	Jabalpur-Orai	1500
6	Ballia-Bhiwadi	1500



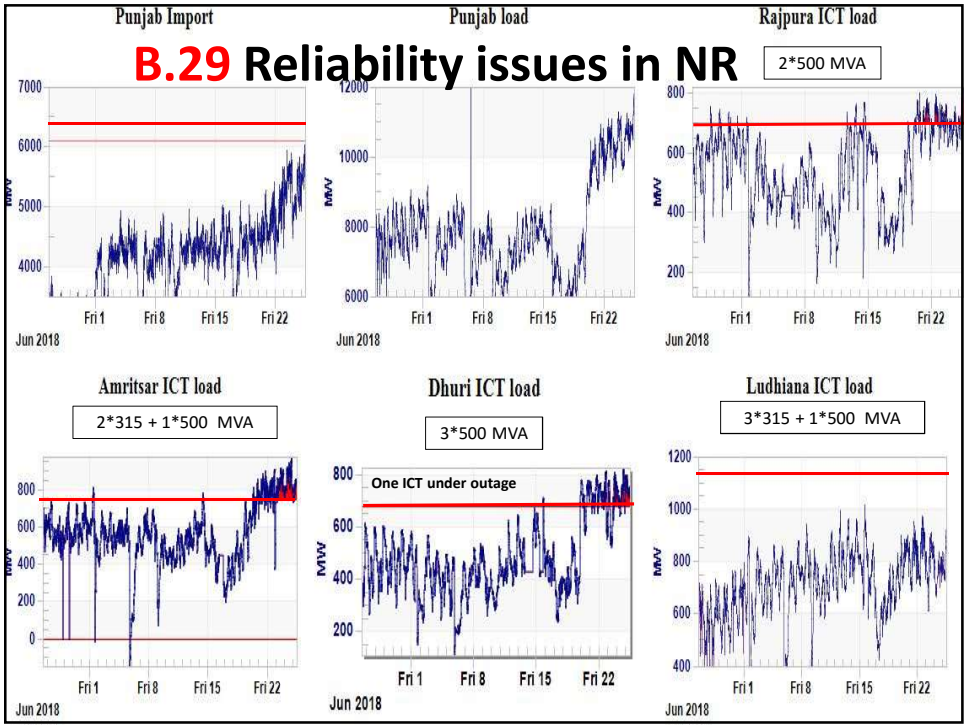
B.26 Monsoon Preparedness

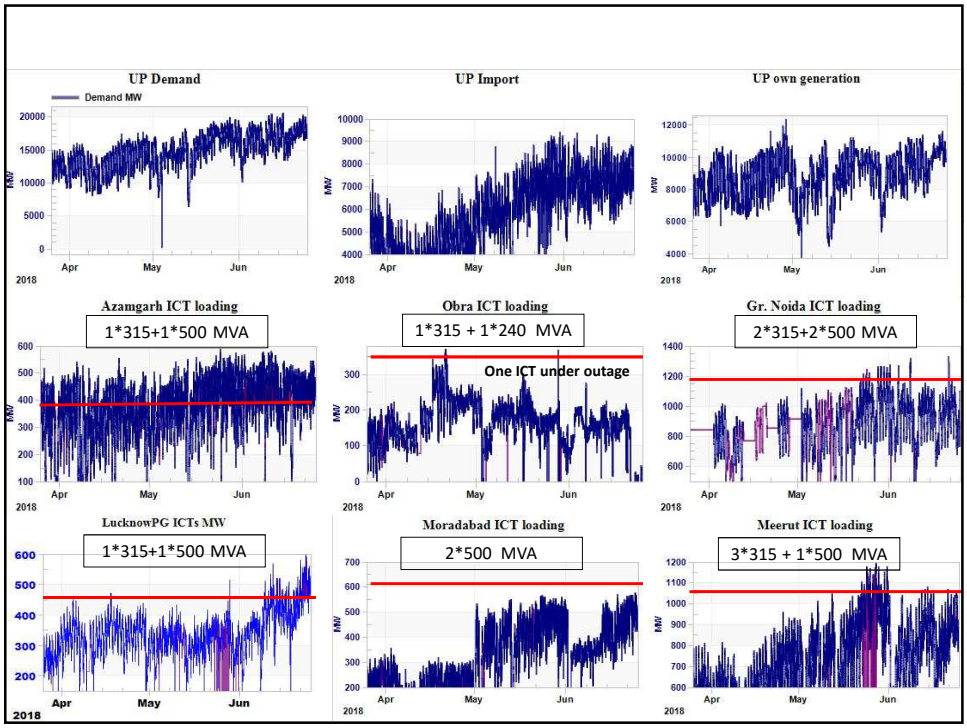
1. Period of highest demand in NR
2. ~63000MW anticipated
3. Paddy loads in Punjab and Haryana

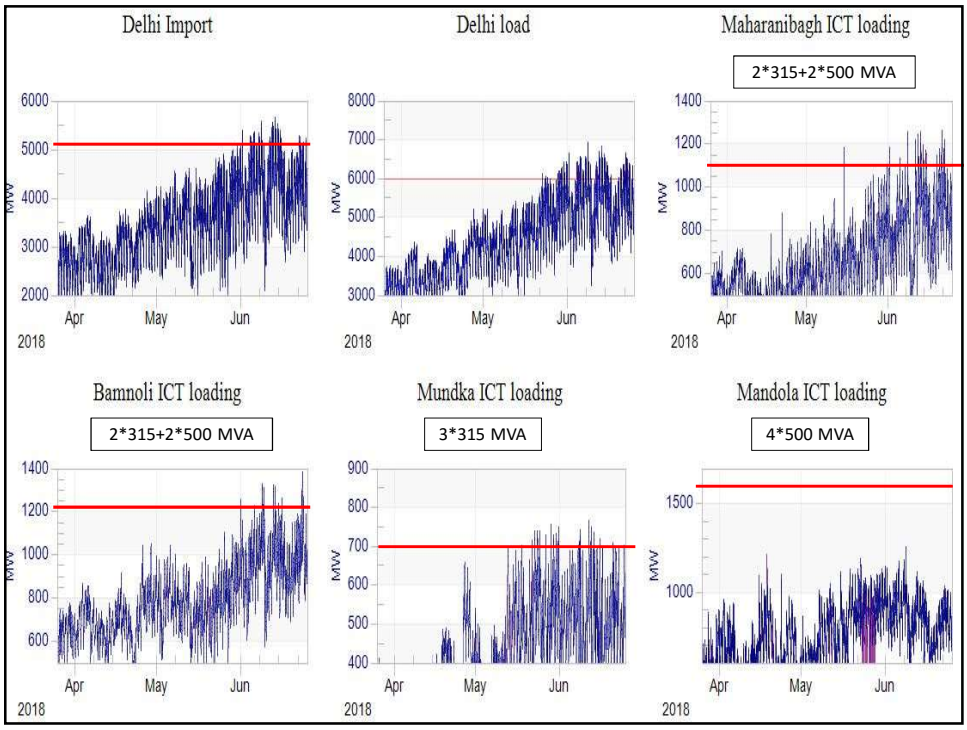
Common issues during monsoon months:

1. Coal shortage issues
2. Lack of gas/ liquid fuel availability (gas shift from WR to NR)
3. Overdrawl by states & poor frequency profile
4. Sudden outage of hydro units on silt
5. Tower collapses, multiple element trippings etc.
6. Load crash events; high demand/OD afterwards
7. Maintaining ICT & line loadings upto N-1 contingency limit

B.29 Reliability issues in NR




UP Demand
Demand MW
UP Import
UP own generation
Azamgarh ICT loading
1*315+1*500 MVA
Obra ICT loading
1*315 + 1*240 MVA
One ICT under outage
Gr. Noida ICT loading
2*315+2*500 MVA
LucknowPG ICTs MW
1*315+1*500 MVA
Moradabad ICT loading
2*500 MVA
Meerut ICT loading
3*315 + 1*500 MVA
MW
Apr
May
Jun
2018


Delhi Import
Delhi load
Maharanibagh ICT loading
2*315+2*500 MVA
Bamnoli ICT loading
2*315+2*500 MVA
Mundka ICT loading
3*315 MVA
Mandola ICT loading
4*500 MVA
MVA
Apr
May
Jun
2018

B.27 Outage of transmission elements

13 ISTS lines of 400kV & above were out on tower collapse/ damage this year:

800kV – 2 **765kV – 7** **400kV – 4** **220kV – 2**

Outage in Baspa-Karcham-Jhakri-Rampur complex

Date	Lines tripped/Lines available	Gen loss (MW)
29-Mar-18	10/14	655
5-May-18	6/14	nil
9-May-18	4/14	nil

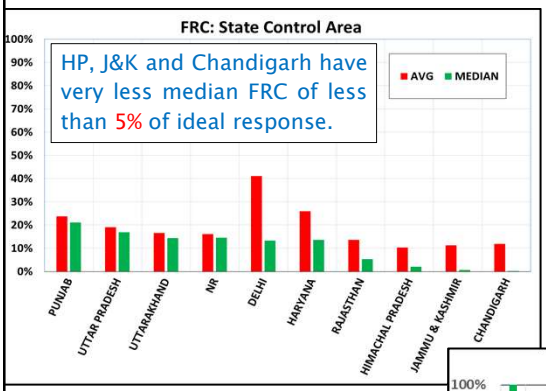
Outage in Tehri-Koteshwar complex:

Date	Lines tripped/Lines available	Gen loss (MW)
02-May-18	2/6	nil
09-May-18	2/6	350MW
13-May-18	2/6	370MW
29-May-18	2/6	590MW

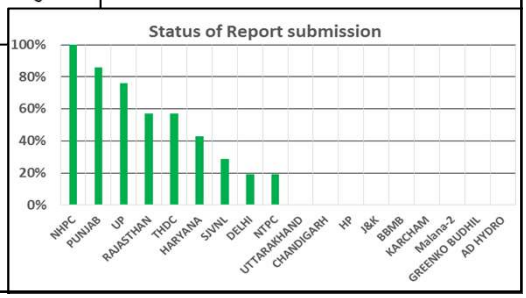
B.30 Implementation of IEGC 5th Amendment provisions

- SoR dated 13.04.18, for 5th amendment to the IEGC recently updated by CERC
- **For calculation of PAF, DC declared by the generator is not to be reduced**. Ensuring proper incentive for the generator for keeping units in readiness
- **Schedule to the beneficiaries would be restricted to Installed Capacity (IC) minus normative auxiliary consumption or the DC by generator whichever is less**
- Generators to forward the water spillage data on daily basis to RLDC for the previous day
- Generator would indicate the reasons for DC being higher than normative. Primary response would be closely observed, recorded and reported of such generators for different events in the system
- Generator to ensure that the gap between the DC and normative DC (in case former is higher) is not utilized for generating under DSM but only used for providing primary response.

B.31 FRC (Frequency Response Characteristic)

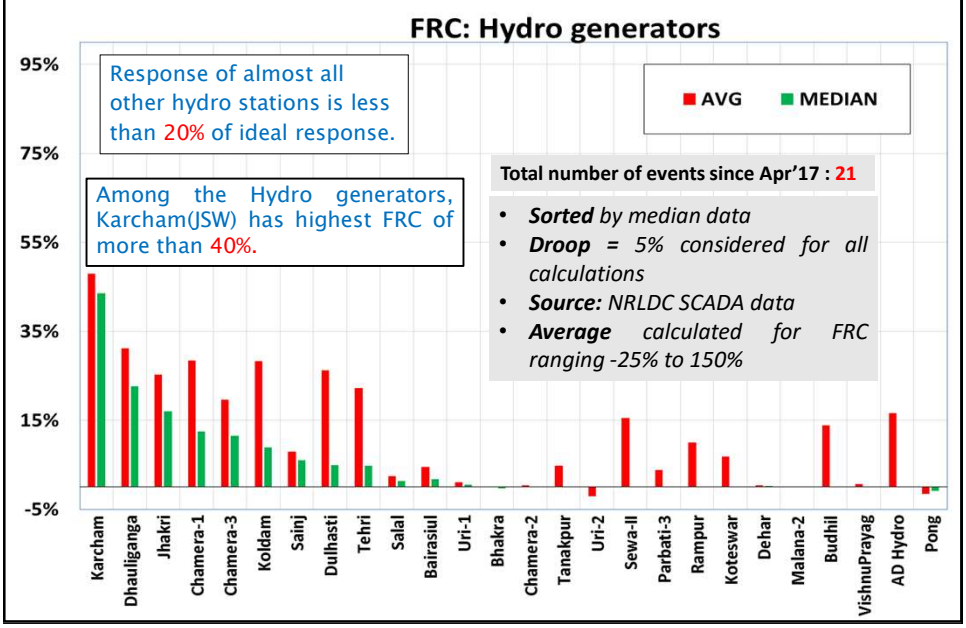


Total number of events since Apr'17 : 21



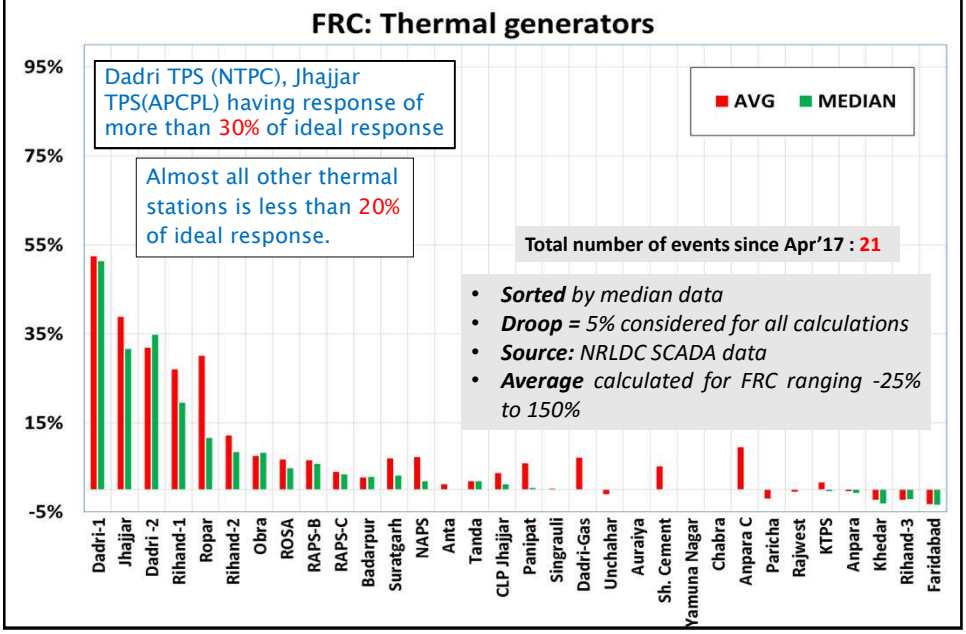
- ***Sorted** by median data*
- ***Droop** = 5% considered for all calculations*
- ***Source:** NRLDC SCADA data*
- ***Average** calculated for FRC ranging -25% to 150%*

FRC (Frequency Response Characteristic)

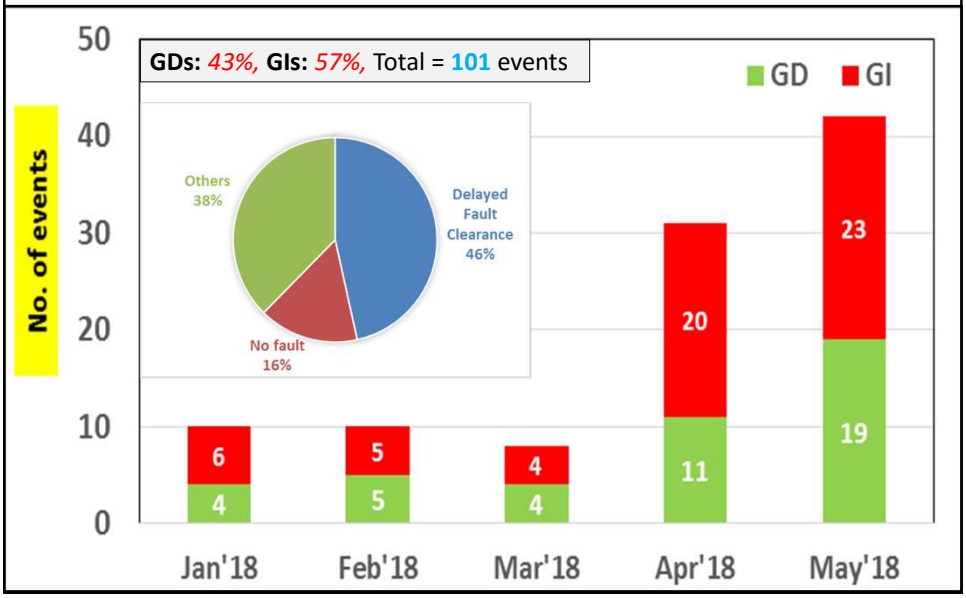


- ***Sorted** by median data*
- ***Droop** = 5% considered for all calculations*
- ***Source:** NRLDC SCADA data*
- ***Average** calculated for FRC ranging -25% to 150%*

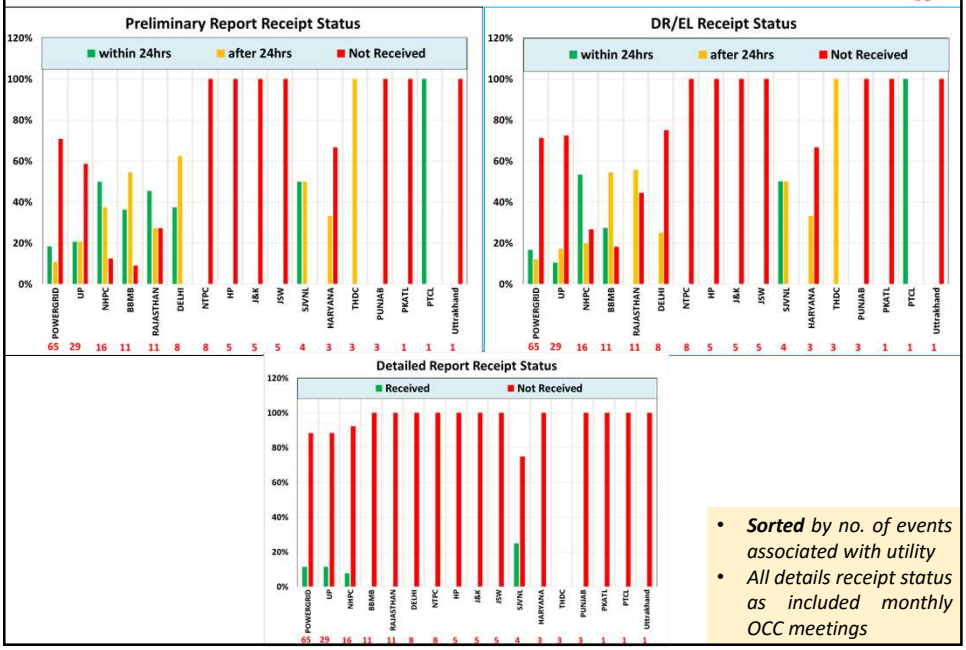
FRC (Frequency Response Characteristic)



B.32 Monthly Grid Event Summary: Jan'18 to May'18



Monthly Grid Event Summary: Jan'18 to May'18



- ***Sorted*** *by no. of events associated with utility*
- *All details receipt status as included monthly OCC meetings*

B.34 Real Time data telemetry from Renewable

- Telemetry of Renewable generation required for real time visibility & forecasting of Renewable generation
- Telemetry of Wind and Solar is very poor from Rajasthan.
- Rajasthan is requested to please arrange for Telemetry from Wind and Solar for better visibility.
- Wind generation is available at SLDC in an isolated system to be integrated with SCADA system for real time visibility across control centres

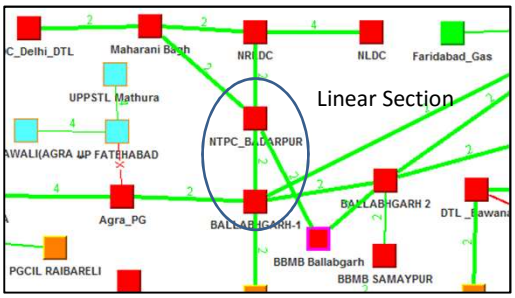
Members may discuss and finalize the timeline for availability of Telemetry.

Status of renewable generation visibility

Northern Region				
State	Wind		Solar	
	Installed Capacity(MW)	Telemetered Cap.(MW)	Installed Capacity(MW)	Telemetered Cap.(MW)
Rajasthan	4292	926	1995	712
Punjab			948	876
Haryana			50.8	35.8
Uttar Pradesh			840	680

B.35 Non redundancy in wideband network to NRLDC

- Major STM 16 wideband network coming to NRLDC on Tejas Network.
- Linear path between Ballabgarh and Badarpur Node.
- Repeated failure observed either at Badarpur or at Ballabhgarh
- Any failure at Ballabgarh and Badarpur results in outage of most of the RTU data (around 50 stations out of 124) and all URTDSM PMUs data at NRLDC.
- Failures on 17 June, 13 May, 2 March etc.



