



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 (47 वीं)/2019/
No. NRPC/ CommI/ 209/ RPC (47th)/2019/ 1-48

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Dated: 01st January, 2020

सेवा में / To,

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

विषय: उत्तर क्षेत्रीय विद्युत समिति की 47 वीं तथा तकनीकी समंवय उप-समिति की 44 वीं बैठक कार्यवृत्त ।

Subject: 47th meeting of Northern Regional Power Committee and 44th meeting of TCC – Minutes.

महोदय / Sir,

उत्तरी क्षेत्रीय विद्युत समिति की 47^{वीं} बैठक दिनांक 11 दिसंबर, 2019 को तथा तकनीकी समंवय उप-समिति की 44^{वीं} बैठक दिनांक 10 दिसंबर, 2019 जैसलमेर, राजस्थान में आयोजित की गयी थी । इन बैठकों के कार्यवृत्त उत्तर क्षेत्रीय विद्युत समिति की वेबसाइट पर उपलब्ध है ।

The 47th meeting of Northern Regional Power Committee was held on 11th December, 2019 and 44th meeting of TCC was held on 10th December, 2019 at Jaisalmer, Rajasthan. The minutes of the meetings are available on Northern Regional Power Committee website.

भवदीय/Yours faithfully,

(आर. पी. प्रधान)

(R. P. Pradhan)

अधीक्षण अभियंता (वा.) और

सदस्य सचिव (प्रभारी)

Superintending Engineer(C.) and
Member Secretary (I/C)

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उत्तर क्षेत्रीय विद्युत समिति

NORTHERN REGIONAL POWER COMMITTEE

MINUTES

FOR

44th MEETING OF TECHNICAL COORDINATION SUB-COMMITTEE

&

47th MEETING OF NORTHERN REGIONAL POWER COMMITTEE

The 44th meeting of Technical Co-ordination Sub-Committee (TCC) and 47th meeting of Northern Regional Power Committee (NRPC) were held on 10th and 11th December, 2019 respectively at Jaisalmer, Rajasthan. The list of participants of the TCC and NRPC meetings is enclosed at Annexure- I & II.

**PROCEEDINGS OF 44th MEETING OF
T.C.C.**

Shri R. P. Sharma, CE (LD) Rajasthan SLDC welcomed all the members and participants of the 44th TCC meeting on the behalf of Rajasthan POWER utilities to the Golden city of Jaisalmer. He briefed members about valiant and glorious history of Rajasthan. He expressed hope that the deliberations in this TCC meeting would also be helpful in resolving issues amicably.

Shri. Naresh Bhandari, Member Secretary, NRPC welcomed the Members of Technical Coordination Sub-Committee and other delegates in the 44th TCC meeting. He informed that Peak demand and energy requirement of NR has drastically reduced to 44.7 GW and 26050 MU during month of November. He highlighted upcoming event of solar eclipse for which utilities need to be prepared. He stated that LGBR is being prepared by NRPC wherein this time outage planning of generators as well as Transmission system will be included.

He also highlighted about two grid events occurred in the month of May and September when large solar generation was disconnected due to LVRT non-compliance. In view of the large RE integration issues like LVRT or HVRT, uniformity in RE generator protection setting are very important. He hoped that in today's deliberations, fruitful discussions would take place and members would be able to guide and recommend solution to the various issues. He also highlighted that many regulations are coming for which draft is available at CERC website. He requested utilites to go through the same and send comments, if any to CERC. Finally, he thanked team of RVPNL for hosting this meeting and making splendid stay arrangements for the participants.

Shri Y.K. Raizada, Director (Technical), RVPN and Chairperson, TCC extended his hearty welcome to all the delegates attending the 44th TCC meeting to Golden city and future hub of RE generation i.e. city of Jaisalmer. He stated that large amount of RE generation would be coming up in near future in the city of Jaisalmer. He highlighted that Grid operation after such high RE integration would be challenge for all the power utilities. He hoped that power sector has been evolving and installed capacity has touched 90 GW. He stated that we have become

surplus in generation and operation as well as commercial aspects are getting much more importance. He also highlighted that issues were being raised regarding the non-availability of Telemetry which needs to be resolved on priority. In such high RE generation scenario, Reactive Power management has become important issue. He hoped that there will be healthy and fruitful deliberations in the TCC meetings. In the end, he appreciated efforts of Rajasthan officers for hosting the meeting and for making excellent arrangements for comfortable stay of the members and participants.

PROCEEDINGS OF 47th MEETING OF N . R . P . C .

Shri R. P. Sharma, CE (LD) Rajasthan SLDC welcomed all the members and participants of the 47th NRPC meeting on the behalf of Rajsthan POWER utilities to the Golden city of Jaisalmer. He hoped all the members were having pleasant and comfortable stay in the city of Jaisalmer.

Member Secretary, NRPC welcomed the members to the 47th meeting of the Northern Regional Power Committee. He informed NRPC members and other senior officers who joined for today meeting that in the TCC meeting held yesterday, there were 23 operational items and 25 Commercial items listed. On many issues, detailed deliberation took place. Now, the recommendations of TCC, have been referred to NRPC for taking a view in the matter. He thanked team of RVPNL officers for hosting this meeting and making marvelous arrangements for comfortable stay of the participants.

Further, he informed that Shri. Kunji Lal Meena, Chairperson, NRPC couldn't attend this meeting due to unforeseen circumstances. In the absence of Chairperson, NRPC he stated that any other member may be nominated to chair the NRPC meeting. He nominated Sh. D. K. Sharma, Chairman, BBMB to chair 47th NRPC meeting in the absence of Shri. Kunji Lal Meena Chairperson, NRPC. Members agreed for the same.