PGCIL to update redundant wide band path to NRLDC

Redundant Channel Availability

Total no of Central sector/IPP RTU = 124

Description	Present
RTU with **No** /Faulty alternate channel	39
RTU with Both channels working	85

Considerations : PLCC with long outage has been considered as non-availability

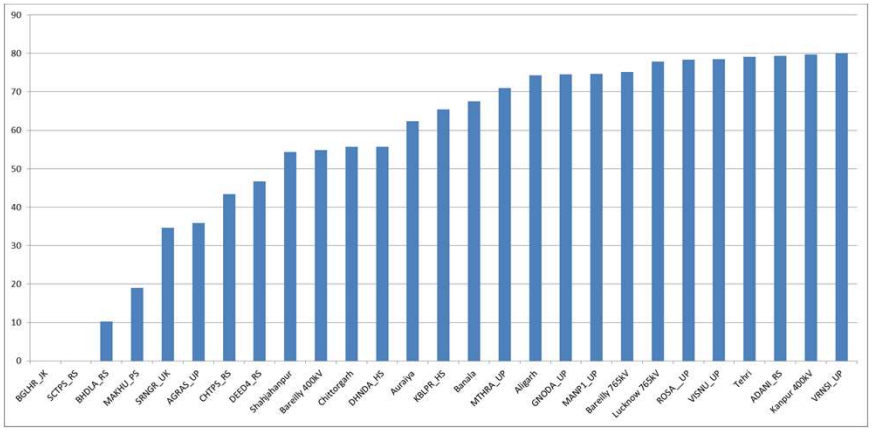
B.36 Percentage availability of Telemetry

S.No	State	CB Availability (%)	Iso Availability (%)
1	PGCIL	81	85
2	BBMB	89	74
3	HPSEB	75	66
4	UPPTCL	70	63
5	PSTCL	69	61
6	DTL	67	27
7	RRVPNL	64	60
8	HVPNL	61	59
9	PTCUL	60	52
10	JK	29	15

- Based on Real-time Snapshot on 21st June at 1000hrs
- Includes CB and Isolator status of 220 KV and above

Real time visibility due to non-availability of Status data
Leading to State Estimator output quality due to non-formation of available physical network

Telemetry Availability for the month of May 2018



B.16 Non availability/ Reliability of Telemetry		
Station	**Communication Media**	**Reason**
Budhil	Single Channel/Leased Line	Highly intermittent
Koteshwar Pooling	Dual Channel available	Availability 97% during last month
Malana	Single Channel/PLCC	Highly intermittent
Banala	Single Channel/GPRS	Highly intermittent
Maharanibagh	Dual Channel available	Frequent Gateway issue
Ludhiana	Dual Channel available	Redundancy not available for NR-II Stations
Salal	Dual Channel available	Availability 99% during last month
Aligarh	Single Channel/GPRS	Highly intermittent
Sewa-2	Single Channel/Leased Line	Highly intermittent
Chittorgarh	Dual Channel available	Path Redundancy not available
Balia	Dual Channel available	Availability 98% during last month
Chamba	Dual Channel available	Availability 98% during last month

B.18 Communication plan for channel redundancy and to back-up

- **NTPC** : Redundant ports to be arranged by NTPC at Jhajjar, Rihand-3 , Rihand NTPC , Unchahar 400 , Anta , Koldam and Badarpur . Present RTUs installed under ULDC not capable of transmitting data through Iec104.
- **NHPC** : Redun dant channel not available from Sewa-2 , Kishanganga, Uri-I , Uri-II , Parbati-II , because of communication not available.
- Port not available at Dhauliganga, NHPC to arrange redundant port at Dhauliganga.
- **NPCIL**: Redundant ports to be made available at RAPPA and RAPPC.
- PLCC communication issues for **Tehri and Nathpa Jhakri**.
- **IPP** : Single channel available from Sri Cement , Budhil , Karcham , Malana and Sorang. All request to arrange secondary channel.

Thank You

C- 5

Northern Region Deviation Charges Status as on 25.06.2018 Considering Week-10 F.Y. 2018-19

All Fig in Rs. Lakhs

S No.	CONSTITUENTS	Deviation Charges PAYABLE/ Receivable	Deviation Delay payment Interest	Total Outstanding	Remarks (Outstanding More than 90 days)
1	ER-NR	7816.96	0.00	**7816.96**	
2	JAMMU AND KASHMIR	3692.99	0.00	**3692.99**	
3	UTTAR PRADESH	3194.57	0.00	**3194.57**	
4	RAJASTHAN	1225.05	0.00	**1225.05**	
5	HARYANA	506.83	0.00	506.83	
6	UTTARAKHAND	339.86	0.00	339.86	
7	HIMACHAL PRADESH	325.14	0.00	325.14	
8	NTPC	151.90	0.00	151.90	
9	APCPL	28.41	0.00	28.41	
10	EPPL	19.66	0.00	19.66	**Since 08.12.2017**
11	SCL	15.06	0.00	15.06	
12	GREENKO BUDHIL	13.25	0.00	13.25	
13	PUNJAB	8.72	0.00	8.72	
14	HIMACHAL SORANG	1.20	0.32	1.52	**Since 27.02.2016**
15	NFL	1.05	0.00	1.05	

Note: (+)ve figure are Payable to Pool and (-)ve figures are receivable from Pool

C-7

Letter of Credit for Deviation Charges

Sl. No	Name of NR Pool members	LC Amount (Rs. in Lakh.)	Status	No of defaults in Deviation Payment in 2017-18	No of defaults in Deviation Payment in 2018-19 (upto Week-7)
1	UPPCL,UP	1258.79	LC not opened	47	7
2	UPCL, UTTARAKHAND	128.22	LC not opened	1	-
3	HPSEB, Himachal	246.61	**LC opened for Rs. 78.55 Lakh for the period of 01.11.17 to 30.06.2018, LC needs to be Enhanced.**	23	-
4	PDD,J&K	422.46	LC not opened	34	5
5	EPPL	1.84	**LC not opened** (LC of amount Rs. 3.39 Lakhs has been expired on 31.03.2018)	25	6
6	Greenko, Budhil	14.14	LC not opened	10	3
7	Punjab	228.39	LC opened for Rs. 154 Lakh for the period of 09.04.18 to 08.07.2018, LC needs to be Enhanced.	29	6
8	UT Chandigarh	85.00	**LC opened for the period from 03.04.18 to 31.03.19.**	5	-
9	PGCIL	2.06	LC not opened	15	-
10	HPPCL	3.19	LC not opened	1	-
11	DTL, Delhi	75.61	LC not opened	3	-
12	NFL	1.58	LC not opened	2	1

C-8

Reactive Energy Status of F.Y. 2018-2019 as on 25-06-2018 Considering Week-10

In Rs. Lakhs

SQ No.	Utility	Opening Balance from Previous year	Amount Payable to Pool	Amount Receivable from pool	Amount Paid to pool	Amount Disbursed from pool	Principal Outstanding
1	CHANDIGARH	-55.59	0.00	7.95	0.00	27.24	-36.30
2	DELHI	1020.59	130.88	0.42	131.05	0.00	**1020.00**
3	HIMACHAL PRADESH	-146.62	0.00	33.81	0.00	32.83	-147.61
4	HARYANA	-1786.40	0.00	195.99	0.00	300.39	-1682.00
5	JAMMU AND KASHMIR	4885.48	680.88	0.00	5196.82	0.00	**369.53**
6	PUNJAB	394.45	0.00	174.11	254.02	33.69	0.00
7	RAJASTHAN	-554.63	0.00	96.86	0.00	269.61	-381.88
8	UTTARAKHAND	-15.37	16.76	2.64	16.76	2.59	-15.42
9	UTTAR PRADESH	-2394.03	0.00	316.73	0.00	943.08	-1767.68

Note: 1. (+)ve figure are Payable to Pool and (-)ve figures are receivable from Pool
2. Delay payment interest up to Qtr-4 of financial year 2017-18 is nil

C-09

Northern Region Congestion Charges Status as on 25.06.2018

All Fig in Rs.

S No.	CONSTITUENTS	Principal Congestion Charges	Congestion Charges Delay Payment Interest (2017-18)	Net Outstanding Payable/ Receivable (In Rs.)	Remarks (Outstanding More than 90 days)
1	UTTAR PRADESH	23863013	11455221	35318234	Since 05.09.2014
2	JAMMU AND KASHMIR	17993	0	17993	Since 30.12.2017
3	HARYANA	0	696882	696882	
4	HIMACHAL PRADESH	85009	607067	692076	Since 30.12.2017
5	RAILWAYS	371471	0	371471	Since 30.12.2017
6	DELHI	0	326379	326379	
7	GREENKO BUDHIL	58637	0	58637	Since 07.08.2015
8	EPPL	0	42777	42777	
9	SJVN	30919	4365	35284	Since 30.12.2017
10	NTPC	0	2508	2508	
11	SCL	0	599	599	
12	ADHPL	0	401	401	
13	THDC	0	129	129	
14	HBPCL (KWHPS)	0	94	94	

C-10: Capacitor Installation in Jammu and Kashmir Region

- NRPC in its 6th meeting had approved the proposal for reimbursement of Rs. 2200 Lakh to PDD J&K for installation of shunt capacitors. As such Rs. 2200 Lakh was retained by NRLDC in Reactive Pool Account. Total amount of Rs. 1949.19 Lakhs has been released to PDD J&K against the installation of shunt capacitor as per NRPC advisory. Now PDD J&K vide letter dated 10.04.18 has refunded amount of Rs. 18.03 Lakhs on dated 10.04.18 as a balance out of Rs. 1949.19 Lakhs.

- The balance amount of Rs. 250.81 Lakhs (i.e. Rs. 2200 Lakhs - 1949.19 Lakhs) retained and balance amount of Rs. 18.03 Lakhs refunded by J&K in Reactive pool account, In this regard committee may please appraise the issue. NRPC concurrence may be accorded for transfer of the above balance amount i.e. Rs. 268.84 Lakhs (Rs. 18.03 Lakhs and Rs. 250.81 Lakhs) to PSDF account.

C-11 : NRLDC Fee & Charges

- Amount of Rs **13,22,668/-** is outstanding against PDD J&K against month of Feb-18 (part payment) and Mar-18

C-14 : RRAS Status

All Fig in Rs. Cr.

Week (2017-18)		Surplus in DSM A/C (A)	RRAS Billed			AGC
			Regulation UP (B)	Regulation Down ('C)	Net (D=B-C)	
W-1	(27.03.17 - 2.04.17)	9.48	12.79	0.00	12.79	
W-2	(03.04.17-09.04.17)	17.91	11.60	0.01	11.58	
W-3	(10.04.17-16.04.17)	14.88	6.87	0.06	6.81	
W-4	(17.04.17-23.04.17)	11.51	7.72	0.01	7.71	
W-5	(24.04.17-30.04.17)	1.45	16.14	0.04	16.10	
W-6	(01.05.17-07.05.17)	18.01	22.44	0.02	22.42	
W-7	(08.05.17-14.05.17)	14.52	22.54	0.04	22.50	
W-8	(15.05.17-21.05.17)	13.01	4.39	0.32	4.07	
W-9	(22.05.17-28.05.17)	15.83	6.42	0.40	6.02	
W-10	(29.05.17-04.06.17)	11.11	7.92	0.15	7.77	
W-11	(05.06.17-11.06.17)	15.66	6.50	0.11	6.39	
W-12	(12.06.17-18.06.17)	11.04	5.91	0.35	5.56	
W-13	(19.06.17-25.06.17)	12.23	3.47	0.58	2.89	
W-14	(26.06.17-02.07.17)	11.94	5.70	0.30	5.40	
W-15	(03.07.17-09.07.17)	18.61	12.78	0.10	12.68	
W-16	(10.07.17-16.07.17)	15.53	10.99	0.21	10.78	
W-17	(17.07.17-23.07.17)	20.50	12.19	0.10	12.09	
W-18	(24.07.17- 30.07.17)	23.20	15.32	0.09	15.23	
W-19	(31.07.17-06.08.17)	21.30	21.06	0.05	21.01	
W-20	(07.08.17-13.08.17)	13.01	20.42	0.02	20.40	
W-21	(14.08.17 - 20.08.17)	13.91	10.94	0.33	10.61	
W-22	(21.08.17-27.08.17)	13.17	11.09	0.09	11.00	
W-23	(28.08.17-03.09.17)	17.44	11.93	0.01	11.93	
W-24	(04.09.17-10.09.17)	36.65	43.10	0.00	43.10	
W-25	(11.09.17-17.09.17)	30.18	65.63	0.02	65.61	
W-26	(18.09.17-24.09.17)	16.41	37.30	0.37	36.93	
W-27	(25.09.17-01.10.17)	19.11	45.53	0.00	45.53	
W-28	(02.10.17-08.10.17)	29.89	68.20	0.00	68.20	
W-29	(09.1017-15.10.17)	26.57	66.99	0.02	66.96	
W-30	(16.10.17-22.10.17)	11.02	49.82	0.00	49.82	
W-31	(23.10.17-29.10.17)	14.32	31.66	0.00	31.66	
W-32	(30.10-17-05.11.17)	3.69	7.20	0.00	7.20	
W-33	(06.11.17-12.11.17)	14.30	51.27	0.00	51.27	
W-34	(13.11.17-19.11.17)	16.17	13.93	0.00	13.93	
W-35	(20.11.17-26.11.17)	20.96	4.97	0.01	4.96	
W-36	(27.11.17-03.12.17)	15.40	5.03	0.05	4.98	
W-37	(04.12.17-10.12.17)	19.08	6.98	0.06	6.92	
W-38	(11.12.17-17.12.17)	13.75	16.87	0.07	16.80	
W-39	(18.12.17-24.12.17)	10.66	32.46	0.03	32.43	
W-40	(25.12.17-31.12.17)	15.63	24.94	0.06	24.88	
W-41	(01.01.18-07.01.18)	9.85	18.58	0.17	18.42	0.35
W-42	(08.01.18-14.01.18)	12.81	8.81	0.09	8.72	1.85
W-43	(15.01.18-21.01.18)	18.38	6.24	0.01	6.23	0.53
W-44	(22.01.18-28.01.18)	17.51	9.00	0.03	8.97	0.86
W-45	(29.01.18-04.02.18)	19.05	19.70	0.00	19.70	1.29
W-46	(05.02.18-11.02.18)	23.01	8.31	0.01	8.30	0.10
W-47	(12.02.18-18.02.18)	12.81	8.13	0.02	8.11	0.68
W-48	(19.02.18-25.02.18)	16.19	9.28	0.00	9.28	0.77
W-49	(26.02.18-04.03.18)	17.82	7.62	0.01	7.60	0.56
W-50	(05.3.18-11.03.18)	25.07	15.82	0.00	15.82	0.95
W-51	(12.03.18-18.03.18)	14.08	8.64	0.00	8.64	0.92
W-52	(19.03.18-25.03.18)	12.29	15.83	0.01	15.82	1.24
Total (F.Y. 2017-18)		847.90	974.98	4.46	970.52	10.10

C-14 : RRAS Status

All Fig in Rs. Cr.

Week (2018-19)		Surplus in DSM A/C (A)	RRAS Billed			AGC
			Regulation UP (B)	Regulation Down ('C)	Net (D=B-C)	
W-1	(26.03.18-01.04.18)	17.39	11.38	0.02	11.37	1.01
W-2	(02.04.18-08.04.18)	19.78	9.90	0.00	9.90	2.47
W-3	(09.04.18-15.04.18)	10.09	8.38	0.00	8.38	2.15
W-4	(16.04.18-22.04.18)	15.99	9.51	0.00	9.51	1.31
W-5	(23.04.18-29.04.18)	17.99	8.33	0.00	8.33	2.21
W-6	(30.04.18-06.05.18)	13.82	5.75	0.00	5.75	-0.36
W-7	(07.05.18-13.05.18)	29.27	10.20	0.14	10.06	0.00
W-8	(14.05.18-20.05.18)	30.17	12.88	0.16	12.72	0.05
W-9	(21.05.18-27.05.18)	26.24	7.68	0.00	7.68	1.69
W-10	(28.05.18-03.06.18)	21.79	10.91	0.10	10.81	1.46
W-11	(04.06.18-10.06.18)	19.85	11.35	0.02	11.33	1.43
Total		**222.37**	**106.29**	**0.44**	**105.85**	**13.43**

All dues are settled against RRAS and AGC from pool account up to week -10

C-16: TDS Reconciliation

Sl. No.	FY	Name of Applicant	Amount to be Deposited (Rs)	Action Taken by NRLDC
1	2013-14	HNGIL	3,25,136	Letters regarding TDS Default were issued on dt: 20.03.17 and dt:01.08.17
2	2015-16	Provestment	6,318	Letters regarding TDS Default were issued on dt: 20.03.17 and dt:01.08.17

C-17: Status of Outstanding STOA Delay Payment Interest

Applicant Name	Outstanding Interest upto 31st March-2016	Outstanding Interest for FY -17-18 Upto Q-3	Outstanding Interest for FY -17-18 for Q-4	Total Outstanding Interest	Action Taken
Provestment	43613	0	0	43613	Punching of Application Portal Blocked
RPPC	2502273	0	0	2502273	Punching of Application Portal Blocked.
UPCL	0	0	58520	**58520**	Letter dated 17.05.18 sent for follow up

C-18:

STATUS of AMR

- LOA for installation and commissioning of AMR system for Northern Region was awarded by POWERGRID to M/s Kalkitech in February 2012.
- SAT (Site Acceptance Test) of 205 locations was completed in year 2016 since then no progress has been made. As on date 1342 SEMs/277 DCU have been integrated.
- However out of 205 locations through AMR only around 164 locations the data can be used for preparation of regional energy account due to various reasons as deliberated earlier also. The main reason for such as informed by representative of Kalkitech is
  - Replacement/addition of meters with Elster make.
  - Communication issues
  - ORU of the SEMs sometime removed /not placed properly
  - DCU not working

C-18:

STATUS of AMR

No of locations from where AMR data are received in totality and used for energy accounting for last 04 weeks have been given below:

S.No	Week No	Total no of locations Where SAT is completed	Total No of locations data received in totality	Total No of locations data received in totality by Tuesday	Total No of locations received after Tuesday
1	300418-060518	205	169	142	27
2	070518-130518	205	163	143	20
3	140518-200518	205	163	147	16
4	210518-270518	205	164	135	29

C-21

Time drift Correction in SEMs

S.No.	Name of the Utility	No of SEM meters due for time correction as on 12.02.18 -18.02.18	No of SEM meters due for time correction as on 02.04.18-08.04.18	No of SEM meters due for time correction as on 21.05.18-27.05.18
1	Delhi	12	8	8
2	Haryana	14	11	10
3	Himachal Pradesh	15	20	10
4	J&K	20	17	17
5	Punjab	41	36	36
6	Rajasthan	33	27	25
7	Uttar Pradesh	52	49	49
8	Uttarakhand	26	23	27
9	POWERGRID	357	284	245
10	NTPC	26	27	22
11	NHPC	31	29	23
12	BBMB	35	20	18
13	NPCL	7	7	7
	Total	669	558	497

B.33 Pending payment of VCS from PTCUL

- Decision was taken at NRPC level meeting to procure VC equipment by NRLDC for PTCUL as PTCUL was excluded from the SCADA up-gradation Project to have VC across all the SLDCs of Northern Region.
- M/s Siemens has supplied and installed Video Conferencing System at PTCUL under SCADA up-gradation Project.
- Procurement & Installation was done based on confirmation letter from PTCUL in which it was stated that PTCUL shall reimburse the payment to NRLDC.
- VC is presently is being used by PTCUL during various meeting like FOLD / OCC etc.
- The amount due from PTCUL is Rs. 20, 65,562.
- Already paid to Vendor by NRLDC based on the installation certificate.
- Audit observation received by NRLDC. Project closed pending payment from PTCUL
- Matter was discussed in TeST meeting. No participation from PTCUL

PTCUL is requested to please release the payment at the earliest.

B.33 Reconciliation of old AMC of Alstom System

- AMC of Alstom System at PTCUL installed under ULDC was done by Alstom till Sep 2012.
- Payment of old AMC of Alstom system is still not reconciled with PTCUL.
- Part payment released after first round of reconciliation
- Reconciled payment till date showing outstanding payment by PTCUL in the book of accounts.
- Despite repeated requests, reconciliation has not been done.
- Audit observation raised to NRLDC.
- AMC project with erstwhile ALSTOM presently M/s GE is still open due to non-payment
- Repeated request from Vendor for release of payment and Project closing

PTCUL is requested to reconcile with NRLDC and release outstanding payment.

Reliability of Telemetry

Northern Region summary sheet and details of current status of implementation of telemetry system

Updated Till: 31.05.2018

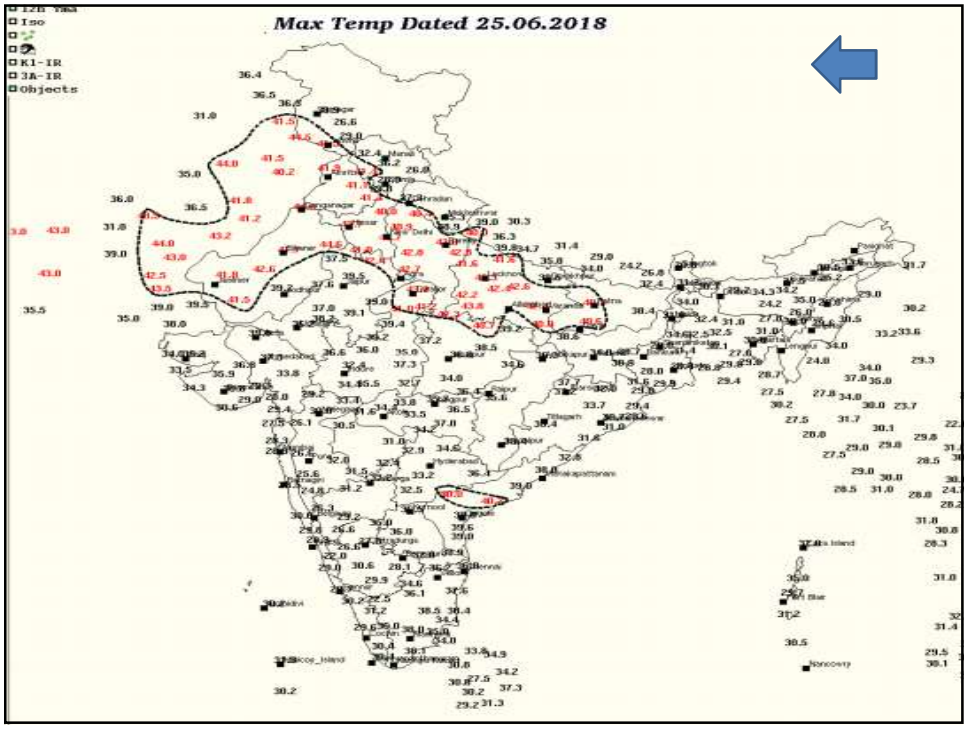
Sl. No.	User Name	Total Nos of Stations		Telemetry not Provided				Telemetry Intemittent				Total non-availability of data in %	
				Total nos of		Non-availability		Total nos of		Non-availability			
		GS	SS	GS	SS	GS	SS	GS	SS	GS	SS	GS	SS
1	Punjab	17	173	-	92	-	53%	1	18	6%	10%	6%	64%
2	Haryana	5	70	-	13	-	19%	-	15	-	21%	-	40%
3	Rajasthan	19	189	-	3	-	2%	1	12	5%	6%	5%	8%
4	Delhi	6	40	-	-	-	-	-	5	-	13%	-	13%
5	UP	20	166	-	-	-	-	-	40	-	24%	-	24%
6	Uttarakhand	10	29	-	-	-	-	7	6	70%	21%	70%	21%
7	HP	12	25	-	-	-	-	2	3	17%	12%	17%	12%
8	JK	4	17	-	-	-	-	3	10	75%	56%	75%	56%
9	POWERGRID	-	79	-	-	-	-	-	9	-	11%	-	11%
10	NTPC	14	-	-	-	-	-	4	-	29%	-	29%	-
11	NHPC	14	-	-	-	-	-	2	-	14%	-	14%	-
12	NPCIL	5	-	-	-	-	-	-	-	-	-	-	-
13	NJPC	2	-	-	-	-	-	-	-	-	-	-	-
14	THDC	2	-	-	-	-	-	1	-	50%	-	50%	-
15	BBMB	6	16	-	-	-	-	-	-	-	-	-	-
16	IPP/JV/Patran	6	2	-	-	-	-	2	-	33%	-	33%	-
	TOTAL	142	806	0	108	0%	13%	23	118	16%	15%	16%	28%
	Total (over all)	948		108		11%		141		15%		26%	

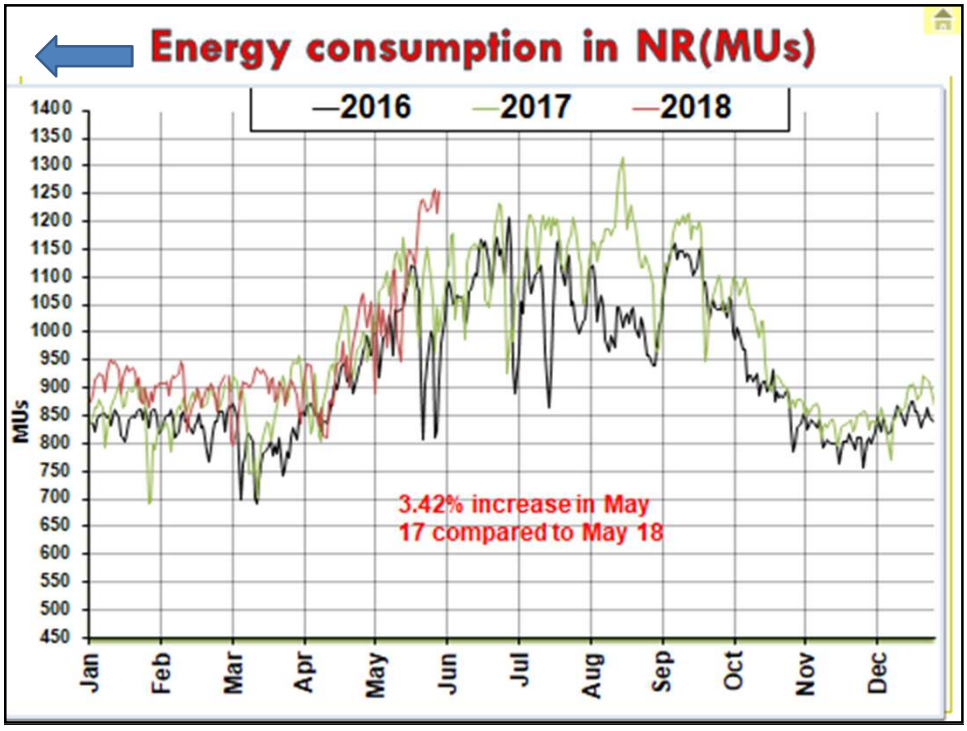
Note:
1. Constituentswise details is as furnished by SLDC's / as available at RLDC.
2. 'GS' Generating Stations and 'SS' subStations

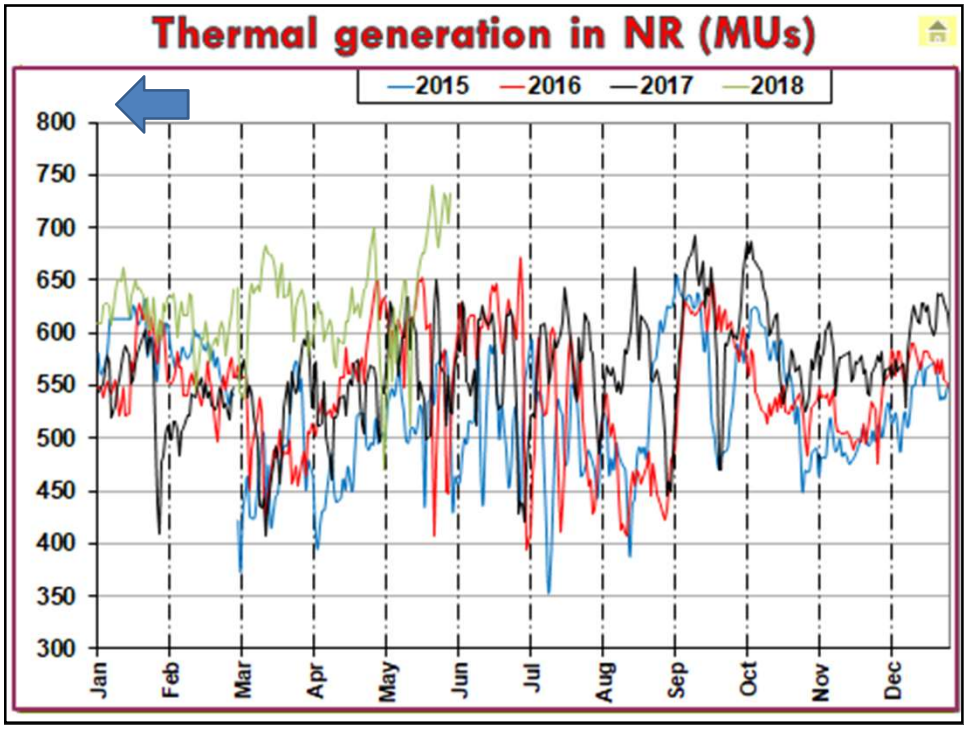
Members may discuss and ensure reliability of data.

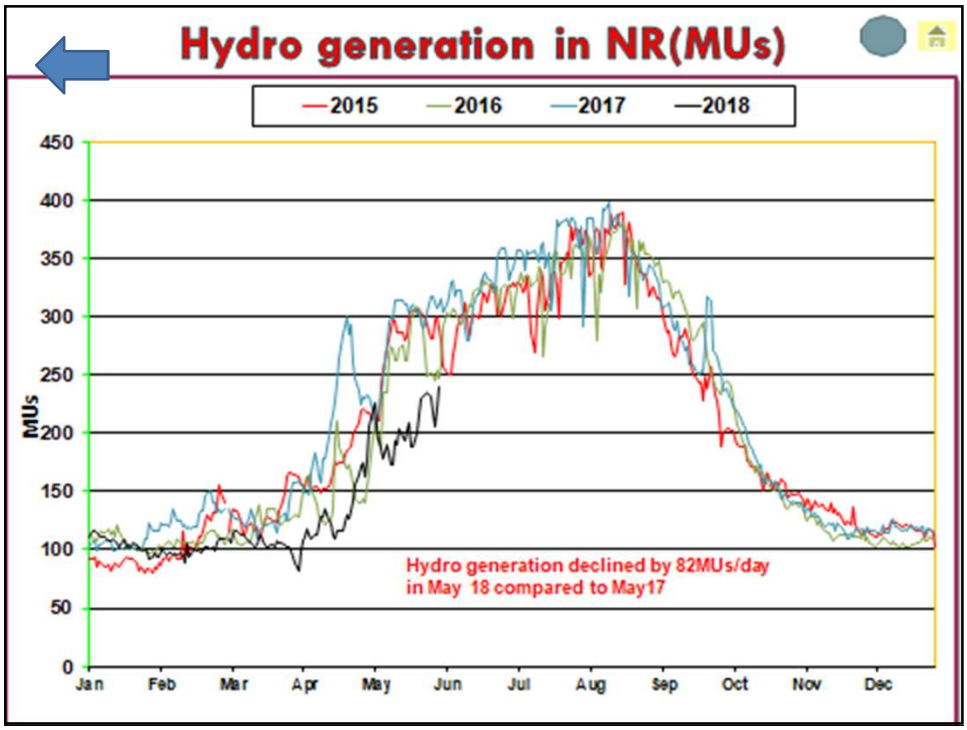
C-6 : Long pending outstanding of PDD J&K

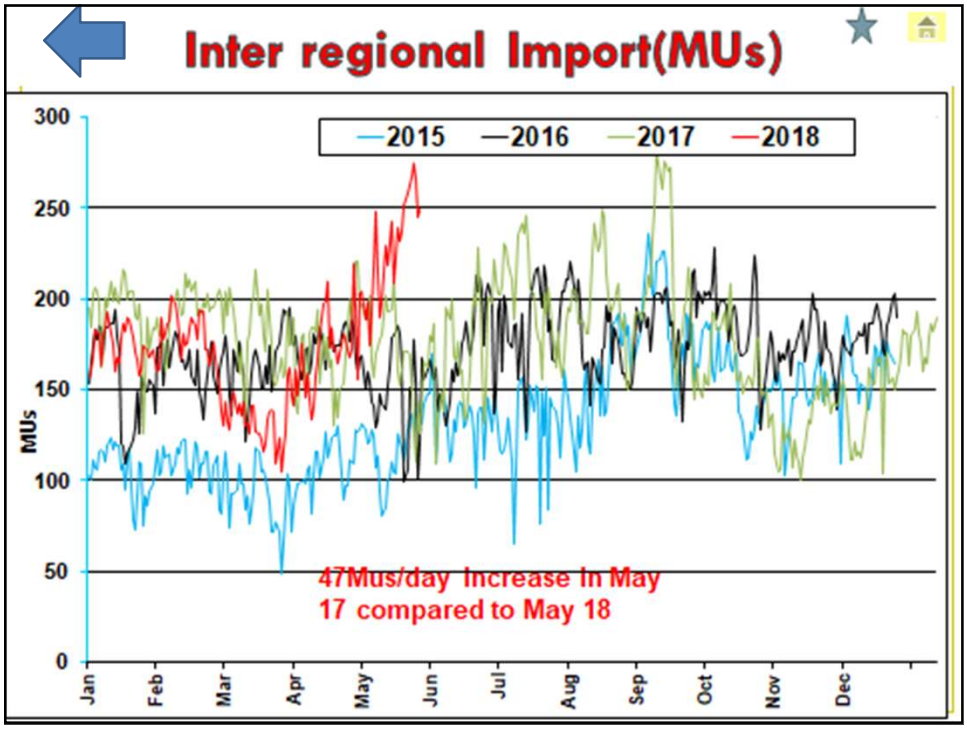
Sl. No.	Account Name	Principal (Amount in Rs. Lakhs)	Interest on Delay Payment (Amount in Rs. Lakhs)	Total (Amount in Rs. Lakhs)
1	Deviation Charges	3692.99	0	3692.99
2	Reactive Energy Charges	369.53	0.00	369.53
3	Congestion Charges	0.17993	0	0.18
	Total Outstanding			**4062.70**


Max Temp Dated 25.06.2018
Iso
K1-IR
3A-IR
Objects


Energy consumption in NR(MUs)
2016
2017
2018
MUs
1400
1350
1300
1250
1200
1150
1100
1050
1000
950
900
850
800
750
700
650
600
550
500
450
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
3.42% increase in May 17 compared to May 18


Thermal generation in NR (MUs)
2015
2016
2017
2018
800
750
700
650
600
550
500
450
400
350
300
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Hydro generation in NR(MUs)
2015
2016
2017
2018
MUs
450
400
350
300
250
200
150
100
50
0
Hydro generation declined by 82MUs/day
in May 18 compared to May17
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec



Contingencies on HVDC links

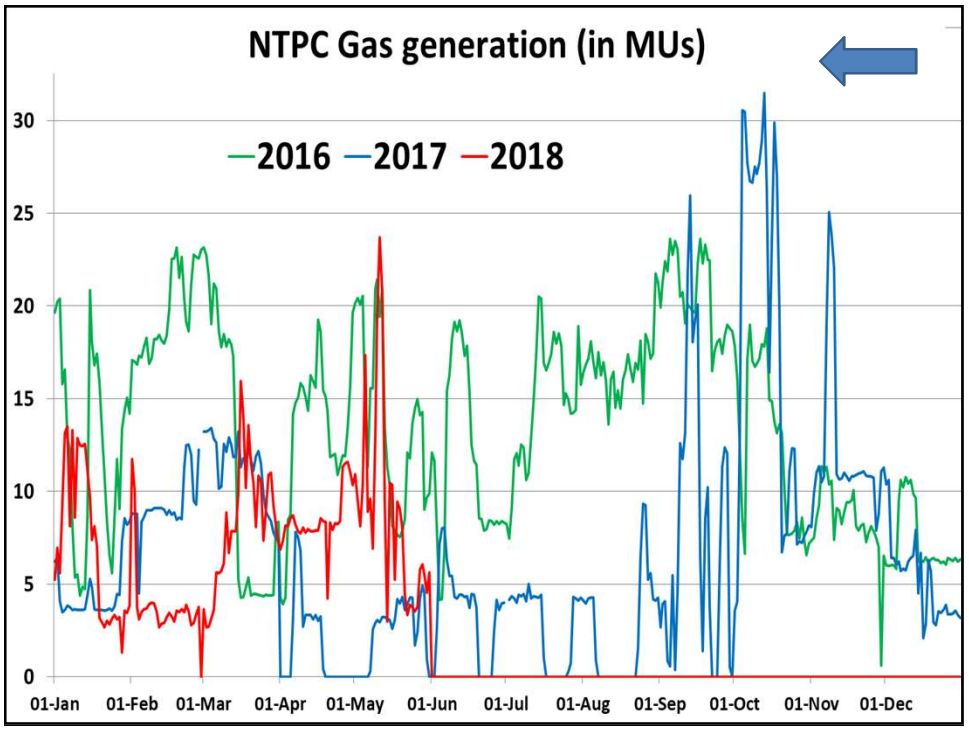
- **Frequent contingencies in HVDC Champa-Kurukshetra Bipole during October'17 to May'18:**

S.No.	Month 'A'	HVDC Pole-1 No. of trippings 'B'	HVDC Pole-2 No. of trippings 'C'	Bipole trippings included in 'B' and 'C'
1	Oct-17	4	10	1
2	Nov-17	6	8	1
3	Dec-17	3	6	1
4	Jan-18	2	4	0
5	Feb-18	4	1	1
6	Mar-18	1	2	0
7	Apr-18	10	13	3
8	May-18	11	12	7
9	June-18	5 (still out)	6	2

- **Pole1 out since 21June 2018, pole 2 tripped on 4 times during this period**
- **HVDC Vindhyachal Back-back Block-2 (250 MW capacity) of is out from 26.11.17 on account of converter transformer failure**
- **Frequent tripping of Block-1 on DC overcurrent protection.**

Outages due to tower collapse/ damage

S. No.	Line	Voltage Level	Owner	Outage Date	Revival Date	Outage days
1	Agra-Jhatikara	765 kV	PGCIL	11-04-2018	06-05-2018	56
2	Agra(PG)-Agra(UP) 1	400 kV	PGCIL	11-04-2018	28-04-2018	18
3	Agra(UP)-Fatehabad 765 (UP) 2	400 kV	PGCIL	11-04-2018	28/4/2018	18
4	Agra - Biswanath Chariali line -1	800 kV HVDC	PGCIL	02-05-2018	25-06-2018	54
5	Agra - Biswanath Chariali line -2	800 kV HVDC	PGCIL	02-05-2018	18/5/2018	17
6	Agra-Gwalior 1	765 kV	PGCIL	02-05-2018	08-06-2018	37
7	Agra(PG)-Aligarh (PG)	765 kV	PGCIL	02-05-2018	04-06-2018	33
8	Kanpur Varanasi 2	765 kV	PGCIL	03-05-2018	03-06-2018	31
9	Kanpur Varanasi 1	765 kV	PGCIL	03-05-2018	03-06-2018	31
10	Auraiya(NTPC)-Sikandra(UP) 1	220 kV	PGCIL	06-05-2018	31/5/2018	26
11	Auraiya(NTPC)-Sikandra(UP) 2	220 kV	PGCIL	06-05-2018	30/5/2018	25
12	Agra-Fatehpur	765 kV	PGCIL	13/5/2018	30/5/2018	17
13	Gaya-Varanasi-1	765 kV	PGCIL	13/5/2018	23-06-2018	41
14	Hisar-Kaithal 1	400 kV	PGCIL	09-06-2018	Still out	(Still out)
15	Hisar-Kaithal 2	400 kV	PGCIL	09-06-2018	Still out	(Still out)



B.28 Load crash events in NR

Date & Time (in hrs)	Summary	Approx. NR Load Crash (in MW)
02.05.18& 14:00	All states of NR affected Complete station outage at Agra(PG) and Muzaffarnagar	14000
07.05.18 & 23:00	Haryana, UP, Delhi most affected	7000
13.05.18 & 16:15	UP, Haryana, Delhi, Rajasthan and Uttarakhand were affected mainly	13000
16.05.18 & 02:30	Haryana, Delhi, Rajasthan and UP were affected	4000
05.06.18 & 19:00	Punjab was the affected state	6000
09.06.18 & 15:00	Haryana, UP, Delhi and Rajasthan	11000

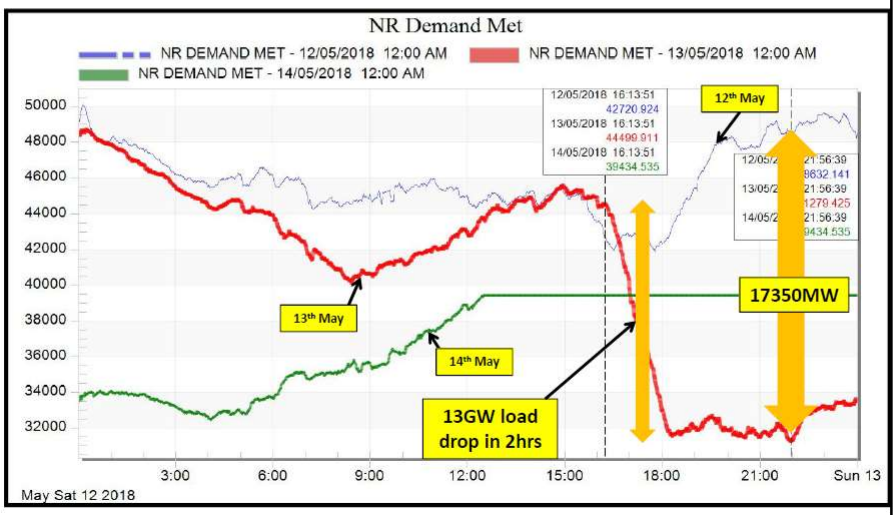
- Complete station outages in many of these events
- Manual opening of feeders results in large deviations in schedule leading to high voltages in grid
- Results in tripping on high voltages apart from trippings during bad weather

- States shall maintain their drawl as per schedule
- Keep units on bar
- Restrict deviation from schedule

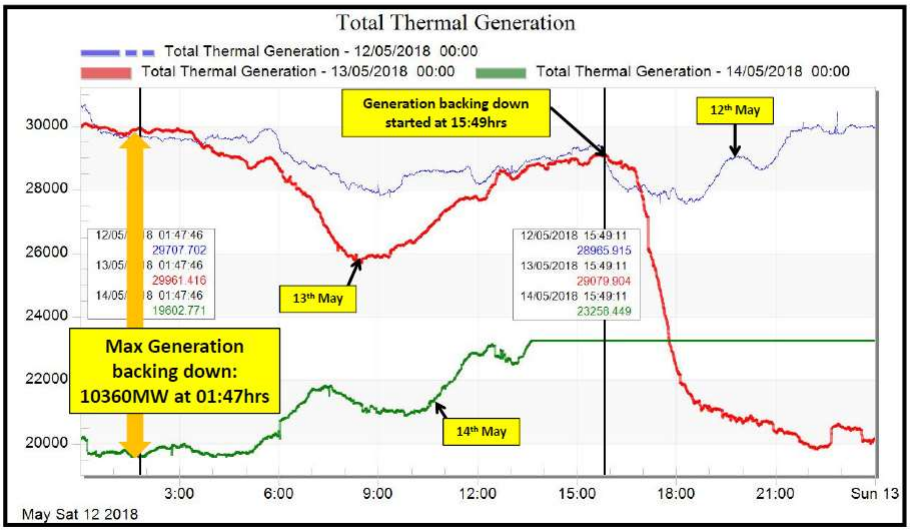
Update on categorization of all the feeders in two lists,