Sh. D. K. Sharma, Chairman, BBMB welcomed all the participants to 47th NRPC Meeting. He thanked entire team of RVPNL for the excellent arrangements made by them in organizing this meeting at Jaisalmer. He stated that during summer months, no major grid incident has been occurred in Northern Region. He further requested all the utilities to adhere to the plan highlighted by NRLDC in the TCC meeting so as to avoid any type of eventuality during the period of winter. He also stated that Preventive maintenance of generating units and transmission lines should be over by end of next month. He further briefed regarding some policy & regulatory developments which have taken place in the Indian power sector such as draft CERC (Sharing of Inter- State Transmission Charges and Losses) Regulations, 2019, SCED pilot scheme for thermal ISGS etc. He stated that NRPC Sectt and NRLDC must have discussed all the operational and commercial issues during the 44th TCC meeting for securing safe, reliable and economic operation of the grid. In the end, he again thanked team of Rajasthan for making splendid arrangements for the meeting and wished all a very successful and conclusive deliberations in the meeting.

C O N F I R M A T I O N O F T C C a n d N R P C M I N U T E S

A.1 Minutes of 43rd meeting of TCC and 46th meeting of NRPC

Minutes of 43rd meeting of TCC and 46th meeting of NRPC held on 23rd and 24th September, 2019, were circulated vide letter No. NRPC/Comm1/209/RPC(46th)/2019/12509-12556 dated 14th October, 2019.

No comment was received on the minutes issued.

Members confirmed the TCC and NRPC minutes.

B . O P E R A T I O N A L I S S U E S

B.1 System Study for Capacitor Requirement in NR for the year 2019-20

TCC Deliberations

- B.1.1 Members were apprised that except J&K and Uttarakhand, all other states have submitted the data required for modelling their respective network and conducting the capacitor requirement study.
- B.1.2 Outcome of the meeting among the representatives of CPRI, NRPC Sectt. and NRLDC for finalising the modalities to carry out the study were highlighted to the members. The copy of minutes of meeting was enclosed at Annex-B.1 of the agenda note.
- B.1.3 It was also informed that, CPRI has been requested to conduct a pilot study initially for Haryana. The PSSE base case file corresponding to the date and time of peak met by Haryana has been submitted to CPRI and the draft study was expected by 15.12.2019, provided, there is no anomaly in the already submitted data.
- B.1.4 Members were requested to submit the details of nodal officers which can be reached directly by CPRI representative so as to coordinate and resolve any issues encountered while modelling of their respective network
- B.1.5 It was informed that the details of nodal officers have been received from Himachal Pradesh, Punjab and Uttar Pradesh. Other states were requested to furnish the details of nodal officers latest by 15th December 2019.
- B.1.6 TCC advised to take up the study, simultaneously for all the states so as to reduce the time being taken by CPRI.

NRPC Deliberations

- B.1.7 Representative of UP informed that the time as recorded for the peak met by UP was inadvertently recorded as 20:00 Hrs and the same may be corrected as 22:00 Hrs.

Similarly, the time for peak met by Punjab was also corrected to be 15:45 Hrs in place of 18:45 Hrs.

B.1.8 NRPC agreed with the advice of TCC for carrying out the study simultaneously for all the states so as to reduce the elapsed time. Further, NRPC directed that extreme efforts shall be made so as to complete the System Study for Capacitor Requirement in NR for the year 2019-20 by 31st March 2020 itself.

B.2 Formation of separate Post-Dispatch Analysis group at each SLDC/utility (Agenda by NRLDC)

TCC Deliberations

B.2.1 Representative of NRLDC stated that Post-Dispatch Analysis is very important function for load dispatch centre/transmission licensee/generating stations. At RLDC front, such arrangement is working on following functions:

- i. Tripping Analysis
- ii. SoPR (Standard of Performance and Regulation) data for ISTS licensee
- iii. Frequent Single element tripping in a month
- iv. Multiple element tripping in a month
- v. Inter-Regional tripping in a month
- vi. FRC computation and analysis
- vii. Load Crash analysis
- viii. Reactive Power Management in its control area
- ix. LVRT/FRT issues or other protection related issues for renewable generators
- x. Protection database formation and updation
- xi. UFR and df/dt operation
- xii. ADMS (Automatic demand management system) related updates
- xiii. Analysis of sudden frequency excursions
- xiv. SPS operation and feedback

B.2.2 In line with RLDC, a dedicated Post-Dispatch Analysis group in state would help in coordinating with the site officials and prepare the detailed report for all incidents and submit these reports to NRPC/NRLDC in a time frame stipulated in IEGC.

B.2.3 UP representative was of the view that setting up of such a dedicated group at SLDC level is of great use and has helped them a lot by formation of separate group to work on reliability issues. Other SLDC were also receptive to the idea of forming a separate

Post-Dispatch Analysis group.

- B.2.4 Rajasthan representative stated that even though the idea of having such a group within SLDC is great and would technically improve the grid operation, however, due to lack of staff and any regulatory provision empowering SLDCs to direct STU and generators with such analysis, it would merely remain an exercise on paper.
- B.2.5 TCC gave its in-principle approval for the formation of the Post-Dispatch Analysis Group at each SLDC. It also decided that modalities for the group may be finalized in the upcoming PSC meeting.

NRPC Deliberations

- B.2.6 NRPC approved the deliberations held in TCC.

B.3 Cyber Security Preparedness Monitoring & Formation of Cyber Security Committee (agenda by PTCUL)

TCC Deliberations

- B.3.1 PTCUL representative stated that so as to ensure better coordinated action on the matters related to cyber-security, a Cyber Security Committee may be constituted comprised of the designated CISOs from the utilities of the Northern Region. Being a platform focussed specifically on cyber-security, this may facilitate a deeper interaction on the topic than is possible in OCC meetings. Further, regular interaction amongst the CISOs would help in development of common framework of action plan to be adopted in case of any criticality.
- B.3.2 TCC was of the view that Ministry of Power has already formed 4 sectoral CERTs (Thermal, Hydro, Transmission and Distribution) and formation of additional committee may encroach upon the mandate of sectoral CERTs and therefore proposed committee may not be needed.
- B.3.3 Further, POWERGRID representative informed that frequent meetings are being conducted at ministry level for CISOs to deliberate on the same and accordingly advisories are being issued promptly.
- B.3.4 Members were briefed about the implementation of action points as highlighted by CISO, MoP in the 37th TCC and 40th NRPC which is being followed-up regularly in OCC meetings.
- B.3.5 All members were requested to take the cyber security issue very seriously and observe utmost diligence in implementing the action points and plugging the vulnerabilities, if any.