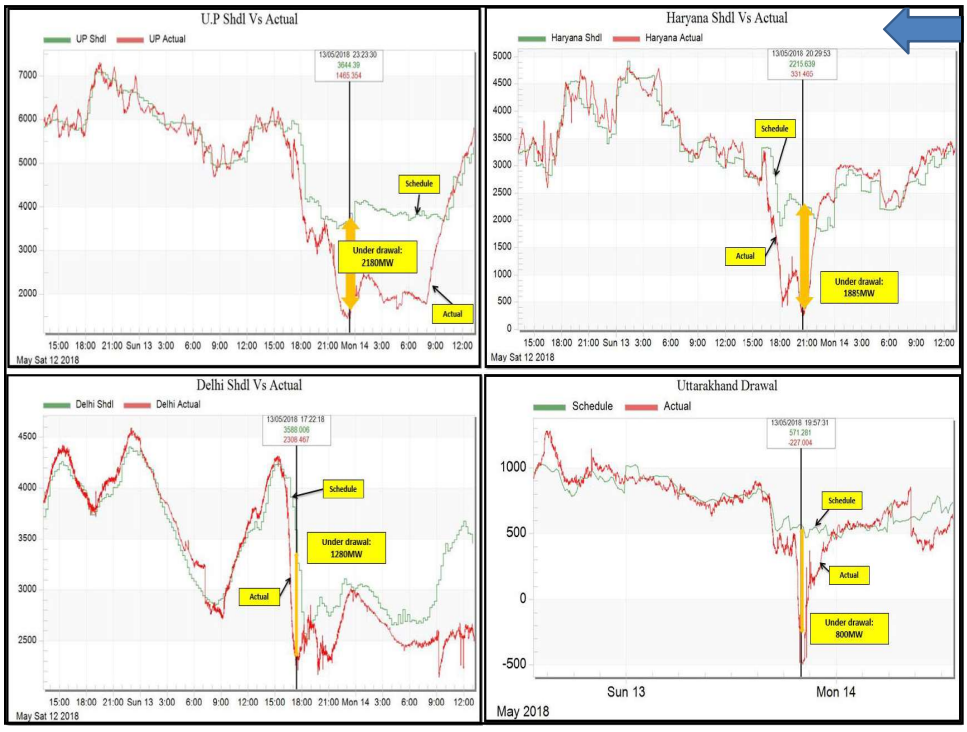
- one which do not require manual opening (in view of safety requirements)
- other with safety concern

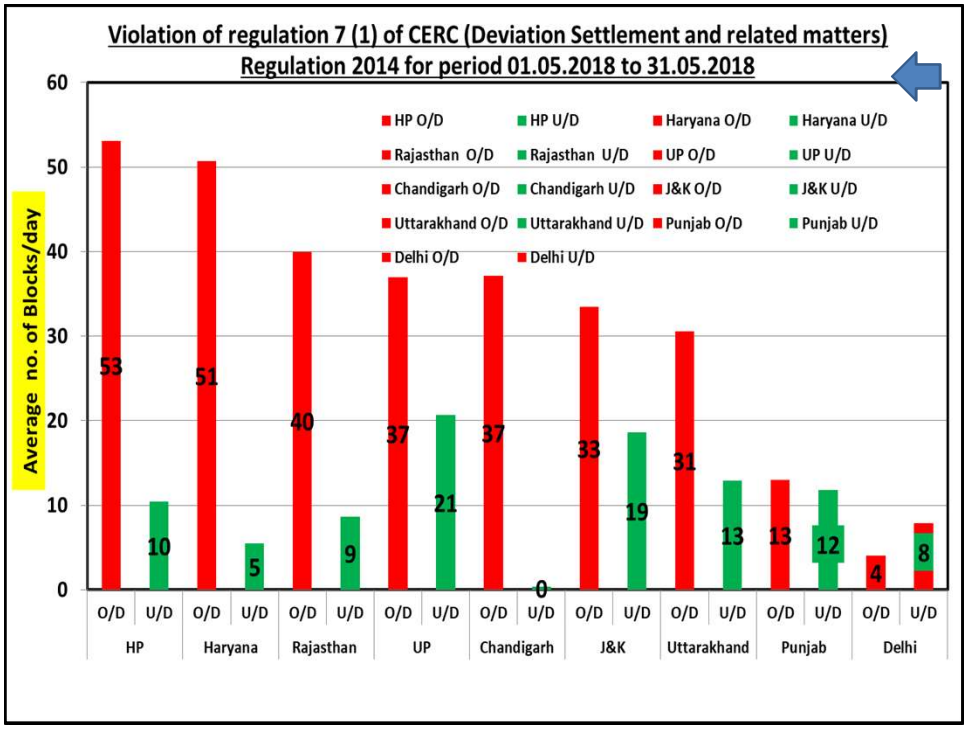
NR

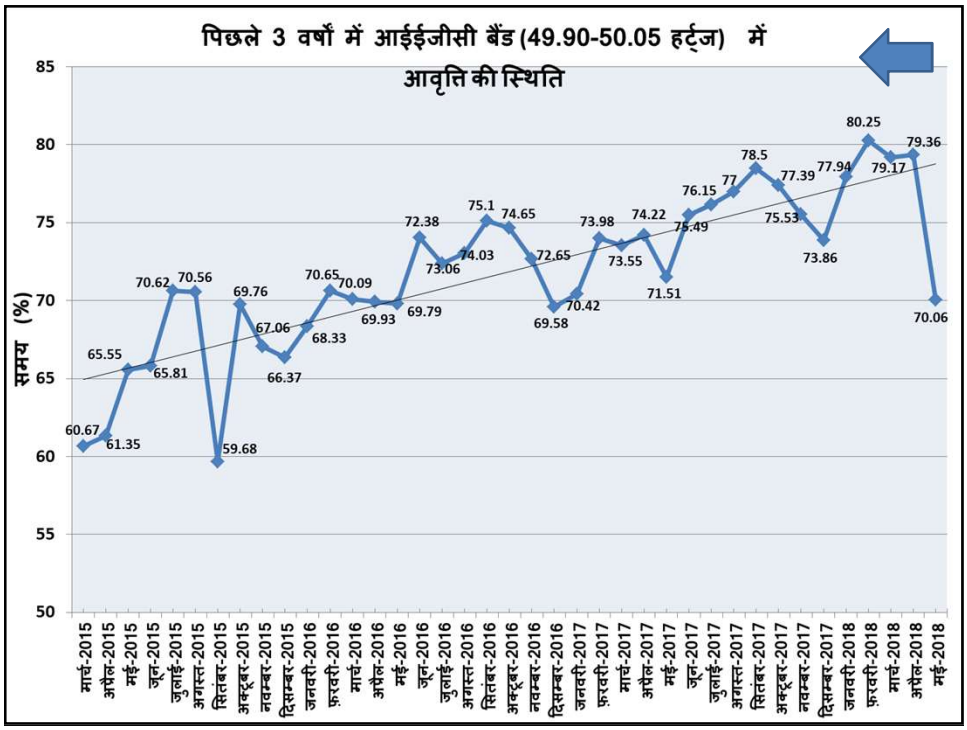


Thermal


Total Thermal Generation
Total Thermal Generation - 12/05/2018 00:00
Total Thermal Generation - 13/05/2018 00:00
Total Thermal Generation - 14/05/2018 00:00
Generation backing down started at 15:49hrs
12th May
13th May
14th May
Max Generation backing down: 10360MW at 01:47hrs
12/05/2018 15:49:11
28985.915
13/05/2018 15:49:11
29079.904
14/05/2018 15:49:11
23258.449
30000
28000
26000
24000
22000
20000
3:00
6:00
9:00
12:00
15:00
18:00
21:00
Sun 13
May Sat 12 2018


U.P Shdl Vs Actual
UP Shdl
UP Actual
Schedule
Under drawal: 2180MW
Actual
Haryana Shdl Vs Actual
Haryana Shdl
Haryana Actual
Schedule
Actual
Under drawal: 1885MW
Delhi Shdl Vs Actual
Delhi Shdl
Delhi Actual
Schedule
Under drawal: 1280MW
Actual
Uttarakhand Drawal
Schedule
Actual
Schedule
Actual
Under drawal: 800MW
Sun 13
Mon 14
May 2018
May Sat 12 2018


Violation of regulation 7 (1) of CERC (Deviation Settlement and related matters) Regulation 2014 for period 01.05.2018 to 31.05.2018
Average no. of Blocks/day
HP O/D
HP U/D
Haryana O/D
Haryana U/D
Rajasthan O/D
Rajasthan U/D
UP O/D
UP U/D
Chandigarh O/D
Chandigarh U/D
J&K O/D
J&K U/D
Uttarakhand O/D
Uttarakhand U/D
Punjab O/D
Punjab U/D
Delhi O/D
Delhi U/D
HP
Haryana
Rajasthan
UP
Chandigarh
J&K
Uttarakhand
Punjab
Delhi


पिछले 3 वर्षों में आईईजीसी बैंड (49.90-50.05 हर्ट्ज) में आवृत्ति की स्थिति
समय (%)

Annexure V

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

No: NRPC/OPR/106/04/2017/11302-307 Dated: 06.10.2017

To: As per list attached

Subject: **Meeting of the group to formulate Detailed Talent Recognition Mechanism for the Protection Engineers-reg.**

As per the recommendations of the group constituted in Aug 2015 to suggest measures for improvement in protection system of Northern Region , it was decided in 38th NRPC meeting that the effort of the protection engineers needs to be acknowledged and rewarded by the management. Consequently, a group comprising of members from utilities was constituted to formulate Detailed Talent recognition mechanism for the Protection Engineers. However, due to transfer/posting of some of the members of the committee, the name of the members has been revised and new formation of the committee is as under:

1.	Sh. M. A. K. P. Singh	MS, NRPC.....Chairman
2.	Sh. Upendra Kumar	SE, NRPC.....Convener
3.	Sh. S. D. Agnihotri	CE, HPSEB
4.	Sh. Loveleen Singh	GM, DTL
5.	Sh. A. Sensarma	Addl. GM, POWERGRID
6.	Sh. Shekhar Agarwal	CE (Transmission Central), UPPTCL

A meeting of the group is scheduled to be held on 23.10.2017 at 15:00 hrs at NRPC Secretariat, New Delhi. Please make it convenient to attend the meeting.

Upendkumar
06/X/17
(Upendra Kumar)
Superintending Engineer, NRPC

18-ए, शहीद जीत सिंह मार्ग, कटवारिया सराय, नई दिल्ली- 110016 फोन:011-26967842 फैक्स: 011-26865206 ई-मेल: seo-nrpc@nic.in वेबसाईट: www.nrpc.gov.in
18-A, Shaheed Jeet Singh Marg, Katwaria Sarai, New Delhi-110016 Phone: 011-26967842 Fax: 011-26865206 e- mail: seo-nrpc@nic.in Website:

List of members

1. Sh. M. A. K. P. Singh, MS, NRPC
2. Sh. S. D. Agnihotri, CE, HPSEB
3. Sh. Loveleen Singh, GM, DTL
4. Sh. A. Sensarma, Addl. GM, POWERGRID
5. Sh. Shekhar Agarwal, CE (Transmission Central), UPPTCL

Annexure

Minutes of First Meeting of the sub-group to formulate Detailed Talent Recognition Mechanism for the Protection Engineers held on 23.10.2017

As per the recommendations of the group constituted by NRPC secretariat to suggest measures for improvement in protection system among utilities of Northern Region, a sub-group has been formed to formulate Detailed Talent Recognition Mechanism for Best Performing utility and Best Protection Engineers of NR utilities.

First meeting of the sub-group was held on 23.10.2017 at NRPC Secretariat. List of Participants is attached as **Annexure-I**.

Deliberations

The sub-group deliberated on the need for recognizing the efforts put in by the Protection Engineers citing that they have to often work in odd hours and under short response time for ensuring safe and stable operation of the grid.

In an effort to recognize and acknowledge their efforts, the sub-group proposed of giving monetary reward annually to

i. Best performing utility in the region (01 prize worth Rs. 5,00,000/-)

ii. Best Performing Protection Engineer(s) in the Northern Region:

   a. For Executive Engineer and below level (03 prizes worth Rs. 1,00,000/- each)
   b. For Superintending Engineers and above level (03 prizes worth Rs. 1,00,000/- each)

In the meeting it was proposed to fund the monetary reward from the NRPC fund. The prize money received by the “Best performing utility in the region” shall be utilized only for the purpose of providing training to the Protection Engineers in the field of Power System Protection by that utility.

Criteria for judging:

1. **Performance of utility:**
   The sub-group listed out criterion for assessing the performance of the utility in regard to sustained improvement in Protection system. E.g.:

   i. Percentage of trippings in the concerned utility where the protection system operation was as desired.

ii. Percentage of trippings in the concerned utility where the protection system operation was not as desired.
iii. Percentage of tripping for which event report submitted in time.
Preliminary tripping report shall be submitted to respective SLDC, NRLDC and NRPC within 24 hrs of the incident. Detailed report with analysis, defects observed and rectifications carried out shall be submitted within 15 days.
iv. Compliance to the recommendations of the Protection Sub-Committee Meetings.
v. Regular conduct of Protection Audit and rectification of the discrepancies observed.
vi. Level of experience of the engineers/staff in the field of Protection (Substation/ Switchyard/ Generating stations).
vii. Periodic testing of Protection system.

Monthly and Annual maintenance plan may be developed and implemented by the utilities. Monthly maintenance activities shall consist of routine checks, not involving testing of the relays. Annual maintenance activities shall consist of detailed testing of the protective relays.
viii. Steps taken for human resource development in the field of Protection system.
ix. Steps taken by the utility to modernize protection system.
x. Best practices in protection system adopted by the utility.

Points for each of the above listed criterion shall be decided in the further meetings and the final score as per the weighted average shall be used to decide the best performing utility in the region.

2. Performance of Protection Engineers:

For assessing the performance of the protection engineers, nominations shall be sought from all the utilities of NR. The nominated engineers shall be judged on the following criterion:

i. Case study of any significant event that occurred in the jurisdiction of the Engineer, its analysis and lessons learnt from the event to be presented by the nominated Engineer in the Protection Sub Committee meeting.
ii. Level of experience of the Engineer in the field of Protection system.
iii. Compliance to the recommendations of the PSC meeting and Protection audit findings for the substations/generating stations under the jurisdiction of the concerned Engineer.

iv. Periodic testing of protection system for the substations/generating stations under the jurisdiction of the engineer.
v. Any significant achievement in terms of system improvement & tripping analysis.
vi. Timely reporting of the event under the jurisdiction of the concerned engineer.
vii. Percentage of tripping under the jurisdiction of Protection engineer for which protection system operation was as desired.
viii. Percentage of tripping under the jurisdiction of Protection engineer for which protection system operation was not as desired.

Points for each of the above listed criterion shall be decided in the further meetings and the final score as per the weighted average shall be used to decide the performance of the protection engineers.

For judging the performance of utilities and protection engineers for the above awards, the sub-group proposed to form a team of officers from NRPC Secretariat, NRLDC and NPC, CEA for evaluation. The recommendations of the above team would be put to Member (GO&D), CEA for his approval. After approval of Member (GO&D), CEA the list would be finalized for that year and would not be re-opened for re-evaluation on any ground.

The meeting ended with Vote of Thanks to the chair.

Annexure-I

List of Participants for the meeting held on 23.10.2017 at NRPC,New Delhi to formulate Detailed Talent recognition mechanism for the Protection Engineers

Sr. No.	Name	Designation	Organization	Phone/ Mobile	e-mail ID
1.	M. A. K. P. Singh	MS	NRPC	-	ms-nrpc@nic.in
2.	Upendra Kumar	SE	NRPC	-	seo-nrpc@nic.in
3.	Hemant Kumar Pandey	SE	NRPC	-	sec-nrpc@nic.in
4.	Loveleen Singh	GM	DTL	9999533659	gm.om2@dtl.gov.in; loveleen.singh@dtl.gov.in
5.	Shekhar Agrawal	CE	UPPTCL	9450909402	cetcupptcl@gmail.com
6.	Akshay Dubey	AEE	NRPC	9599179744	dubey.akshay@gov.in

DEVELOPMENT OF MECHANISM
for
BETTER HYDRO GENERATION FORECASTING
including
SILT EFFECTS

(Specific Reference to Hydros &
to Take Care of Vagaries of Weather)

A PRERSENTATION BY

Er. Suneel Grover, Chief Engineer (Sys. Op.), HPSEBL,
Vidyut Bhawan, Shimla- 171004
(Mob. 98160 96666, Email. grovers_in@yahoo.com)

CONTENTS

Weather ……..

Weather is the state of the atmosphere, to the degree that it is hot or cold, wet or dry, calm or stormy, clear or cloudy.

However the Accurate impact of weather forecast has much larger foot print in present times than ever imagined may it is ;

- ❑ Agriculture
- ❑ Aviation
- ❑ Chemical & Telecom
- ❑ Energy & Utilities
- ❑ Government
- ❑ Insurance
- ❑ Retail

And Many More …..the list is endless ……

NRPC MANDATE AS PER EA 2003

Clause-2(55) of Indian Electricity Act mandates:

"Regional Power Committee" means a committee established by resolution by the Central Government for a specific region for facilitating the integrated operation of the power systems in that region.

Primarily this responsibility calls for

- **Effective balancing of Generation and Loads in order to maintain grid discipline & security**

Challenges in Power Sector

- **Third Largest Grid in the World, with n number of complexities and "one frequency one nation" philosophy**
- **124 Crore population and about 25 Crore active electricity consumers who require un-interrupted power supply round the year**
- **Thus the onerous responsibility to sustain the grid and the supply chain with utmost security, optimisation and servicing the needs of consumers lies with the power system operators**

HYDRO GENERATION AND SILT MONITORING

– Need for development of weather forecast bias mathematical model for better/accurate hydro generation forecast with error correction mechanism

A presentation was given by HPSEBL in 35th TCC and 39th NRPC meeting held on 1st & 2nd May 2017 respectively and issues concerning huge variations amongst the anticipated generation as per the LGBR, day ahead forecast and the actual generation in real time primarily due to huge difference in the forecasted and the actual weather conditions encountered on the particular day. It has been observed that there is huge difference in weekly or even 3 days & one day advance weather forecast resulting into abrupt decline/rise in hydro generation coupled with no forecast for silt making the situation vulnerable and alarming.

Accordingly, in order to take care of weather vagaries suggested the development of "Weather forecast Bias Mathematical Model for Generation Forecast/ Availabilities with error correction mechanism". After detailed deliberations, it was decided to constitute a committee comprising of Members from HPSEBL, NRLDC, NRPC Secretariat, CEA, NHPC, BBMB and CWC under Member Secretary NRPC to develop mechanism for better hydro generation forecasting.

HYDRO GENERATION AND SILT MONITORING

– Need for development of weather forecast bias mathematical model for better/accurate hydro generation forecast with error correction mechanism

Observations recorded in the MoM of 37th TCC and 40th NRPC meeting held on 27th and 28th October, 2017.

i. ***Chairperson, CEA suggested that CERC should consider fuel neutral and more power under ancillary services. He suggested that a sub-group may be constituted to examine all the issues and submit report to CEA.***
ii. ***Member Secretary, NRPC informed that a Committee has been formed for silt forecasting. Nominations had been sought for member of the Committee.***
iii. ***NRPC decided that all the States would sign the overarching agreement to facilitate short-term power transactions among NR beneficiaries. It was also decide that the scope of the sub-group to be constituted would be widened to examine all related issues.***

HYDRO GENERATION AND SILT MONITORING

– Need for development of weather forecast bias mathematical model for better/accurate hydro generation forecast with error correction mechanism

As per the decisions taken in the 35th TCC and 39th NRPC meeting the committee was constituted comprising of members from HPSEBL, NRLDC, NRPC Sectt. , CEA, NHPC, BBMB and CWC under MS NRPC to develop mechanism for better hydro generation forecasting with following terms of reference;

a) To review the present mechanism used by hydro generators for generation and silt forecasting as well as protocols being followed for operation of hydro generators during high silt season.

b) To suggest measures and mechanisms for improving the forecasting by generators

c) To suggest mechanism for silt forecasting, silt information dissemination and protocols to be used to manage hydro generation operation keeping in view grid and generating machine safety

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HYDRO GENERATION AND SILT MONITORING

– Need for development of weather forecast bias mathematical model for better/accurate hydro generation forecast with error correction mechanism

The first meeting of the Committee was held on 02.02.2018 wherein The need of development of mechanism for better hydro generation forecasting including silt monitoring was emphasized, yet no much head way has been achieved in this direction.

It was also proposed that before the next meeting, the committee should look into utilizing the data available with CWC for forecasting before the rainy season. Rainy season is about to start.

It was also added by the CWC representative that in the next meeting they will give a presentation on the methodology in which their silt forecasting model is being operated by them. Next meeting is yet to take place.

However, the methodology for development of a mechanism for better forecasting remained at the background only and next meeting is yet to take place.

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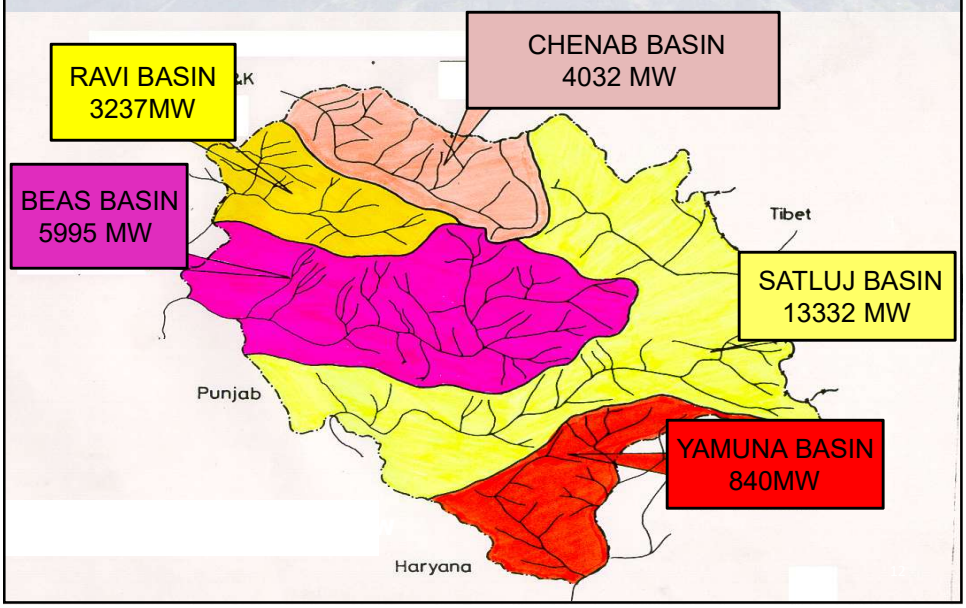
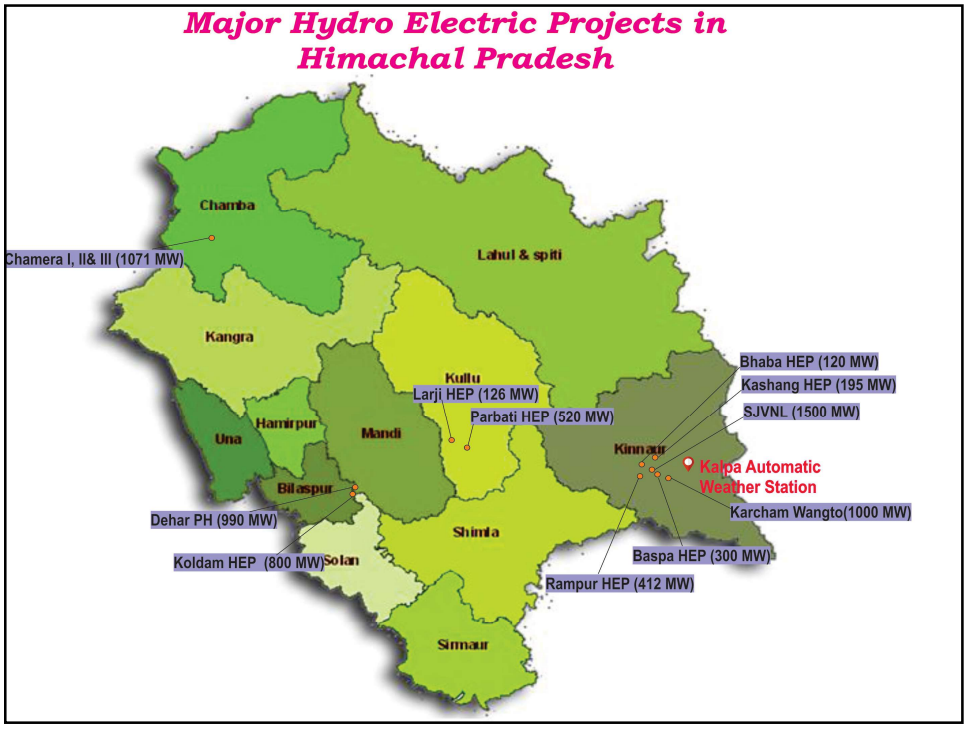
MAJOR HYDRO ELECTRIC PROJECTS IN NR

STATION	OPERATOR	STATE	GENERATOR UNITS	CAPACITY (MW)	UNDER CONSTRUCTION
Pong	BBMB	Himachal Pradesh	6 x 66	396	-
Parbati Hydroelectric Project	NHPC	Himachal Pradesh	4 x 200, 4 x 130	520	800
Nathpa Jhakri	SJVNL	Himachal Pradesh	6 x 250	1500	-
Karcham Wangtoo Hydroelectric Plant	JHPL	Himachal Pradesh	4 x 250	1000	-
Dehar Power House	BBMB	Himachal Pradesh	6 x 165	990	-
Chamera Dam	NHPC	Himachal Pradesh	3 x 180, 3 x 100, 3 x 77	1071	-
Baspa-II	JHPL	Himachal Pradesh	3 x 100	300	-
Baira Suil	NHPC	Himachal Pradesh	3 x 60	180	-
AD Hydro Power Ltd.	ADHPL	Himachal Pradesh	2 x 96	192	-
Uri Hydroelectric Project	NHPC	Jammu & Kashmir	4 x 120, 4 x 60	480	240
Sewa	NHPC	Jammu & Kashmir	3 x 40	120	-
Salal Hydroelectric Power Station	NHPC	Jammu & Kashmir	6 x 115	690	-
Nimmo-Bazgo	NHPC	Jammu & Kashmir	3 x 15	45	-
Dulhasti	NHPC	Jammu & Kashmir	3 x 130	390	-
Chutak	NHPC	Jammu & Kashmir	4 x 11	44	-
Bhakra Dam	BBMB	Punjab	5 x 108, 5 x 157	1325	-
Tehri Dam	THDC	Uttarakhand	4 x 250, 4 x 250	1000	1000
Tanakpur	NHPC	Uttarakhand	3 x 40	120	-
Koteshwar Dam	THDC	Uttarakhand	4 x 100	400	
Dhauliganga-I	NHPC	Uttarakhand	4 x 70	280	-

BASIN WISE HYDRO POWER POTENTIAL OF H.P.





HYDRO SCHEDULING- REGULATIONS IN VOGUE

IEGC 2010

"6.5 (18) Revision of declared capability by the ISGS(s) having two part tariff with capacity charge and energy charge(except hydro stations) and requisition by beneficiary(ies) for the remaining period of the day shall also be permitted with advance notice. Revised schedules/declared capability in such cases shall become effective from the 6th time block, counting the time block in which the request for revision has been received in the RLDC to be the first one. **Provided that RLDC may allow revision, of the DC at 6 hourly intervals effective form 0000,0600,1200 and 1800 hours in case of Run of the River (ROR) and pondage based hydro generating stations, if there is large variation of expected energy (MWh) for the day compared to previous declaration.**

HYDRO SCHEDULING- REGULATIONS IN VOGUE ....CONTD.

1st Amendment 2011

"19. Notwithstanding anything contained in Regulation 6.5.18, in case of forced outage of a unit of a generating station (having generating capacity of 100 MW or more) and selling power under Short Term bilateral transaction (excluding collective transactions through power exchange), the generator or electricity trader or any other agency selling power from the unit of the generating station shall immediately intimate the outage of the unit along with the requisition for revision of schedule and estimated time of restoration of the unit, to SLDC/RLDC, as the case may be. The schedule of beneficiaries, sellers and buyers of power from this generating unit shall be revised accordingly. The revised schedules shall become effective from the 4th time block, counting the time block in which the forced outage is declared to be the first one. The SLDC/RLDC as the case may be shall inform the revised schedule to the seller and the buyer. The original schedule shall become effective from the estimated time of restoration of the unit. However, the transmission charges as per original schedule shall continue to be paid for two days. Provided that the schedule of the buyers and sellers shall be revised after forced outage of a unit, only if the source of power for a particular transaction has clearly been indicated during short-term open access application and the said unit of that generating station goes under forced outage. Provided also that the provisions of this sub-regulation in respect of revision of schedule by electricity traders and any other agency (except the generating station) shall be operative with effect from 1st July 2012."

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HYDRO SCHEDULING-REGULATIONS IN VOGUE ....CONTD.

2nd Amendment 2014

6.5 (18). Revision of declared capability by the ISGS(s) having two part tariff with capacity charge and energy charge **(except hydro stations)** and requisition by beneficiary(ies) for the remaining period of the day shall also be permitted with advance notice **Revised schedules/declared capability in such cases shall become effective from the 4th time block,** ounting the **time block in which the request for revision** has been received in the RLDC to be the first one."

But in present times taking leverage of above regulation:

i) Hydro Generator is revising its schedules based upon above regulation in vogue which are otherwise for except hydro stations.

ii)Further Generator is availing revisions as the situation warrants. It may be a) less discharge, b) silt and/or c) outage of machine

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HYDRO GENERATION – WEATHER DEPENDENCY

- Weather plays a vital role in hydro forecasting as most of hydro resources are snow fed and remaining rain dependent.
- Minute temperature variations affects the snow melt and the precipitations greatly.
- Generators plans generation schedule on the basis of weather forecast but never look for the variations in weather and the adjustments because of non-availability of mechanism.
- Beneficiaries plans disposal/procurement on the basis of generation schedules based on Declared Capacities (DCs).
- Generators undergo revisions as per the provisions of the regulations.

17

HYDRO GENERATION – WEATHER DEPENDENCY

- In real time operations, both availability and demand are analogous to each other. Even if demand is forecasted to the best of its accuracy, any deviation in availability thereof makes the whole planning of hydro based State haywire.
- The major contribution attributing to decline or escalation in hydro based availability is variations in weather conditions and *the projections made by the generators for LGBR are not weather biased.*
- The mismatch so occurred between demand and availability(-ve) ultimately leads to power cuts in the State and thus causes un-comforts to the public & availability (+ve) have financial implications.

18

Mismatch In Weather Forecast & Actual

Forecasted on 01.04.2018

Meteorological Centre
India Meteorological Department
Shimla

Period	Today	02nd Apr.	03rd Apr.	04th Apr.	05th Apr.	06th Apr.	07th Apr.
Weather Forecast							
Max/ Min T	23°C /11°C	22°C /11°C	18°C /13°C	20°C /11°C	21°C /10°C	21°C /10°C	22°C /11°C
Sun Rise/ Sunset (IST)	06:11/18:40	06:09/18:41	06:08/18:41	06:07/18:42	06:06/18:43	06:04/18:43	06:03/18:44

Description of Weather Icon	Sunny	Partly Cloudy	Cloudy	Scattered Rain	Partly cloudy & Rain	Rain/Snow	Hail	Thunder with rain	Thunderstorm

Actual recorded

Date	Station	Max. (°C)	Rainfall(mm)/Snowfall(cm) (0830-1730hrs IST)
01.04.2018	Shimla	22.4	0.0
02.04.2018	Shimla	22.0	0.0
03.04.2018	Shimla	22.7	0.0
04.04.2018	Shimla	22.5	0.0
05.04.2018	Shimla	22.2	0.0
06.04.2018	Shimla	22.6	0.0
07.04.2018	Shimla	18.5	0.0

MISMATCH IN WEATHER FORECAST & ACTUAL

Forecasted on 03.05.2018

Meteorological Centre
India Meteorological Department
Shimla

Period	Today	04th May.	05th May.	06th May.	07th May.	08th May.	09th May.
Weather Forecast							
Max/ Min T	24°C /13°C	24°C /12°C	25°C /12°C	26°C /14°C	26°C /15°C	26°C /15°C	27°C /15°C
Sun Rise/ Sunset (IST)	05:36/19:02	05:35/19:02	05:34/19:03	05:33/19:04	05:32/19:04	05:31/19:05	05:31/19:06

Description of Weather Icon	Sunny	Partly Cloudy	Cloudy	Scattered Rain	Partly cloudy & Rain	Rain/Snow	Hail	Thunder with rain	Thunderstorm

Forecasted on 05.05.2018

Period	Today	06th May.	07th May.	08th May.	09th May.	10th May.	11th May.
Weather Forecast							
Max/ Min T	25°C /15°C	23°C /14°C	22°C /14°C	25°C /15°C	26°C /16°C	26°C /16°C	26°C /16°C

Forecasted on 07.05.2018

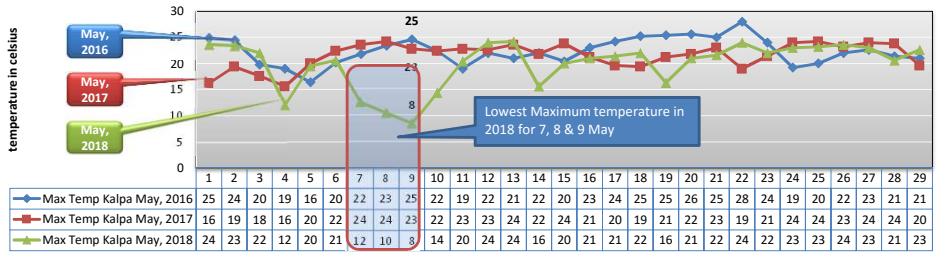
Period	Today	08th May.	09th May.	10th May.	11th May.	12th May.	13th May.
Weather Forecast							
Max/ Min T	21°C /10°C	19°C /10°C	18°C /11°C	19°C /12°C	21°C /12°C	21°C /13°C	19°C /11°C

Forecasted on 09.05.2018

Period	Today	10th May.	11th May.	12th May.	13th May.	14th May.	15th May.
Weather Forecast							
Max/ Min T	23°C /07°C	25°C /08°C	27°C /09°C	27°C /10°C	25°C /11°C	23°C /10°C	21°C /08°C

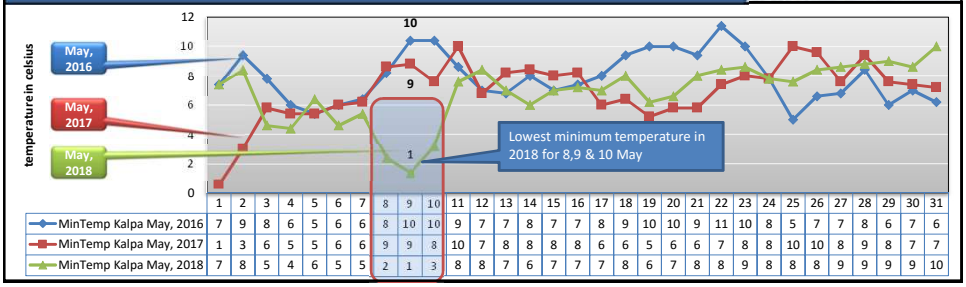
TEMPERATURE CHANGING WEATHER CONDITIONS OVER THE YEARS -SOME OBSERVATIONS

Actual Maximum Temperature for Kalpa During May, 2016, 2017 & 2018



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Max Temp Kalpa May, 2016	25	24	20	19	16	20	22	23	25	22	19	22	21	22	20	23	24	25	25	26	25	28	24	19	20	22	23	21	21
Max Temp Kalpa May, 2017	16	19	18	16	20	22	24	24	23	22	23	23	24	22	24	21	20	19	21	22	23	19	21	24	24	23	24	24	20
Max Temp Kalpa May, 2018	24	23	22	12	20	21	12	10	8	14	20	24	24	16	20	21	21	22	16	21	22	24	22	23	23	24	23	21	23

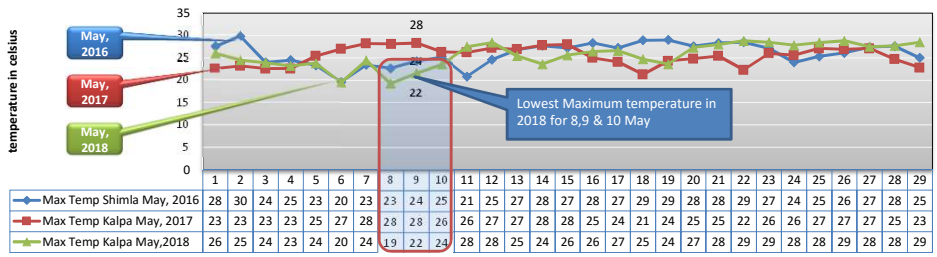
Actual Minimum Temperature for Kalpa During May, 2016, 2017 & 2018



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
MinTemp Kalpa May, 2016	7	9	8	6	5	6	6	8	10	10	9	7	7	8	7	7	8	9	10	10	9	11	10	8	5	7	7	8	6	7	6
MinTemp Kalpa May, 2017	1	3	6	5	5	6	6	9	9	8	10	7	8	8	8	8	6	6	5	6	6	7	8	8	10	10	8	9	8	7	7
MinTemp Kalpa May, 2018	7	8	5	4	6	5	5	2	1	3	8	8	7	6	7	7	7	8	6	7	8	8	9	8	8	8	9	9	9	9	10

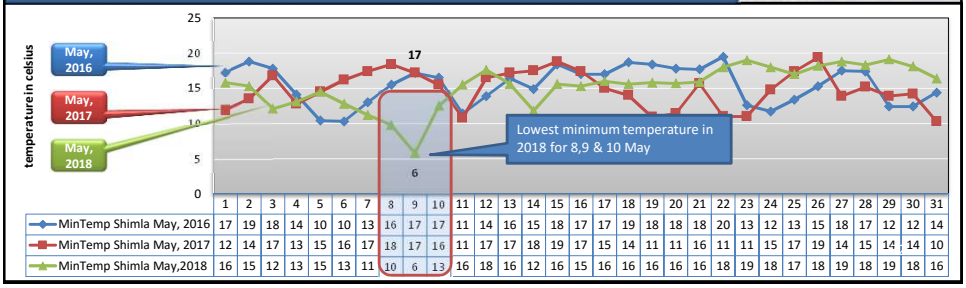
TEMPERATURE CHANGING WEATHER CONDITIONS OVER THE YEARS- SOME OBSERVATIONS

Actual Maximum Temperature for Shimla During May, 2016, 2017 & 2018



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Max Temp Shimla May, 2016	28	30	24	25	23	20	23	23	24	25	21	25	27	28	27	28	27	29	29	28	28	29	27	24	25	26	27	28	25
Max Temp Kalpa May, 2017	23	23	23	23	25	27	28	28	28	26	26	27	27	28	28	25	24	21	24	25	25	22	26	26	27	27	27	25	23
Max Temp Kalpa May,2018	26	25	24	23	24	20	24	19	22	24	28	28	25	24	26	26	27	25	24	27	28	29	29	28	28	29	28	28	29

Actual Minimum Temperature for Shimla During May, 2016, 2017 &2018

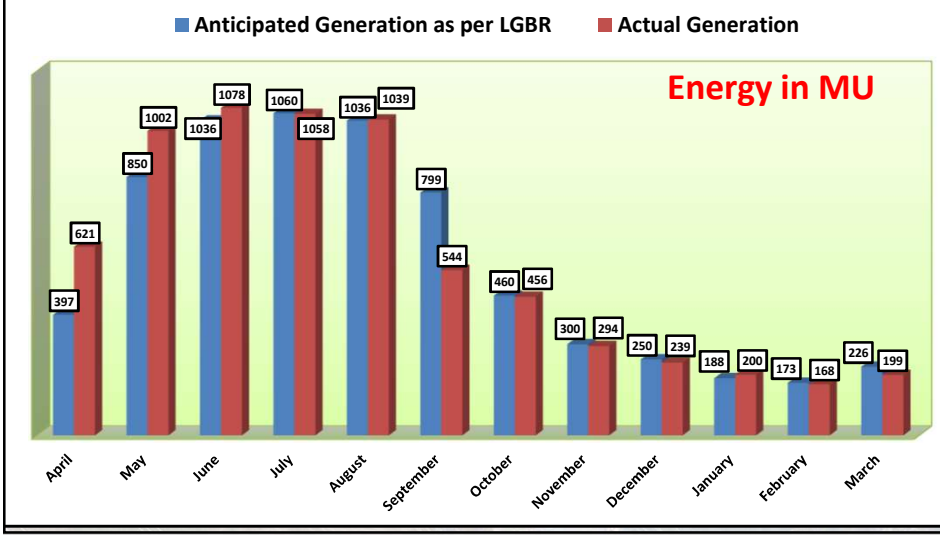


	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
MinTemp Shimla May, 2016	17	19	18	14	10	10	13	16	17	17	11	14	16	15	18	17	17	19	18	18	18	20	13	12	13	15	18	17	12	12	14
MinTemp Shimla May, 2017	12	14	17	13	15	16	17	18	17	16	11	17	17	18	19	17	15	14	11	11	16	11	11	15	17	19	14	15	14	14	10
MinTemp Shimla May,2018	16	15	12	13	15	13	11	10	6	13	16	18	16	12	16	15	16	16	16	16	16	18	19	18	17	18	19	18	19	18	16

ACTUAL POWER SUPPLY POSITION DURING 2017-18

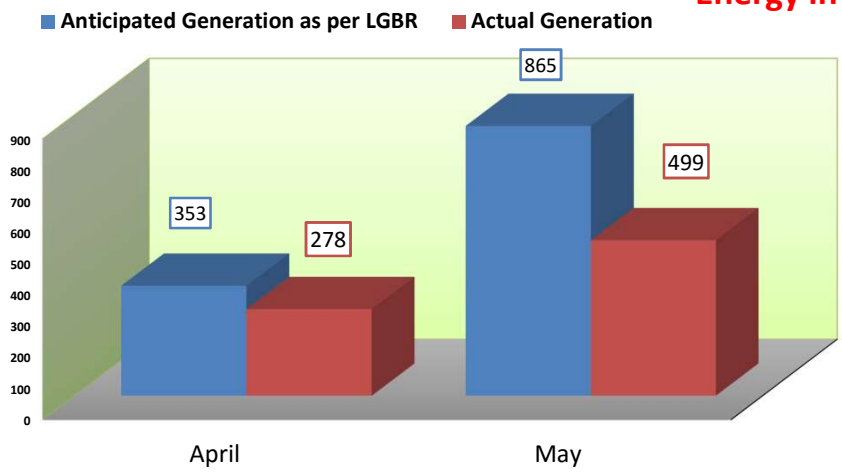
State / Region	ENERGY				PEAK			
	Requirement	Availability	Surplus(+)/ Deficit (-)		Requirement	Availability	Surplus(+)/ Deficit(-)	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
Chandigarh	1,707	1,665	-43	-2.5	390	365	-25	-6.4
Delhi	32,396	38,346	5,950	18.4	6,560	6,657	97	1.5
Haryana	51,353	56,029	4,676	9.1	9,890	8,880	-1,010	-10.2
Himachal Pradesh	9,740	12,869	3,130	32.1	1,570	2,333	763	48.6
Jammu & Kashmir	18,133	14,724	-3,409	-18.8	2,770	2,393	-377	-13.6
Punjab	55,935	58,165	2,230	4.0	12,130	11,502	-628	-5.2
Rajasthan	72,535	77,291	4,756	6.6	11,490	12,382	892	7.8
Uttar Pradesh	117,072	136,419	19,346	16.5	17,720	17,866	146	0.8
Uttarakhand	14,428	14,207	-221	-1.5	2,240	2,167	-73	-3.3
Northern Region	**373,301**	**409,715**	**36,415**	**9.8**	**56,800**	**60,600**	**3,800**	**6.7**
All India	**1,229,661**	**1,337,828**	**108,167**	**8.8**	**169,130**	**180,601**	**11,471**	**6.8**