NRPC Deliberations

- B.3.6 Representative of Haryana stated that the cyber security issue should be deliberated in the TeST sub-committee meetings instead of OCC meetings as cyber security issues

need attention of SCADA / communication personnels. NRPC agreed to the proposal of Haryana and advised NRPC Sectt. to follow-up the cyber security issue in TeST sub-committee meetings in place of OCC.

B.3.7 PTCUL representative stated that they were not aware of any meeting being held at the ministry level. NRPC advised NRPC Sectt. to bring the same to the notice of CISO, MoP.

B.3.8 NRPC approved the deliberations held in TCC.

B.4 Cold Spare transformer requirement for Northern Region (Agenda by POWERGRID)

TCC Deliberations

B.4.1 MS, NRPC stated that CERC had set up a Committee on dated 15.03.2018 consisting of representatives from CERC, CEA, NLDC & POWERGRID under the Chairmanship of the Chief (Engineering) of the CERC to assess the requirement of regional spares including bus reactors, line reactors, ICTs, etc.

B.4.2 As per CERC Committee recommendation, POWERGRID has proposed following spares transformers for Northern Region:

MVA rating and phase	Voltage rating	Qty. required as per POWERGRID norms	Available regional spare	Qty. proposed for procurement	Spare requirement location
1Ø-500MVA	765/400	4	3	1	Rajasthan
1Ø-333MVA	765/400	2	1	1	UP
3Ø-500MVA	400/220	5	0	5	Delhi, Rajasthan, Haryana, UP & Punjab
3Ø-315MVA	400/220	9	6	0**	
1Ø-105MVA	400/220	3	0	3	Himachal, J&K & UP
3Ø-200MVA	220/132	1	0	1	UP
3Ø-100MVA	220/132	1	0	1	Uttarakhand
Total		25	10	12	

***The 3Ø-315MVA spare requirement will be met through proposed 3Ø-500MVA transformer.*

B.4.3 POWERGRID representative stated that the aforementioned transformer would be kept as regional spare which could be used by any of the constituent in case of an emergency. The requirement of these transformers has been calculated considering the population

of different transformers in different states.

- B.4.4 Punjab representative stated that the tariff for the aforementioned transformers shall be shared by all the state transmission licensee until charging. In case of its usage by any of the state transmission licensee, the charges would be levied only on that state transmission licensee and same shouldn't be levied on other states. Further, if any of the state decides to procure the said regional spare at the depreciated cost, the same may be allowed and the tariff burden from other states shall be reduced accordingly.
- B.4.5 Further, it was also decided that NRPC Sectt would be the authority responsible for deciding the deployment of cold spares in case of requirement of the states.
- B.4.6 TCC agreed for the procurement of the following 7 Nos. of 3- ϕ transformers as Regional cold spare transformer out of 12 Nos. proposed by POWERGRID:

MVA rating and phase	Voltage rating	Qty. required as per norms	Available regional Spare	Qty. proposed for procurement	Spare requirement location
3 ϕ -500MVA	400/220	5	0	5	Delhi, Rajasthan, Haryana, UP & Punjab
3 ϕ -315MVA	400/220	9	6	0**	-
3 ϕ -200MVA	220/132	1	0	1	UP
3 ϕ -160MVA	220/132	1	0	1	Uttarakhand
Total		16	6	7	

***The 3 ϕ -315MVA spare requirement will be met through proposed 3 ϕ -500MVA transformer.*

For procurement of 5 Nos. of 1- ϕ transformers difficulties on account of impedance mismatch was highlighted as constraint.

- B.4.7 Further, on the request of Uttarakhand the rating of 220/132 kV 3- ϕ 100 MVA transformer was changed to 160 MVA.

NRPC Deliberations

- B.4.8 NRPC approved the aforementioned 7 number of 3- ϕ transformer.

B.5 Revised SPS (System Protection Scheme) for Kawai - Kalisindh - Chhabra generation complex (Agenda by Rajasthan)

TCC Deliberations

- B.5.1 Members were apprised that after detailed deliberation, revised SPS of Kawai-Kalisindh-Chhabra generation complex was approved in the 163rd OCC meeting held on 17.09.2019. To expedite implementation of revised SPS, NRPC Sectt. has given in-principle approval to Rajasthan to proceed with implementation of revised SPS scheme for Kawai-Kalisindh-Chhabra generation complex. The agenda has been put up for post-facto approval of the revised logics for SPS of Kawai–Kalisindh–Chhabra generation complex.
- B.5.2 Further, it was informed that M/s Adani Power has raised concern stating that tripping of one unit of Kawai TPS may be avoided in case of N-1-1 contingency of Kawai-Anta 1 & 2 and N-1-1 of contingency of Anta-Phagi 1 & 2. It was mentioned that M/s Adani Power has requested that generation backing down may be explored in the aforesaid cases.
- B.5.3 Representative of M/s Adani Power stated that in addition to above signal may be sent to Chhabra directly from Anta instead of routing it from APRL, Kawai as 400kV Anta-Chhabra is connected now.
- B.5.4 Rajasthan representative stated that it is essentially to trip the units of Kawai TPS and backing down generation may not be possible in case of N-1-1 trippings. He stated that instantaneous backdown generation is not possible and in case of tripping of another Kawai-Anta line, Anta-Chhabra line wouldn't be able to carry 1200 MW flow which may result into cascade tripping. He stated that considering reliability and safety of the grid, risk of generation backdown may be avoided. It was also deliberated that routing of signal to Chhabra directly from Anta may be explored at the time of implementation.
- B.5.5 In view of above, TCC recommended revised logics for SPS of Kawai–Kalisindh–Chhabra generation complex for the post-facto approval of NRPC.