EFFECTS/AFTERMATHS OF MISMATCH-RESULTS OVER/UNDER GENERATION IN RESPECT OF NJHPS (FY 17-18)



EFFECTS/AFTERMATHS OF MISMATCH-RESULTS OVER/UNDER GENERATION IN RESPECT OF NJPC (April & May, 2018)

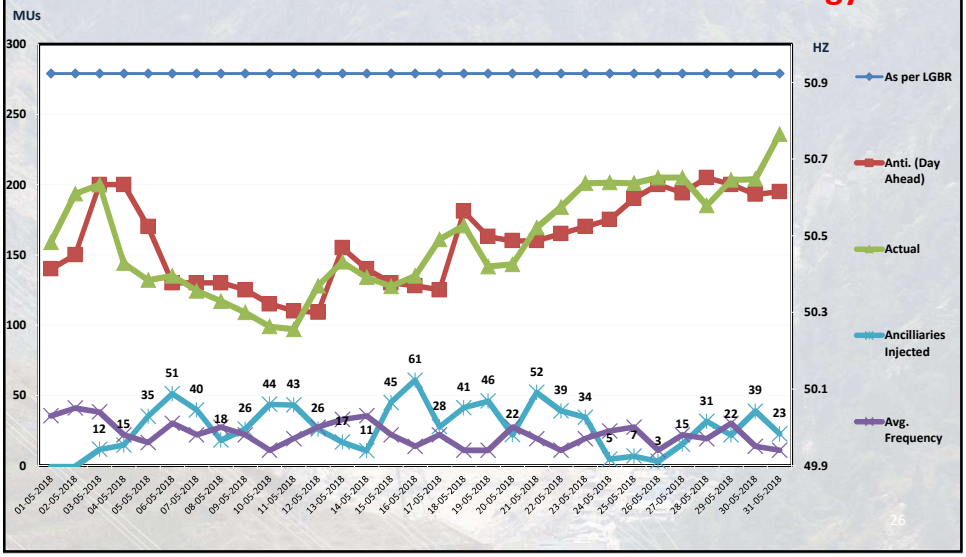
Energy in MU



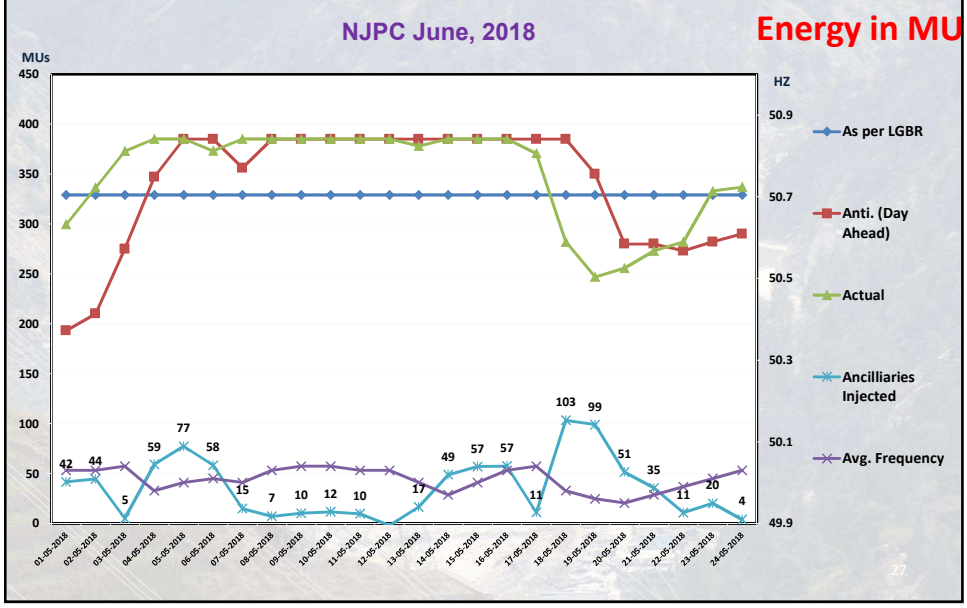
COMPARISON OF ANTICIPATIONS VS. ACTUAL GENERATION and ANCILLARIES INJECTED

NJPC May, 2018

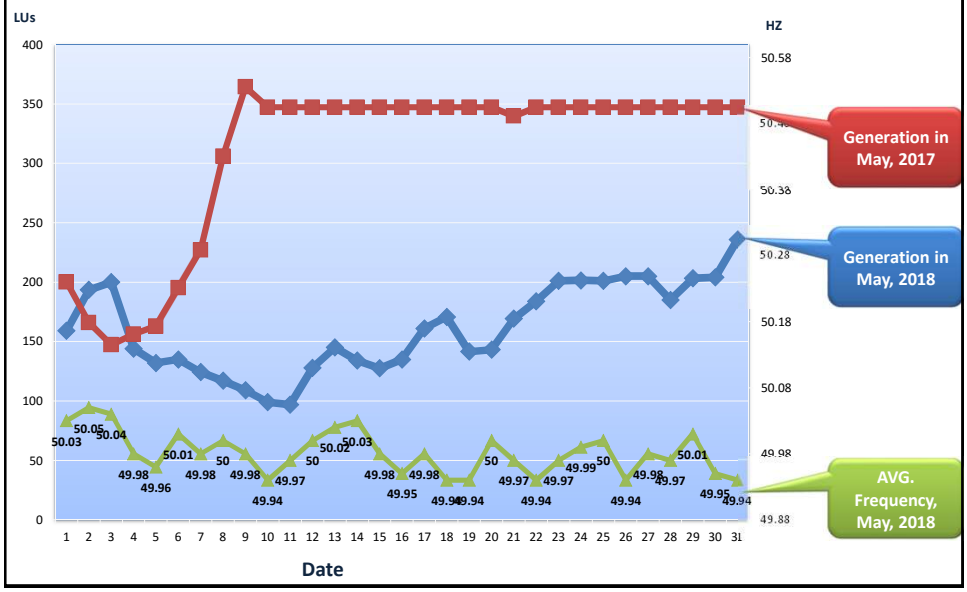
Energy in MU



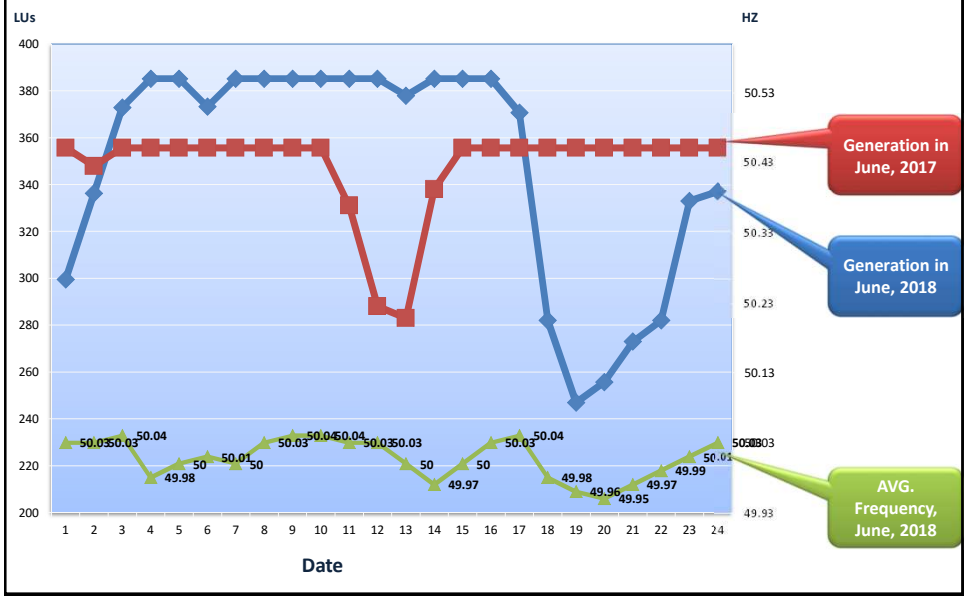
COMPARISON OF ANTICIPATIONS VS. ACTUAL GENERATION and ANCILLARIES INJECTED



COMPARISON OF NJPC ACTUAL GENERATION IN THE MONTH OF MAY, 2017 AND May, 2018

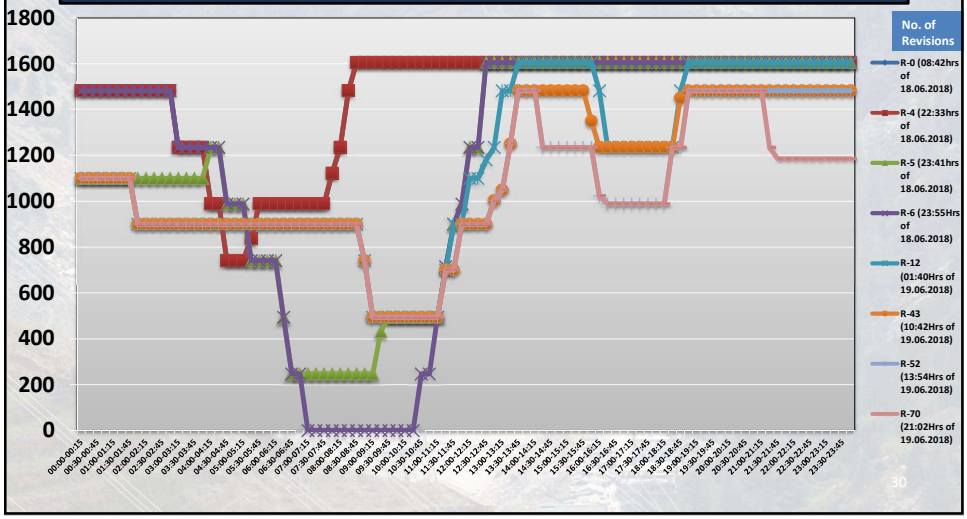


COMPARISON OF NJPC ACTUAL GENERATION IN THE MONTH OF JUNE, 2017 AND JUNE, 2018

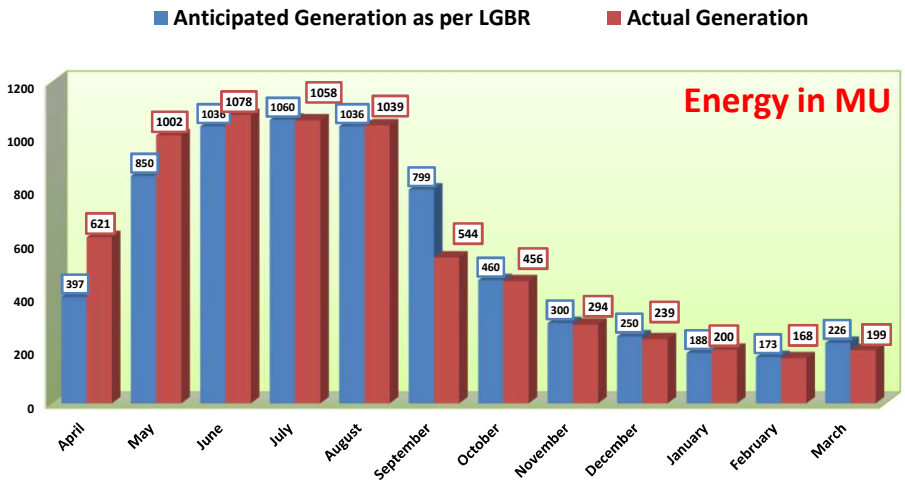


SOME SPECIFIC DAY INSTANCE

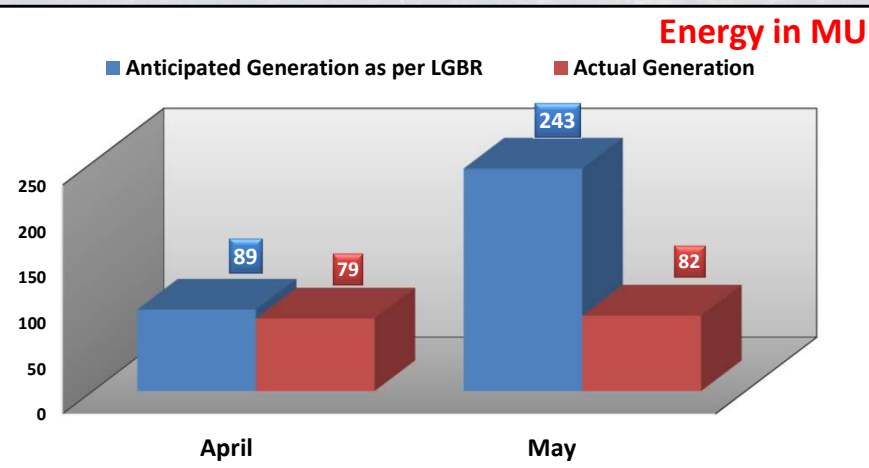
Schedule of NJPS vis-a-vis major revisions thereof on 19.06.2018



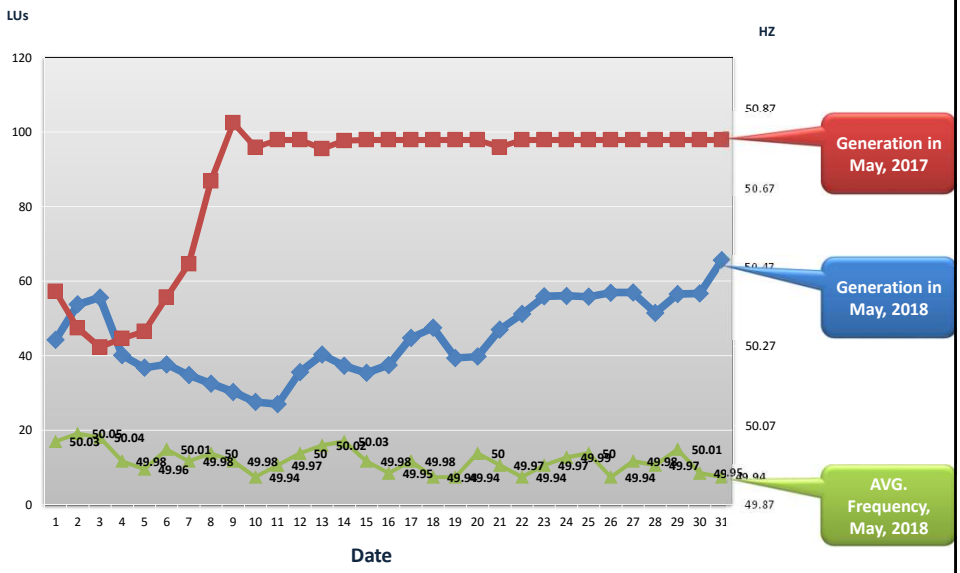
EFFECTS/AFTERMATHS OF MISMATCH-RESULTS OVER/UNDER GENERATION IN RESPECT OF Rampur (FY 17-18)



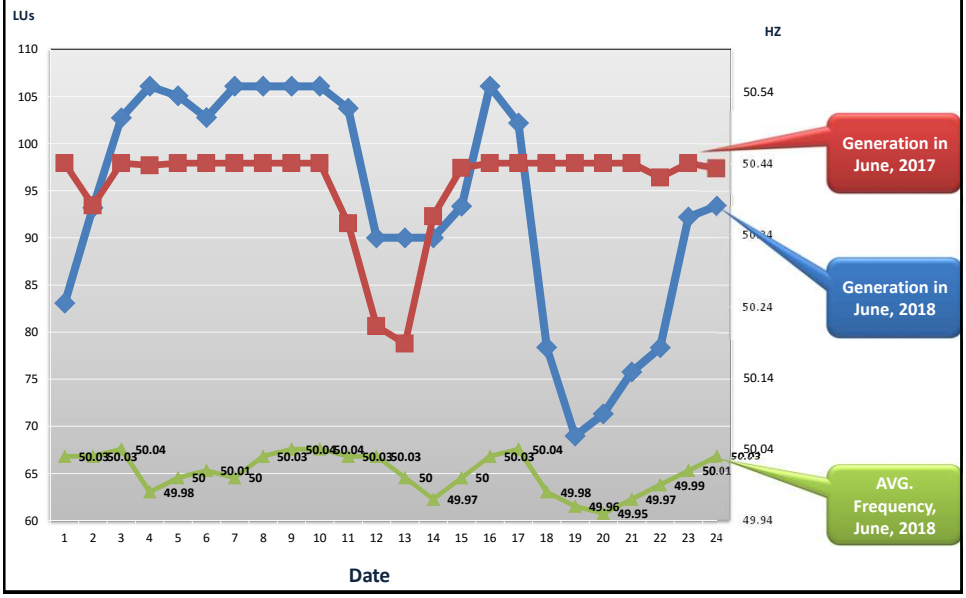
EFFECTS/AFTERMATHS OF MISMATCH-RESULTS OVER/UNDER GENERATION IN RESPECT OF Rampur (April & May, 2018)



COMPARISON OF RAMPUR ACTUAL GENERATION IN THE MONTH OF MAY, 2017 AND MAY, 2018

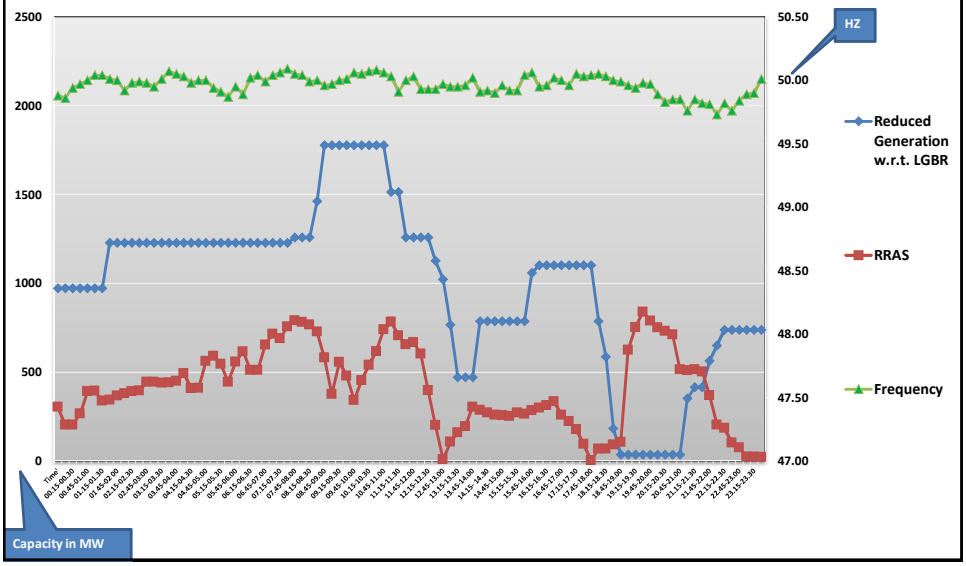


COMPARISON OF RAMPUR ACTUAL GENERATION IN THE MONTH OF June, 2017 AND MAY, 2018



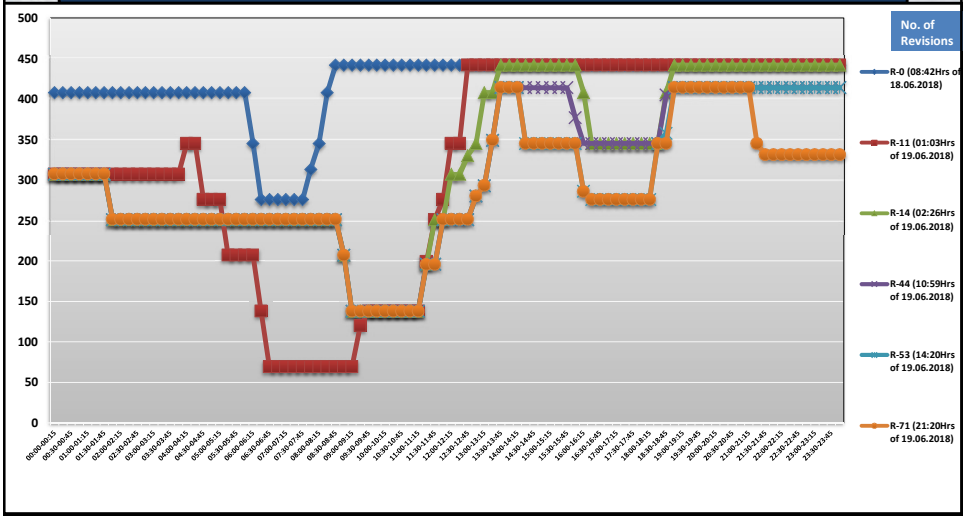
REDUCTION IN GENERATION OF NJPC, RAMPUR & KWHEP W.R.T. LGBR AND ANCILLARIES INJECTED