NRPC Deliberations

- B.5.6 NRPC accorded post-facto approval for the revised SPS (System Protection Scheme) for Kawai–Kalisindh–Chhabra generation complex.

B.6 Reliable Communication Scheme (Additional) under Central Sector for Northern Region (Agenda by POWERGRID)

TCC Deliberations

B.6.1 POWERGRID representative stated that during 39th & 40th NRPC meetings, implementation of Reliable Communication Scheme envisaging 7248 km (including ULDC replacement) was approved for implementation by POWERGRID to provide connectivity of substation of 132 kV and above under central sector as per directive of MOP, GOI.

B.6.2 In order to provide reliability and redundancy in ISTS communication system in line with CERC's Communication Regulation 2017 and draft CEA's Manual of Communication Planning 2019, following additional fibre optic length was proposed in the last TCC/NRPC meeting by POWERGRID for building path redundancy and route diversity for reliable data & voice connectivity:

S. No.	Name of Link	Route length (km)	Purpose
1	400kV Panchkula-Patiala	65.494	Physical Path Redundancy & route diversity for Panchkula S/s
2	400kV Nalagarh-Patiala	93.78	Reliable ICCP link between HP, Punjab and NRLDC
3	400kV Jalandhar Moga	85.15	Physical Path Redundancy & route diversity for Jalandhar (PG) through Central Sector links.
4	400kV Parbati PS - Amritsar	250.53	Path Redundancy & route diversity of Parbati PS (Banala) & Hamirpur through Central sector network.
5	LILO of Parbati-Amritsar at Hamirpur	6.7	
6	400kV Kurukshetra-Malerkotla PG	180	Path Redundancy of Malerkotla (PG) through central sector network.
7	765kV Meerut - Moga	337.15	Route diversity of Moga S/S & creation of reliable ICCP link between Punjab, Rajasthan (through upcoming 765kV Bikaner Moga under GEC Part D & NRLDC).
8	400kV Bassi-Sikar	169.8	Redundancy of Sikar S/S
9	400kV Dehradun-Bagpat	165	Physical path Redundancy & for route diversity of Bagpat S/S
10	400kV RAPP B -Jaipur South with LILO at Kota	300	Redundancy of Kota & RAPP through Central Sector network

S. No.	Name of Link	Route length (km)	Purpose
11	400kV Allahabad-Singrauli	200	Redundancy of Singrauli
12	400kV Allahabad-Fatehpur 765	130	Strengthening of Inter Regional Connectivity (WR-NR). (400kV Fatehpur -Mainpuri is under implementation under Reliable Communication scheme)
13	400kV Patna-Ballia	200	Strengthening of Inter Regional connectivity ER -NR.
14	400kV Kanpur-Ballabgarh	260	Redundancy of old Agra-Kanpur link which has reached the end of its useful life of 15 years.
15	Chittorgarh 400kv RVPN to Chittorgarh 220 RVPN	52	Redundancy of Chittorgarh 220/132 through Central Sector network
16	400kV Lucknow - Kanpur	156	Redundancy of Network and avoiding multiple sub-stations
	TOTAL	2651.604	

B.6.3 As per the decision of 43rd TCC and 46th NRPC, the matter related to additional fibre optic length was discussed in 16th TeST sub-committee meeting held on 14.11.2019. After detailed deliberations, following links were agreed for deletion from the original additional requirement:

Sl. No.	Name of Link	Length (km)	Reason for Deletion
1	400kV Patiala-Nalagarh	93.78	PSTCL agreed for one short link to meet redundancy criterion of Patiala. Therefore 400kV Panchkula-Patiala (65.494km) was agreed for implementation.
2	400kV Bassi-Sikar	169.80	Newly awarded transmission lines under TBCB from Sikar S/s (765kV Sikar-Khetri & 765kV Khetri-Jhatikara) will have OPGW to meet redundancy.

3	400kV Patna-Ballia	200.00	This link is under consideration by ERPC for ER-NR inter-regional communication strengthening.
	Total	463.58	

B.6.4 After detailed deliberations, the following links were agreed upon:

Sl. No.	Name of Link	Route Length (km)	Purpose
1	400kV Panchkula-Patiala	65.494	Physical Path Redundancy & route diversity for Panchkula S/s
2	400kV Jalandhar Moga	85.15	Physical Path Redundancy & route diversity for Jalandhar (PG) through Central Sector links.
3	400kV Parbati PS - Amritsar	250.53	Path Redundancy & route diversity of Parbati PS (Banala) & Hamirpur
4	LILO of Parbati - Amritsar at Hamirpur	6.7	through Central sector network.
5	400kV Kurukshetra-Malerkotla PG	180	Path Redundancy of Malerkotla (PG) through central sector network.
6	765kV Meerut - Moga	337.15	Route diversity of Moga S/S & creation of reliable ICCP link between Punjab, Rajasthan (through upcoming 765kV Bikaner Moga under GEC Part D & NRLDC.
7	400kV Dehradun-Bagpat	165	Physical path Redundancy & for route diversity of Bagpat S/S
8	400kV RAPP B -Jaipur South with LILO at Kota	226	Redundancy of Kota & RAPP through Central Sector network
9	400kV Allahabad-Singrauli	200	Redundancy of Singrauli
10	400kV Allahabad-Fatehpur 765	130	Strengthening of Inter Regional Connectivity (WR-NR). (400kV Fatehpur -Mainpuri is under implementation under Reliable Communication scheme)

Sl. No.	Name of Link	Route Length (km)	Purpose
11	400kV Kanpur-Ballabhgarh	370	Redundancy of old Agra-Kanpur link which has reached the end of its useful life of 15 years.
12	Chittorgarh 400kV RVPN to Chittorgarh 220kV RVPN	07	Redundancy of Chittorgarh 220/132 through Central Sector network
13	400kV Lucknow - Kanpur	156	Redundancy of Network and avoiding multiple sub-stations
	TOTAL	2179.024	

B.6.5 POWERGRID further informed that in accordance with 39th & 40th NRPC meeting, implementation of 7248 Km OPGW is under execution. POWERGRID also informed that around 2031 km OPGW network is not coming up in the original reliable scheme (as approved in 39th NRPC) as some of the IPPs are not coming up and also connectivity for some were covered in different schemes. Considering the same and additional requirement of 2180 km as proposed for taking care of contingencies as per Communication Planning Criteria, the overall network size approved in 39th & 40th NRPC will increase by only 150 km considering new requirement of 2180 km in lieu of 2031km network not coming up as brought out above.

B.6.6 Accordingly, TeST sub-committee members have agreed for the implementation of 2180 Km of OPGW network under on-going Reliable Communication Project (7248 km) so that the same can be implemented within the same time period. The revised network size of Reliable Communication Project will become 7398 Km.

B.6.7 TCC recommended for the approval of the modified scheme as agreed by TeST sub-committee.

NRPC Deliberations

B.6.8 NRPC concurred with TCC deliberations.

B.7 Upgradation of STM-16 to STM-64 Communication Equipment (Agenda by POWERGRID)

TCC Deliberations

B.7.1 POWERGRID representative stated that during the last TeST subcommittee meeting, NRLDC requested to explore the possibility of upgradation of communication

equipment from STM-16 capacity to STM-64 or adopt other latest technology to cater additional requirement for future projects including RTU/SAS data reporting on 104 protocol, new PMUs under WAMS System, SCED, AGC Project, establishment of inter-regional control centres of SCADA/ PDC, upgradation of NLDC and establishment of REMC control centres and backup control centre at Kolkata for WAMS system and other new schemes.

B.7.2 In this regard, POWERGRID has examined the possibility and 17 Equipment needs to be upgraded from STM-16 to STM-64 on Tejas make Communication Equipment, their associated SFPs and amplifiers are required. Further in view of shortage of Ethernet Ports, new cards also required at several locations/specially NLDC, NRLDC and all SLDCs of Northern Region along with some of station where most of the ports has been utilized for grid operation services (RTU/SAS, PMU, VOIP, AMR, TWFL, Pilot project PMU, some inter-connections for other sub-stations) and ports are not available for AGC and SCED scheme of NLDC.

B.7.3 The estimated cost for above up-gradation is approx. Rs.2.98 Cr. In case of complete replacement, the approximate cost shall be around Rs.6.5 Rs Cr which is almost double the up-gradation cost. In view of same, the TeST subcommittee members agreed for up-gradation on proprietary basis by M/s Tejas.

B.7.4 The tariff for the investment made is to be shared by all constituents as per CERC notification under Reliable Communication Scheme. The scheme shall become part of existing Commercial Agreement signed for ULDC Project.

B.7.5 TCC recommended the modified scheme for approval of NRPC.

NRPC Deliberations

B.7.6 NRPC approved the scheme for up-gradation of STM-16 to STM-64 as presented by POWERGRID.

B.8 Winter preparedness (Agenda by NRLDC)

TCC Deliberations

B.8.1 NRLDC representative presented power supply position of Oct-Nov 2019. It was highlighted that energy consumption of Northern region in the month of Oct and Nov 2019 were less by 5.52% and 3.17% respectively as compared to 2018 for same months.

Further, it was mentioned that frequency remained in band for 77.05% and 73.62% of time during Oct & Nov'19 respectively.

- B.8.2 It was also highlighted that frequency continued to be on the higher side for last few months and average frequency recorded for Sep-Nov 2019 was 50.01Hz. All constituents were requested to optimise their own generation and requisition from ISGS stations to avoid sustained high frequencies.
- B.8.3 It was mentioned that winter preparedness measures were discussed in 163rd, 164th and 165th OCC and 43th TCC / 46th NRPC meetings. Recently, IMD has forecasted above normal temperatures for India except in Northern region where it is likely to be in normal (-0.5 to +0.5) range. Following challenges pertaining to power system operation being faced during winter season were discussed:
- Huge variation in demand during morning/evening and rest of the day: *Variation from ~28000MW in night to ~42000-44000MW during morning and evening hours*
 - Ramp in demand: *Ramp up rate of ~80MW/min during morning and ramp down rate of 50MW/min during night hours*
 - Opening of 40-50 lines of 400kV & above for voltage control
 - Optimisation of hydro resources: *Optimising hydro resources to meet ramp requirements*
 - Reactive power support from different resources
 - High voltages observed even after all these measures
- B.8.4 It was discussed that measures for manging high voltages such as switching off capacitor bank, switching on Bus reactor, usage of Line Reactor as Bus Reactor when line not in service are being practiced. Other reactive power sources such as SVC, STATCOMs, HVDC filter bank etc. are also being optimised at RLDC level to arrest high voltages. Tap positions of 400/220kV ICTs at locations such as Mandola, Lucknow(UP), Abdullapur, Hindaun, Alwar, Fatehpur(PG), Agra(PG), Bahadurgarh, etc. have been optimized after discussion in OCC as well as request from utilities.
- B.8.5 Apart from this, reactive power support from other resources such as MVAr absorption by generators, usage of hydro and gas generators in synchronous condenser mode of operation need to be enhanced. NRLDC representative highlighted that based on discussion in 164th OCC meeting, most of hydro generators have shown inability for support as synchronous condenser. Detailed information shown below was also deliberated in the meeting:

Sl. No.	Agency	Status as per discussions in 164 th OCC meeting
1.	NHPC HEPs of NR	Facility not available at any of the station other than Chamera-II HEP . Two unit of Chamera-II HEP is already under breakdown and 3 rd unit is also under stress so trial run will be done after Jan-2020.