-on dated 19.06.2018

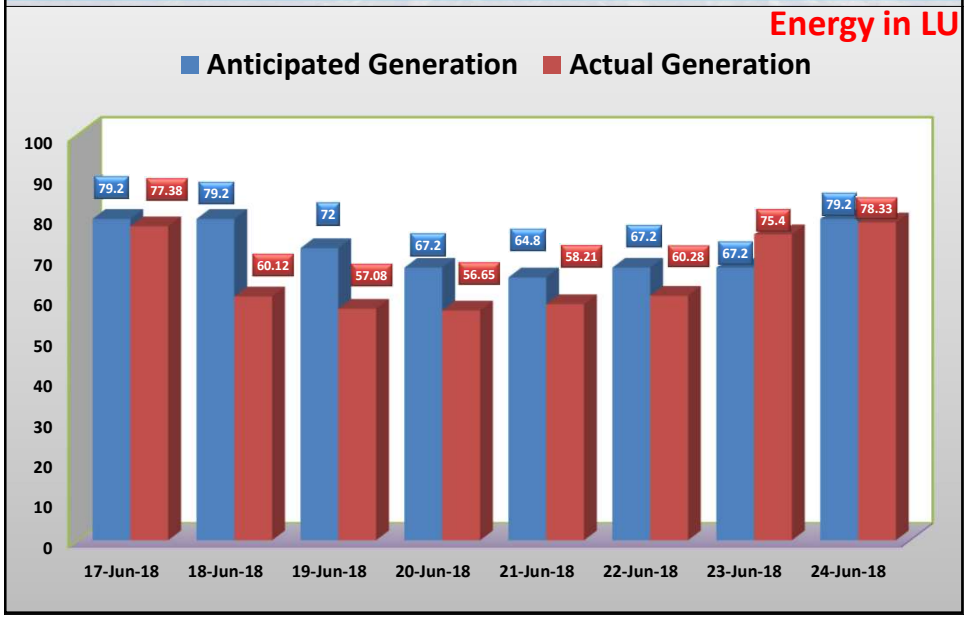


SOME SPECIFIC DAY INSTANCE

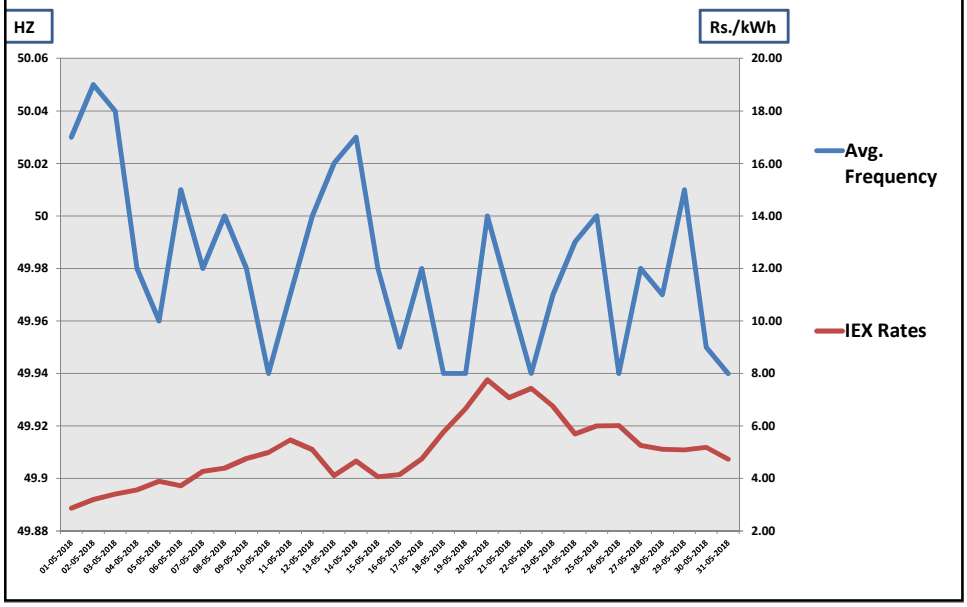
Schedule of Rampur vis-a-vis major revisions thereof on 19.06.2018



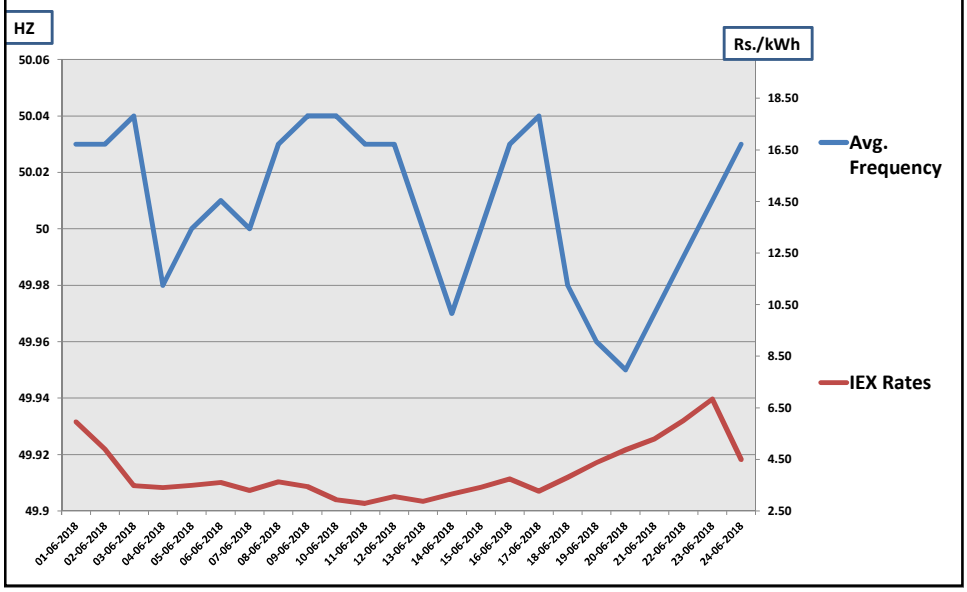
ANTICIPATED VS. ACTUAL GENERATION OF BASPA HEP (from 17.6.2018 to 24.6.2018)



GRID FREQUENCY VS. IEX RATE May, 2018



GRID FREQUENCY VS. IEX RATE
June, 2018



ANOTHER VAGARY OF WEATHER-SILT

- Abrupt rise in silt content and its unbearable affects on availability/ generation results into drastic mismatch of demand and availability.
- These mismatches affects hydro based beneficiaries/States severely and makes whole planning made for forecasting haywire and thus attributes to ultimate public un-comforts.

INSTANCES OF EXCESSIVE SILT CONTENTS IN DISCHARGE RESULTING IN SUDDEN COMPLETE FORCED OUTAGES

GENERATION LOSS AND ITS AFFECT ON THE BENEFICIARIES

Date	Timing of outage		Generation Loss		BENEFICIARIES AFFECTED (MW)									Ancillaries injected	
	Period (From Hrs - To Hrs)	Duration (Hrs:Min)	Total i/c KW (MW)*	NJHPS+ Rampur only	HP	Chandigarh	Delhi	Haryana	J&K	Punjab	Rajasthan	UP	UK	Range(MW)	Total (LUs)
18.07.2017	09:15- 24:00	14:45	2920	1920	720	18	142	81	173	217	144	360	58	0-437	12.67
19.07.2017	00:00 - 04:00 & 19:00 - 24:00	09:00	2920	1920	720	18	142	81	173	217	144	360	58	0-294	7.77
20.07.2017	00:00 - 08:45	08:45	2720	1920	720	18	142	81	173	217	144	360	58	0-49	.73
30.07.2017	14:00 - 24:00	10:00	2920	1920	720	18	142	81	173	217	144	360	58	0-95	1.85
31.07.2017	00:00 - 01:15	01:15	2920	1920	720	18	142	81	173	217	144	360	58	75.61-205	2.03
01.08.2017	07:00 - 24:00	17	2920	1920	720	18	142	81	173	217	144	360	58	0-953	60.33
02.08.2017	00:00 - 12:30	12:30	2920	1920	720	18	142	81	173	217	144	360	58	48.21-866	41.78

* Total Outage includes 1500 MW NJPC, 420 MW Rampur HEP and remaining power from KWHEP

** HPSEBL availed Equity Power from NJPC (22 %) and Rampur HEP (26.1%) out of total power scheduled to HP during above period

SOME INSTANCES OF SILT RESULTING IN COMPLETE FORCED OUTAGES ….CONTD.

GENERATION LOSS AND ITS AFFECT ON THE BENEFICIARIES

Date	Timing of outage		Generation Loss		BENEFICIARIES AFFECTED									Ancillaries injected	
	Period (From Hrs - To Hrs)	Duration (Hrs:Min)	Total i/c KW (MW)*	NJHPS+ Rampur only	HP	Chandigarh	Delhi	Haryana	J&K	Punjab	Rajasthan	UP	UK	Range (MW)	Total (LUs)
07.08.2017	22:15-24:00	01:45	2920	1920	720	18	142	81	173	217	144	360	58	145.75 -274	3.78
08.08.2017	00:00 – 07:00	07:00	2920	1920	720	18	142	81	173	217	144	360	58	0-447	16.95
09.08.2017	15:30 - 24:00	08:30	2920	1920	720	18	142	81	173	217	144	360	58	0-474	8.7

* Total Outage includes 1500 MW NJPC, 420 MW Rampur HEP and remaining power from KWHEP

** HPSEBL availed Equity Power from NJPC (22 %) and Rampur HEP (26.1%) out of total power scheduled to HP during above period

ANCILLARY SERVICES REGULATIONS, 2015

6.5. Nodal agency shall direct the selected RRAS Provider(s) based on the merit order for economical despatch for Regulation Up and Regulation Down, as and when requirement arises in the system on account of any of the following events:

i. **Extreme weather forecasts and/or special day;**
ii. **Generating unit or transmission line outages;**
iii. **Trend of load met;**
iv. **Trends of frequency;**
v. **Any abnormal event such as outage of hydro generating units due to silt, coal supply blockade etc.;**
vi. **Excessive loop flows leading to congestion; and**
vii. **Such other events.**

PROCEDURE FOR SCHEDULING OF ANCILLARY SERVICES

- **A virtual regional entity called "Virtual Ancillary Entity (VAE)" shall be created for each of the five regional grids by the respective RLDCs.**
- **The quantum of generation dispatched by the Nodal Agency shall be directly incorporated in the schedule of respective RRAS provider by the concerned RLDC.**
- **For Regulation Up Service, power shall be scheduled from the RRAS Provider to the respective VAE by the Nodal Agency/concerned RLDC and for Regulation Down Service, power shall be scheduled from the respective VAE to the RRAS Provider.**
- **The schedule of the RRAS Providers will become effective earliest from the time block starting 15 minutes after issue of the dispatch instruction by the Nodal Agency and this shall be clearly specified in the dispatch instruction.**

PROCEDURE FOR SCHEDULING OF ANCILLARY SERVICES

- However, the Nodal Agency may also consider to implement RRAS from any time block after the above mentioned time block, if required, based on the anticipated system conditions.
- Once RRAS has been triggered, a message shall be sent from the Nodal Agency to the concerned RLDC for incorporation of the RRAS despatch instruction in the schedule of the respective RRAS Provider. Subsequently, a message shall also be sent by the Nodal Agency/RLDC to the concerned RRAS provider.
- In case of downward DC revision due to unit tripping/transmission line tripping/congestion in evacuation of power from the RRAS provider generating station, in the station of the RRAS provider, the RRAS power will be curtailed first, followed by STOA, MTOA and LTA transactions.

LIST OF RRAS PROVIDERS

Sl No	RRAS Provider Name	Region	Installed Capacity (MW)	Fixed cost (Paisa/kWh)	Variable cost (Paisa/kWh)	Ramp Up (MW/Block)	Ramp Down (MW/Block)	Technical Minimum (MW)
1	AGTPP - Agartala*	AR	130	137.9	131.2	8	8	70
2	AGBPP - Kathalguri	AR	291	178	145.8	34	34	156
3	BongaigaonGTPP	AR	250	271.42	290.8	15	15	125
	Total installed Capacity	AR	671					
4	Talcher STPS - I	ER	1000	96.4	163.4	48	48	518
5	Nabinagar Thermal Power Project	ER	500	255.4	177.7	20	20	125
6	Kahalgaon STPS - II	ER	1500	109.8	227.7	113	113	778
7	Barh TPS	ER	1320	186.5	229.8	90	90	684
8	Farakka STPS - I & II	ER	1600	83.5	234.1	120	120	823
9	Farakka STPS - III	ER	500	150.4	235.5	38	38	259
10	Kahalgaon STPS - I	ER	840	106.5	238.1	90	90	421
	Total installed Capacity	ER	7260					
11	Singrauli STPS	NR	2000	65.7	130.6	135	197	1024
12	Rihand TPS Stage - II	NR	1000	71.2	131.3	100	150	518
13	Rihand TPS Stage - I	NR	1000	85.8	131.9	100	150	507
14	Rihand TPS Stage - III	NR	1000	145.6	133.7	100	150	518
15	Unchahar TPS Stage - I	NR	420	109.6	250.9	15	15	210
16	Unchahar TPS Stage - II	NR	420	101.3	250.9	15	15	210
17	Unchahar TPS Stage - III	NR	210	136.4	250.9	15	15	105
18	Anta Gas Power Project GF	NR	419	71.7	271.6	225	225	225
19	Unchahar TPS Stage - IV*	NR	500	149.8	275	35	35	275
20	Auraiya Gas Power Project GF	NR	663	64.2	289.2	138	138	356
21	Dadri TPS Stage - II	NR	980	145	297	100	100	509
22	Dadri Gas Power Project GF	NR	830	58.2	302.7	50	50	445
23	Dadri TPS Stage - I	NR	840	98.7	316.8	80	80	422
24	Indira Gandhi STPS	NR	1500	162.8	320.1	150	150	782
25	Anta Gas Power Project RF	NR	419	71.7	798.2	225	225	225
26	Dadri Gas Power Project RF	NR	830	58.2	847.3	50	50	445
27	Auraiya Gas Power Project RF	NR	663	64.2	964.8	138	138	356
28	Dadri Gas Power Project LF	NR	830	58.2	976.7	50	50	445
29	Anta Gas Power Project LF	NR	419	71.7	1019.4	225	225	225
30	Auraiya Gas Power Project LF	NR	663	64.2	1024	138	138	356
	Total installed Capacity		11782					

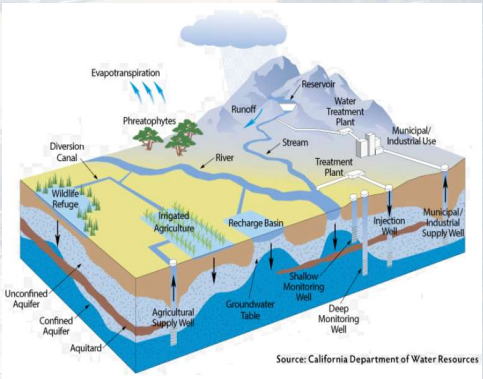
*Details mentioned are as per previous AS3 Format (Charges yet to be submitted by plant for period 16th May 2018 to 15th June 2018)

31	Talcher STPS - II	SR	2000	72.1	163.3	100	100	1037
32	Ramagundam STPS - III	SR	500	77.6	236.5	24	24	259
33	Ramagundam STPS - I & II	SR	2100	73.2	240.4	99	99	1078
34	NLC TPS - II Exp.	SR	500	246.3	259.6	36	36	248
35	NLC TPS - I Exp.	SR	420	102.5	259.7	36	45	211
36	NLC TPS - I	SR	630	80.5	277.8	68	81	312
37	NLC TPS - II	SR	840	83.4	277.8	90	108	416
38	Simhadri STPS - I	SR	1000	95.1	289.1	58	58	521
39	Simhadri STPS - II	SR	1000	153.3	289.6	58	58	521
40	NTPL - Tuticorin TPS	SR	1000	158.3	315.3	50	50	516
41	NTECL - Vallur TPS	SR	1500	178.4	326.3	90	90	770
42	Kudgi STPS I	SR	1600	152.1	372.1	40.5	40.5	415
	Total installed Capacity	SR	13090					
43	Korba STPS STG (III)	WR	500	139.6	118	30	30	256
44	Korba STPS STG (I & II)	WR	2100	66.9	119.5	90	90	1066
45	SIPAT TPS Stg-I	WR	1980	131.54	119.7	135	225	1026
46	SIPAT TPS Stg-II	WR	1000	124.87	123.2	90	150	518
47	Sasan Power Ltd	WR	3960	17	129	180	180	2047
48	Vindhyachal-II	WR	1000	70.1	134.1	70	70	518
49	Vindhyachal-III	WR	1000	105.5	134.2	70	70	518
50	Vindhyachal-IV	WR	1000	158	135	70	70	518
51	Vindhyachal-V	WR	500	168.65	137.7	35	35	256
52	Vindhyachal-I	WR	1260	86.4	143.4	90	90	631
53	Costal Gujarat Power Ltd*	WR	4150	90.46	151.16	150	150	2168
54	Ratnagiri Gas & Power Pvt Ltd GF*	WR	664	129	181	300	300	354
55	NTPC-SAIL Power Company Pvt. Ltd	WR	500	172.5	210	30	30	250
56	Gandhar Gas Power Project GF	WR	657	105.7	216.6	293	293	353
57	Kawas Gas Power Project GF	WR	656	85.4	219.8	208	208	352
58	Gandhar Gas Power Project NAPM	WR	657	105.7	246.2	293	293	353
59	Kawas Gas Power Project NAPM	WR	656	85.4	247.8	208	208	352
60	Mouda STPP Stage-II	WR	1320	142.2	291.5	34	34	343
61	Mouda STPP Stage-I	WR	1000	189.4	295.9	70	70	518
62	Solapur Super Thermal Power Project	WR	660	215.6	313.6	30	30	363
63	Ratnagiri Gas & Power Pvt Ltd RF*	WR	664	129	357	300	300	354
64	Ratnagiri Gas & Power Pvt Ltd IR	WR	664	130	373	300	300	354
65	Gandhar Gas Power Project RF	WR	657	105.7	639.3	293	293	353
66	Kawas Gas Power Project RF	WR	656	85.4	645.8	208	208	352
67	Kawas Gas Power Project LF	WR	656	85.4	843.5	208	208	352
	Total installed Capacity	WR	23907					
	All India Total Installed Capacity		56711					

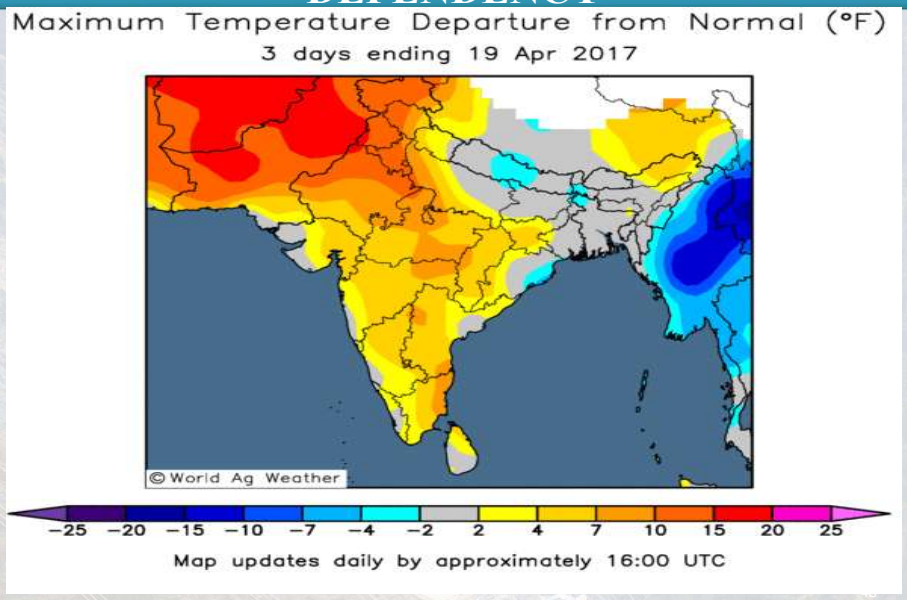
ASSESSED REASONS: MISMATCH BETWEEN FORECAST VIS-À-VIS ACTUALS (SNOW, RAIN, TEMPERATURE) – INACCURATE MODELS

- Initialization Data
- Model Bias

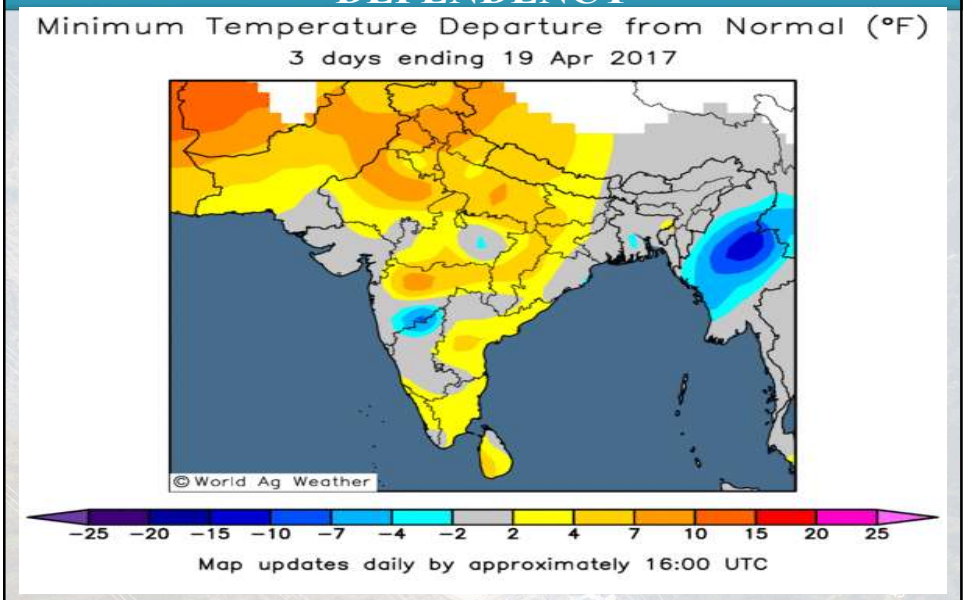
Also, no reliable prediction modelling for:
a) Silt
b) Thunder Storm
c) Solar
d) Wind



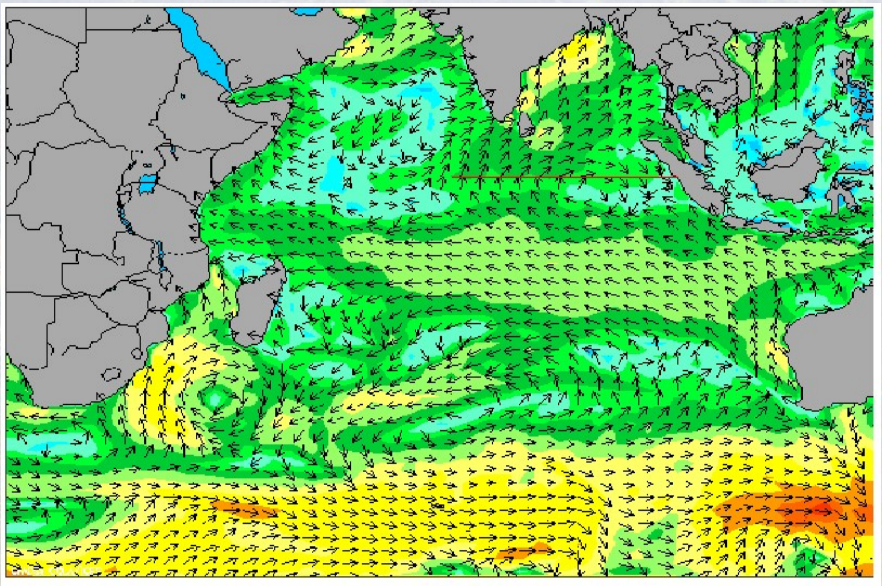
HYDRO GENERATION – WEATHER DEPENDENCY



HYDRO GENERATION – WEATHER DEPENDENCY



HYDRO GENERATION – WEATHER DEPENDENCY



SUGGESTIONS/CONCLUSION

Till such time the a foolproof mechanism is developed for better hydro forecasting including silt forecasting, following is proposed:

- That the gaps being encountered on daily basis w.r.t. LGBR anticipations, day ahead forecast and the real time drastic downward revisions including forced outages of hydro generating stations owing to high silt, may be filled in by ancillary services provider(s) (RRAS) by the nodal agency through respective RLDCs in a transparent manner.
- Availability of ancillary service providers and capacity available with them may be shared by the nodal agencies through web portal.