Sl. No.	Agency	Status as per discussions in 164 th OCC meeting
2.	Tehri HEPs	Unit-1, 2 & 4 have already been tested , unit-3 will be tried this year
3.	Punjab HEPs	OeM suggested some improvement in RSD to run the unit in synchronous condenser mode. Order has been placed and will be delivered till March-2020 .
4.	Rajasthan HEPs	Rajasthan representative informed that no unit can run in synchronous condenser mode.
5.	Uttar Pradesh HEPs	UP to confirm status of their generators (7 days after OCC)
6.	Uttarakhand HEPs	Uttarakhand to confirm status of their generators (7 days after OCC)
7.	Himachal Pradesh HEPs	HP to confirm status of their generators (15 days after OCC)
8.	Jammu & Kashmir HEPs	J&K to confirm status of their generators
9.	BBMB HEPs	Pong HEP can run as and when required
10.	NTPC Gas station	NTPC informed that due to clutch arrangement issue the gas stations Anta, Auraiya, Dadri, Bawana are not capable of running in Condenser mode.
11.	Delhi Gas station	Matter under discussion in DERC
12.	Uttarakhand Gas stations	Shravanti and Gamma infra cannot run in synchronous condenser mode.

- B.8.6 THDC representative expressed concern regarding DSM charges payable for the time it is running as synchronous condenser. TCC confirmed that there shall not be any DSM charges payable by Tehri for time it is running as synchronous condenser based on certification from NRLDC and if any payment was made, the same shall be reversed.
- B.8.7 TCC appreciated Punjab (taking action), THDC and BBMB for their efforts for running / enabling their machines as synchronous condenser and asked other hydro and gas generators to confirm the status at the earliest. MS, NRPC stated that this status later shall be submitted to CERC so that the commission is also aware of the situation and necessary action is taken in this regard.
- B.8.8 TCC deliberated that even after reactive power support from different resources, still high voltages are being observed in the grid. Voltages at most of substations of Northern region especially those lying in Punjab, Haryana, Delhi, parts of Uttar Pradesh (near Agra) continue to be above 420kV for more than 60-70% of time. Voltages during night hours at these stations is in range of 430-435kV. Thus, it is necessary that there is

adequate reactive power absorption by generators, operation as synchronous condenser apart from other reactive power support.

- B.8.9 Issue of high voltage at HVDC substations such as Agra and Kurukshetra was also deliberated. NLDC representative stated that although, measures such as optimising HVDC power order to make sure minimum filters in service are being taken, still voltages continue to remain on the higher side. TCC agreed that both 220kV as well as 400kV voltages are high at these stations and there is urgent need of reactive power support at these stations.
- B.8.10 POWERGRID representative stated they are opening several lines on daily basis for voltage control on instruction from NRLDC. They are communicating to CTU as well as POSOCO regarding frequent switching of lines and possible actions that could be taken to minimise switching operations. TCR is planned at Kurukshetra and its commissioning is expected only after 2020 winter. Further, POWERGRID requested that while opening of 765kV lines, lines may be opened when voltages are around 780-790kV instead of 800kV to avoid stress on circuit breakers. NRLDC expressed that in case it is expected that voltage would increase further, lines are being opened even before 800kV and it shall be continued in that manner.
- B.8.11 NRLDC representative stated that voltages at Hindaun and Alwar vary by 50-60kV in a single day from past few days. Tap positions at these locations were changed on request from Rajasthan SLDC to improve voltage profile at 220kV voltage level. However, as demand of Rajasthan rises from 6000MW at 04:00hrs to 12000MW at 07:00hrs, 400kV voltages at Hindaun and Alwar fall by nearly 50kV even reaching 370kV and 360kV respectively.
- B.8.12 TCC deliberated that, although, tap changes were done temporarily at Hindaun and Alwar, this is not long-term solution. There is need to plan for more reactive power support or additional connectivity at Hindaun/Alwar to avoid such situation in future.
- B.8.13 Chairperson, TCC expressed concern that mostly planning studies are done for designing network such that it is able to supply power in adequate manner; however, reactive power requirement also needs to be critically analysed. With incoming renewable generation, studies also need to be carried out for making sure that system is able to bear the variations in renewable generation.

NRPC deliberations

- B.8.14 PSTCL representative suggested that in order to minimize frequent switching of lines, lines may be kept open for longer duration say several weeks and months after considering reliability of the grid.
- B.8.15 NRLDC representative stated that as deliberated earlier also demand picks up from ~28000MW to ~42000MW during morning hours within 2-3 hours, thus there is large variation in grid voltages as well. To ensure ramping requirement support from hydro generators, the lines near hydro generators need to be taken in service and in the night hours these have to be opened for voltage regulation.

B.8.16 Regarding support from synchronous condenser operation of generators, NRPC agreed that there needs to be incentive for hydro generators for running as synchronous condenser. A solution to this could be increasing O&M charges considering wear and tear of machines.

B.8.17 NRLDC also raised concern on the support from synchronous condenser mode of operation of NTPC gas stations. NTPC representative informed that they are taking up the matter of running gas stations as synchronous condenser with their higher ups and shall convey the same in upcoming meetings.

B.8.18 NRPC asked utilities to expedite works for commissioning of already planned reactors.

B.8.19 SLDC Rajasthan representative expressed concern that technical minimum operation of thermal generators is required especially considering variations in demand pattern as well as variability in renewable generation. NRPC agreed that these issue needs to be discussed in FoR meeting so that state regulators take necessary actions.

B.9 Low Voltage Ride Through (LVRT) in Renewable generators (Agenda by NRLDC)

TCC Deliberations

B.9.1 It was deliberated that in two grid events in Rajasthan on 07.05.2019 and 16.09.2019 large solar generation got disconnected indicating non-compliance of LVRT. During analysis and details received from constituents, a few issues emerged viz. protection setting, data availability, etc. In view of ongoing large RE integration, different make of inverters coming up and such large outages on LVRT / HVRT, NRPC Sectt. called a meeting on 13.11.2019. One of the outcomes of the meeting is forming of a committee comprising of members from CEA, NRPC, NRLDC, and three solar developers which would come up with guidelines to be adopted by RE generators connected at ISTS level to avoid unintended disconnection / reduction in RE generation. These guidelines would also be useful for states having large scale RE integration.