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SUGGESTIONS/CONCLUSION

- The Committee may be empowered to hire specialists including expertise of IMD, ISRO, SASE etc. to develop the foolproof mechanism for better hydro generation forecasting and take care of weather beggaries in a time bound manner with a time frame of three months and the expenditure to be incurred on this account be made from NRPC funds.
- The above proposed model initially be got developed for Satluj Basis which possesses the maximum hydro generating stations in operation in its vicinity and unfortunately having only one automatic weather station at Kalpa. (In fact there is utmost urgency and requirement of more weather stations/observatories for landslides, sedimentations etc. in the catchment areas.

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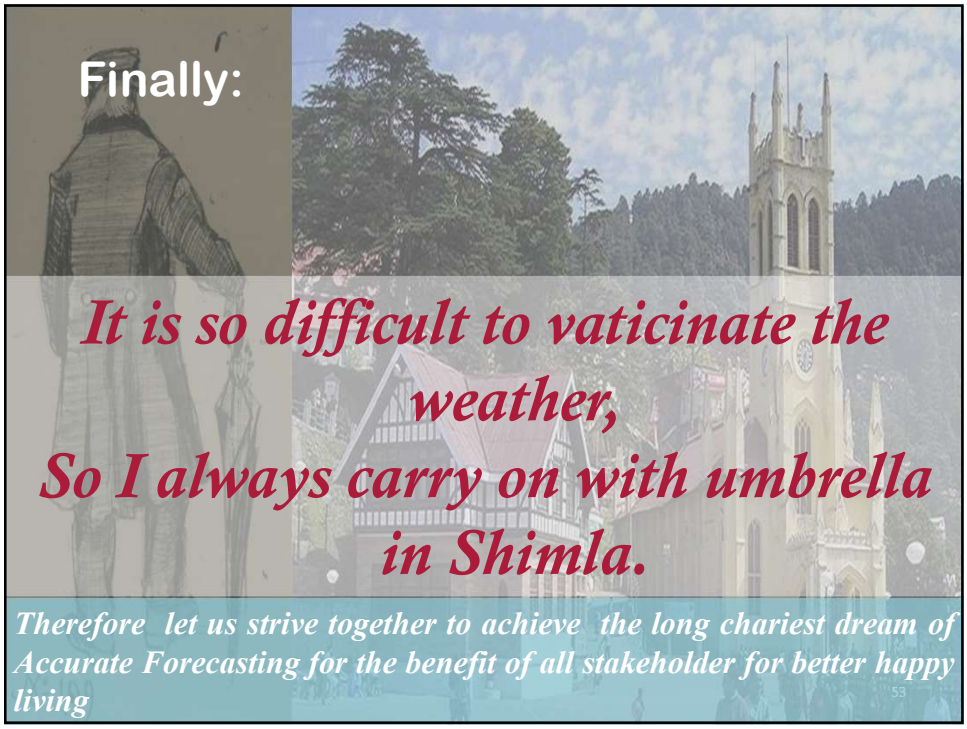

Finally:
It is so difficult to vaticinate the weather,
So I always carry on with umbrella in Shimla.
Therefore let us strive together to achieve the long chariest dream of Accurate Forecasting for the benefit of all stakeholder for better happy living


THANK YOU
Larger the footprint…. Larger the complexities involved

Compensation due to Part Load Operation of Gas Power Plants

CERC- DOP on Reserve Shutdown and Compensation Mechanism (15-05-2017)

- The RPCs shall work out a mechanism for compensation for station heat rate and auxiliary energy consumption for low unit loading on monthly basis in consultation with generators and beneficiaries at RPC forum and its sharing by the beneficiaries.
- NTPC and PPCL had submitted values for degraded SHR and APC values in their stations at the 33rd CSC meeting held on 28.07.2017
- A sub group was constituted under the chairmanship of Member Secretary, NRPC with representatives from NRLDC, TE&TD Division-CEA, TPDDL and NRPC Sectt.
- The sub group visited Gas Stations in Dadri (28.09.2017 & 07.11.2017), Bawana (11.10.2017) and Faridabad (17.01.2017) and carried out run tests at different loading conditions.
- In addition to that, some historical data regarding GHR and APC values for Anta, Auraiya and Faridabad GPPs at different loading conditions were also received from NTPC.

CERC- DOP on Reserve Shutdown and Compensation Mechanism (15-05-2017)

- For Gas based generating stations, degraded SHR and AEC shall be decided based on the characteristic curve provided by manufacturer.
- If the characteristic curve is not provided for the entire range of the operating range i.e. up to 55% of module rating, then the extrapolation of the curve provided by the manufacturer shall be done to extend the curve up to 55% of module loading.
- No compensation for SHR degradation or increase in AEC shall be payable if the Average unit loading for the generating station for the computation period works out more than or equal to 85%.

Methodology

- NTPC and PPCL were asked to submit Load vs GHR and Load vs APC curves for their respective machine.
- PPCL provided both the curves through its OEM BHEL. The degraded SHR and APC values have been tabulated using curve submitted.
- NTPC submitted that no detailed Load vs GHR and Load vs APC curves were available. Only HBD diagrams at certain discreet loading values were available.

Loading	Anta	Auraiya	Dadri	Faridabad
100%	Module output (Gross & Net), module fuel input and NCV of fuel	Module output (Gross & Net). Net Heat Rate at NCV	Gross Heat Rate at GCV only	Module output (Gross & Net), Gross Module efficiency and NCV
80%	-do-	-do-	-do-	-do-
60%	-do-	-do-	-	-do-

Methodology

- For Dadri GPP, heat rate value at 65% loading was considered based on the data provided by NTPC.
- APC figures for Dadri GPP were taken from the test carried out 07.11.2017.
- A quadratic curve was plotted for all stations (except Anta) considering the Heat rate and APC values at the known points
- The curves were extrapolated to arrive at GHR and APC figures at different loading conditions.
- For calculation of compensation, a common value at intervals of 5% (like 84.99% to 80%) was taken by taking the average of the values at the extremes of the interval.
- The recommendations given by the sub group were shared in the 34th CSC meeting.

Deliberations in 34th CSC meeting

- In the meeting, NTPC claimed additional degradation based on running hours of the gas units in addition to the degraded SHR and APC values arrived at from the extrapolated curve.
- However, some members of the sub group were of the view that as components of CCPP are to be replaced after certain firing hour as per OEM recommendation, the new components that installed may enhance the efficiency of CCPP instead of degrading it.
- Issue of enhanced APC of Anta & Auraiya GPP and conversion factor from NCV to GCV were also discussed
- Another meeting of the sub group was proposed to further deliberate upon the issues raised
- The sub group decided to co opt members from the OEM, BHEL.

Discussions in 2nd sub group meeting

Issue-I : Additional Compensation for degradation due to ageing

- Representative of BHEL stated that it would not be possible to ascertain the amount of degradation due to ageing as it depends on how well the maintenance of the machine has been carried out.
- Also, since the characteristic curves as required under the CERC regulations are not available, PG test may be carried out by the respective generating company through any third party like BHEL under the supervision of the sub group.
- As an interim measure, the values derived from extrapolating HBD diagram of NTPC generating station and the curve provided by PPCL Bawana without considering any degradation due to ageing may be used for provisional billing till PG test results are available.

Discussions in 2nd sub group meeting

Issue-II : Higher APC for Anta and Auraiya GPP

- NTPC claimed higher APC values for Anta GPP than that calculated from HBD.
- The reason stated was that plant was designed to operate in open cooling water cycle mode whereas now it was running closed cooling water cycle mode due to limited water availability
- The sub group accepted the claim made by NTPC
- Additional auxiliary consumption of 2.83 MW was considered for calculation of APC of Anta GPP.
- Similarly for Auraiya inclusion of auxiliaries of 2.132 MW not included by OEM in the HBD was considered.

Discussions in 2nd sub group meeting

Issue-III : NCV to GCV conversion

- PPCL had submitted a conversion factor of 1.12 whereas NTPC had used a factor of 1.103 for converting NCV to GCV.
- Energy conversion matrix available on GAIL India website states NCV is 90% of GCV
- Hence, conversion factor of 1.11 (1/0.9) was considered for calculations

Discussions in 2nd sub group meeting

Issue-IV : Part module Operation

- The sub group reiterated its recommendations no separate values for part module operations would be provided.
- It was stated that even CERC has not issued any separate heat rates for part module operation for either Bawana or NTPC stations.
- Even if separate values were to be provided, it would not be possible to calculate the AUL for each module separately when a combination of full and half modules are running simultaneously.
- The sub group observed that running a GPP on half module with part loading is a wastage of precious natural gas and advices constituents against it.

Compensation Table-GHR

Loading (%)	Bawana Normative= 2.5%		Anta Normative= 2.5%		Auraiya Normative= 2.5%		Faridabad Normative= 2.5%		Dadri Normative= 2.5%	
100-85	1845		2075		2100		1975		2000	
84.99-80	1845		2075		2100		1975		2000	
79.99-75	1845		2075		2100		1975		2000	
74.99-70	1845		2075		2100		1975		2032	1.60%
69.99-65	1860	0.8%	2075		2118	0.9%	1982	0.4%	2076	3.80%
64.99-60	1904	3.2%	2079	0.2%	2175	3.6%	2013	1.9%	2128	6.40%
59.99-55	1954	5.9%	2150	3.6%	2242	6.8%	2046	3.6%	2187	9.40%

Compensation Table-APC

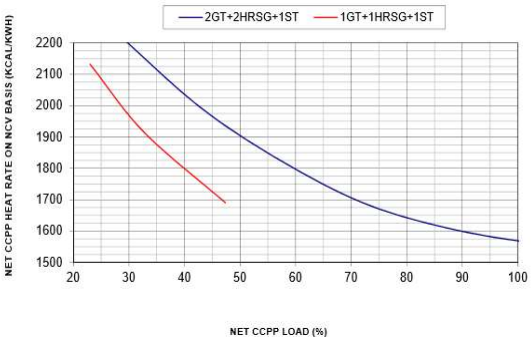
Loading (%)	Bawana Normative= 2.5%		Anta Normative= 2.5%		Auraiya Normative= 2.5%		Faridabad Normative= 2.5%		Dadri Normative= 2.5%	
100-85	2.5		2.5		2.5		2.5		2.5	2.5
84.99-80	2.84	0.34	2.5		2.51	0.01	2.5		2.5	2.5
79.99-75	2.97	0.47	2.5		2.61	0.11	2.5		2.5	2.5
74.99-70	3.1	0.6	2.57	0.07	2.73	0.23	2.55	0.05	2.64	0.14
69.99-65	3.25	0.75	2.71	0.21	2.88	0.38	2.6	0.1	2.82	0.32
64.99-60	3.42	0.92	2.86	0.36	3.04	0.54	2.64	0.14	2.99	0.49
59.99-55	3.59	1.09	3.04	0.54	3.21	0.71	2.67	0.17	3.17	0.67

ANNEXURES

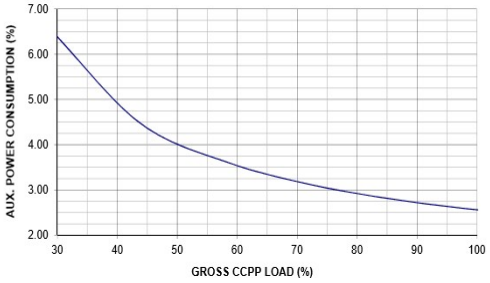
PRAGATI POWER CORPORATION LIMITED
1500 MW PRAGATI-III CCPP

DESIGN GROSS CCPP OUTPUT - 685.6 MW
DESIGN NET CCPP OUTPUT - 668.1 MW

NET CCPP LOAD VS NET CCPP HEAT RATE



CCPP LOAD VS AUXILIARY POWER



NOTES:
1. 100% and 80% load points are guaranteed points on this curve. All other points on the curve are for information only.

PPCL-Bawana

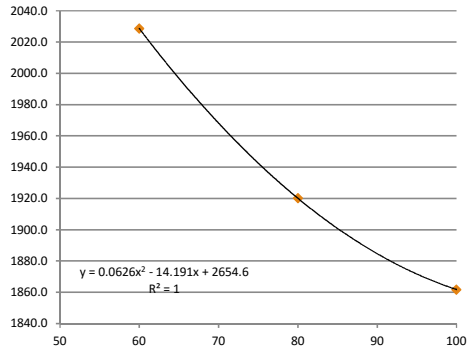
Loading	Net Heat Rate at NCV (kcal/kWh)	Net Heat Rate at GCV (kcal/kWh)	APC (%) Normative= 2.5%	Gross Heat Rate at GCV (kcal/kWh) Normative= 1845 kcal/kWh
100%	1569	1742	2.5	1698
95%	1580	1753	2.58	1708
90%	1596	1771	2.67	1724
85%	1617	1795	2.78	1745
80%	1643	1824	2.9	1771
75%	1674	1859	3.03	1802
70%	1711	1899	3.17	1839
65%	1753	1946	3.33	1881
60%	1800	1998	3.5	1928
55%	1852	2056	3.68	1981

NTPC-Faridabad

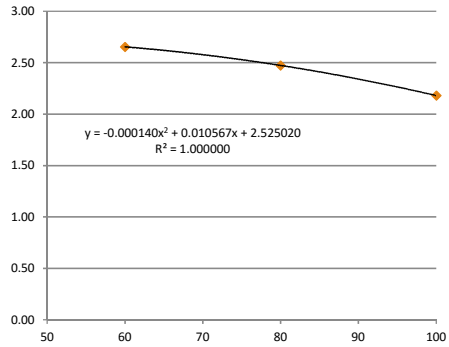
Loading (%)	Efficiency (%)	Heat Rate at NCV (kcal/kWh)	Heat Rate at GCV (kcal/kWh)	Gross Output (MW)	Net Output (MW)	APC (%)
100	51.3	1677.2	1861.7	442.29	432.65	2.18
80	49.74	1729.8	1920.1	355.276	346.49	2.47
60	47.08	1827.6	2028.6	268.096	260.98	2.65

NTPC-Faridabad

Load vs GHR



Load vs APC

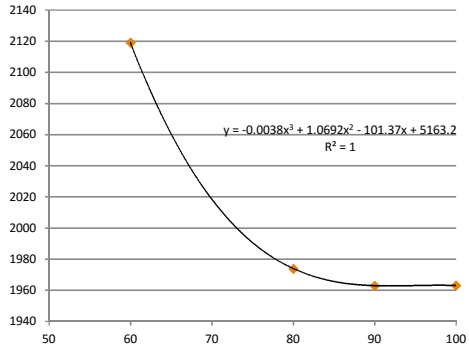


NTPC-Anta

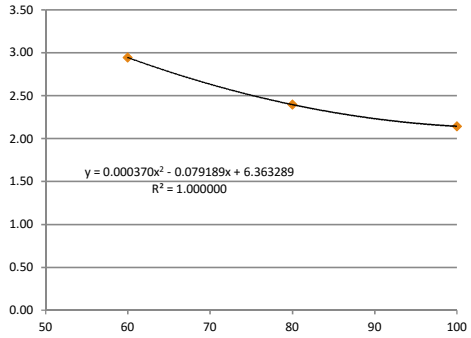
Loading (%)	Fuel Flow / GT (T/Hr)	Total Module Fuel Input (T/Hr)	NCV (kcal/kg)	GCV (kcal/kg)	Gross Output (MW)	Net Output (MW)	Gross Heat Rate (kcal/kWh)	APC (%)
100	24.444	73.332	10115	11228	419.41	413	1963	2.14
80	19.642	58.926	10116	11229	335.2	330	1974	2.40
60	15.941	47.823	10117	11230	253.43	249	2119	2.94

NTPC-Anta

Load vs GHR



Load vs APC

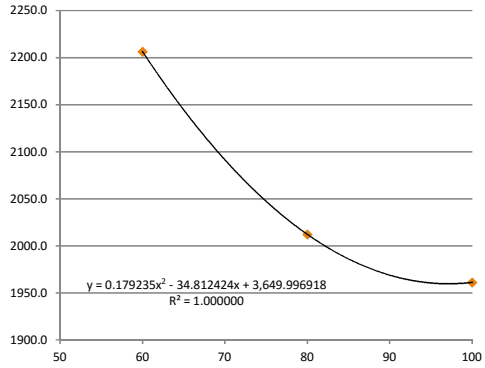


NTPC-Auraiya

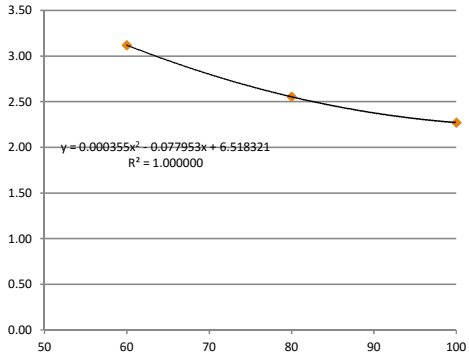
Loading (%)	Net Heat Rate at NCV (kcal/kWh)	Net Heat Rate at GCV (kcal/kWh)	Gross Heat Rate at GCV (kcal/kWh)	Gross Output module (MW)	Net Output module (MW)	APC (%)
100	1796	1993.6	1961.1	331.68	326.28	2.27
80	1845	2048.0	2012.1	265.68	261.03	2.55
60	2029	2252.2	2206.5	195.68	191.71	3.12

NTPC-Auraiya

Load vs GHR



Load vs APC

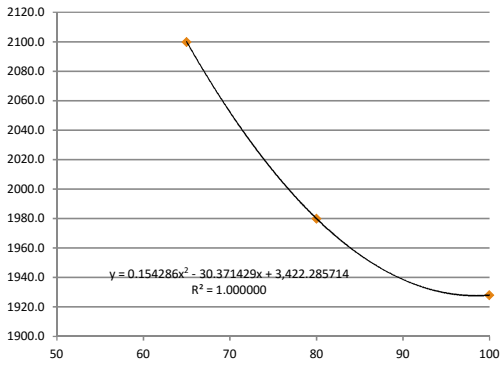


NTPC-Dadri

Loading (%)	Heat Rate at GCV (kcal/kWh)
100	1928
80	1980
65	2100

Value at 65% from data submitted by NTPC

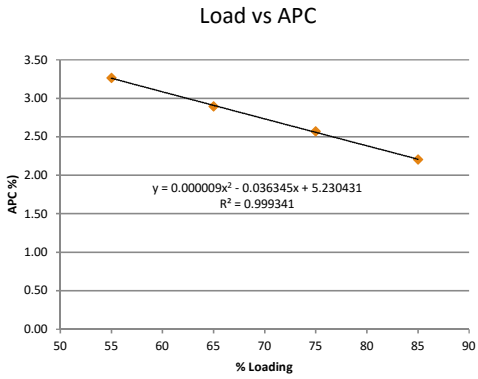
Load vs GHR



NTPC-Dadri

Loading (%)	APC (%)
55%	3.26
65%	2.89
75%	2.57
85%	2.20

Values from test carried out on 07.11.2017



NTPC-HBD GHR values

Loading (%)	Anta Normative= 2075 kcal/kWh	Auraiya Normative= 2100 kcal/kWh	Faridabad Normative= 1975 kcal/kWh	Dadri Normative= 2000 kcal/kWh
85%	1938	1986	1901	1955
80%	1951	2012	1920	1980
75%	1972	2047	1942	2012
70%	2003	2091	1968	2052
65%	2048	2144	1997	2100
60%	2109	2206	2029	2155
55%	2190	2277	2063	2219

NTPC-HBD APC values

Loading (%)	Anta Normative= 2.5%	Auraiya Normative= 2.5%	Faridabad Normative= 2.5%	Dadri Normative= 2.5%
85%	2.31	2.46	2.41	2.21
80%	2.40	2.55	2.47	2.38
75%	2.51	2.67	2.53	2.56
70%	2.63	2.80	2.58	2.73
65%	2.78	2.95	2.62	2.91
60%	2.94	3.12	2.66	3.08
55%	3.13	3.30	2.68	3.26

THANK YOU..!!