B.9.2 TCC concurred the formation of subgroup.

NRPC deliberations

B.9.3 NRPC approved formation of subgroup. NRPC also decided to include Rajasthan's representation in the sub-group.

B.10 Low Availability of bus reactor at Koldam HEP and Koteshwar HEP (Agenda by NRLDC)

TCC Deliberations

B.10.1 NRLDC representative stated that 80 MVAR bus reactor at Koldam has been out since 07.06.2019 due to voltage regulation. During Nov'19, voltage at Koldam was above 420kV for more than 80% of time. Thus, there is need for revival of reactor at Koldam

at the earliest. In the meeting, NTPC representative intimated that bus reactor has been revived on 05.12.2019

B.10.2 At Koteshwar, there is one 125MVAR bus reactor. The same is charged through transfer bus coupler. Thus, in case of need of transfer bus coupler, bus reactor is opened and it cannot remain in service till transfer bus coupler is engaged. This poses operational challenge specially in case of high voltage conditions.

B.10.3 THDC representative informed that bus reactor is under the ownership of POWERGRID and due to space constraint at Koteshwar, additional bay for bus reactor has not been envisaged.

B.10.4 TCC also suggested for expediting revival works of prolonged out elements such as:

- 220kV Chamera III – Chamba ckt 2
- 220kV Chamera III Bus-I
- 80MVAr Bus reactor at Nathpa Jhakri

B.10.5 HP representative expressed concern over long outage of line and stated they are further planning for evacuation of Bajoli Lahal. Moreover, the single circuit of line in service is on ERS. NHPC informed that they are taking remedial actions however, since equipments would be transferred from France thus, delivery of same is expected in Jul-Sep 2020.

B.10.6 TCC suggested that the measures need to expedited and at least before peak hydro season next year, revival of lines as well as bus at Chamera-III be carried out.

NRPC deliberations

B.10.7 NRPC noted TCC deliberations. NRPC decided that site visit at Koteshwar may be carried out by committee approved by MS NRPC to explore possibility of dedicated bay for bus reactor at Koteshwar.

B.10.8 HPPTCL expressed concern over long outage of line as well as restoration of one line on ERS, thus depleting the maximum power transfer limit. POWERGRID informed that the lines would be restored on normal towers by Mar'20.

B.10.9 NRPC asked utilities to expedite revival works of above mentioned elements.

B.11 Dynamic reactive power support from generators (Agenda by NRLDC)

TCC Deliberations

B.11.1 NRLDC representative stated that as highlighted earlier, Northern region substations are experiencing very high voltages during winter months. These high voltages are more severe during night hours when demand of Northern region is less.

B.11.2 IEGC Section 6.6.6 states that:

“The ISGS and other generating stations connected to regional grid shall generate/absorb reactive power as per instructions of RLDC, within capability limits of the respective generating units, i.e. without sacrificing on the active generation

required at that time. No payments shall be made to the generating companies for such VAr generation/absorption.”

B.11.3 Reactive power response of major generating station is being shown by NRLDC at monthly OCC meetings; however, it has been observed that even after lot of discussions, significant response from many generators is yet to come. It has been requested in OCC meeting that every state/SLDC should also start focusing on big generator to address issues like plant reactive response, availability of telemetry so that desirable response can be achieved for better system operation.

B.11.4 In 165th OCC meeting, it was discussed that in view of persistent high voltages in Northern region and inadequate response from most generators, reactive power capability testing shall be carried out after discussion in OCC meeting. This shall also boost confidence of generators to absorb/generate MVar as per capability curve. SLDCs may also consider carrying out reactive power capability testing of generators under their jurisdiction. This is likely to improve voltage profile in the grid.

B.11.5 TCC concurred with discussions of OCC and it was decided that:

- All generators (including intrastate) shall absorb MVar as per capability curve
- Reactive power support performance and MVAR telemetry issues will be reviewed in monthly OCC meetings.
- Reactive power capability testing will be carried out after discussion in OCC meeting.

NRPC deliberations

B.11.6 NRPC concurred with deliberations of TCC.

B.12 Involvement of SLDC officials in system studies (Agenda by NRLDC)

TCC Deliberations

B.12.1 NRLDC representative stated that as per CERC regulations and decision taken in the 4th NPC Meeting, states need to carry out ATC/TTC computations of their area and also share basecase on monthly basis for regular network update. Over the years several training sessions have also been organized at NRLDC/NLDC for PSSe software used for simulation studies in POSOCO. Moreover, representatives of SLDCs have also been visiting NRLDC for interactions with system study engineers.

B.12.2 Involvement of SLDC officials in power system studies not only helps to assess TTC/ATC limits of the control area but also provides information about likely constraints and precautionary actions that may be taken to avoid high line/ICT loadings etc. This Intra-state TTC/ ATC computations could also help to identify margins in transfer of power among NR-Constituents.

B.12.3 Following is the status of involvement of SLDCs in system studies:

- Delhi, Haryana, Punjab, UP sharing basecase and ATC/TTC assessment before summer season
- Rajasthan sharing basecase and ATC/TTC assessment before winter season

- Delhi SLDC also conducting shutdown simulation studies
- Negligible involvement of officials from **HP, Uttarakhand, J&K and Chandigarh**

B.12.4 NLDC representative stated that in other regions (especially SR) monthly basecase alongwith ATC/ TTC assessment is being shared by states leading to more frequent update of study network.

B.12.5 Further, new draft regulations for sharing of transmission charges suggest monthly basecase need to be prepared. Thus, timely network update and sharing of information with NRLDC is necessary so as to make sure that correct system model is also being used for simulation results.

B.12.6 Moreover, as discussed in Agenda No. B.1, for preparation of basecase for capacitor study requirement, thorough checking of network in PSSe is required before forwarding it to CPRI. Thus, it is necessary to designate manpower for this job.

B.12.7 TCC advised HP, Uttarakhand, UTs of J&K, Ladakh and Chandigarh to nominate their engineers for system studies at SLDC level and also advised all states to timely share basecase as well as ATC/TTC assessment with NRLDC/NRPC. All states/UTs were asked to share nomination in upcoming OCC meeting.

B.12.8 Uttarakhand representative stated that the nodal officer would be nominated at the earliest. Moreover, it was agreed that ATC/TTC limit shall also be furnished at SLDC websites.

NRPC deliberations

B.12.9 NRPC concurred with deliberation of TCC. HP representative informed that they would start sharing basecase on regular basis from Jan-Feb'20.

B.13 2019-20 Solar eclipses Preparation (Agenda by NRLDC)

TCC Deliberations

B.13.1 NRLDC representative stated that India is expected to witness two annular solar eclipses on 26th Dec 2019 and 21st Jun 2020. Since share of solar generation has been on increasing trend and has significant portion in our portfolio, it is necessary that we prepare ourselves for impact of solar eclipse on this solar PV generation.

B.13.2 For 26th Dec 2019 solar eclipse, it is estimated that eclipse shall lead to reduction of PV generation by approximately 7823MW. During initial period of eclipse, the generation is likely to reduce by 1124 MW in 1.25 hrs. However, after maximum magnitude of the solar eclipse, the generation from the solar PV plant is likely to increase by 13,344 MW in 1:50 hrs. This condition will pose serious challenge to system operators to maintain load and generation balance during the eclipse period i.e. 08:04 AM to 11:58 AM.

B.13.3 It is estimated that Northern Region PV generation would decrease by nearly 1000MW within 1.00 hour from start of eclipse and would increase by almost 2100 MW within 1:45 hrs after the maximum impact of the eclipse.

- B.13.4 To maintain the load generation balance due to reduction in PV generation during solar eclipse, around 7823 MW generation (pan-India) from other sources (i.e. Thermal, Hydro, and Gas) is required within a short duration of time.
- B.13.5 There could be 1 to 2 % average drop in demand during the eclipse compared to a normal day due to human behaviour. The possible impacts of solar eclipse on generation profile and actions required have already been discussed in 162nd and 165th OCC of northern region.
- B.13.6 With the present level of solar penetration level, there is no reliability issue in Northern region. But, with increase in the penetration of distributed solar generation in future there would a great reliability issue. (next solar eclipse on 21st Jun 2020 affecting NR).
- B.13.7 POSOCO has prepared a report on likely impacts of solar eclipse on Indian power system and preparedness measure required from different utilities. The report can be accessed from <https://posoco.in/wp-content/uploads/2019/12/Solar-Eclipse-26th-December-2019-Indian-Power-System-likely-impacts-and-preparedness-A-report.pdf>
- B.13.8 NTPC representative stated that for support from gas generation, advance intimation is required to make necessary arrangements. TCC appreciated efforts of POSOCO and asked them to come up with post event analysis of the solar eclipse and use this as preparedness drill for future solar eclipse which is expected on 21st Jun 2020.

NRPC deliberations

- B.13.9 NRPC noted the information and appreciated efforts of POSOCO.

B.14 Grid Events in Northern Region during Sep'19-Oct'19 (Agenda by NRLDC)

TCC Deliberations

- B.14.1 NRLDC representative stated that total 53 number of Grid Events as per CEA standard have been witnessed in Northern Region during Sep'19 to Nov'19.
- B.14.2 Monthly GD/GI summary is as under:

Month	Event Category			Monthly event as % of total	fault duration > 100ms / 160ms
	GD	GI	Total		
Sep'19	9	5	14	26%	29%
Oct'19	13	9	22	42%	23%
Nov'19	9	8	17	32%	24%
Total	31	22	53	100%	25%
GD as % of total			58%	Fault duration > 100ms / 160ms for almost every fourth event	
GI as % of total			42%		

- B.14.3 These tripping events have been discussed in various OCC, PSC and other special meetings.
- B.14.4 From the above, it could be observed that during the past two month periods there are three grid event occurrence in almost every five days. Renewable integration in grid is

increasing complexity in the grid, thus formation of subgroup as discussed in Agenda No. B.2 would be useful in this regard.

- B.14.5 Apart from this, tripping portal has been made live from 01.11.2019 for facilitating timely submission of DR, EL, preliminary and detailed reports. All utilities have been given userid and password to login and upload the required information as per IEGC timelines.
- B.14.6 NRLDC representative informed that this season mock blackstart exercise of Dhauliganga and Koteshwar have been conducted successfully on 15.11.2019 and 28.11.2019 respectively.
- B.14.7 TCC appreciated efforts of NRLDC for creation of tripping portal and asked utilities to upload DR, EL, preliminary and detailed tripping reports as per IEGC timelines. Further, as discussed in Agenda No. B.2 formation of separate post-dispatch group at SLDCs would help in the process.

NRPC deliberations

- B.14.8 NRPC concurred with deliberation of TCC.

B.15 Multiple tripping in Kashmir valley due to heavy snowfall on 07, 08 November 2019 (Agenda by NRLDC)

TCC Deliberations

- B.15.1 NRLDC representative stated that all 220kV and below voltage level lines in Kashmir valley tripped during snowfall / inclement weather condition in valley on 07th and 08th November 2019. Consequently, it resulted in complete interruption of power supply in valley including generation loss of around 150-200MW at Kishenganga HEP (NHPC) and 80MW at state own generation.
- B.15.2 During the restoration of grid, it was found that except 220kV Kishenganga-Delina D/C, other 220kV circuits at Delina were damaged thus rendering 220kV Kishenganga-Delina D/C as only evacuation for Kishenganga HEP. Black start of Kishenganga HEP would have helped in early restoration of load at Delina.
- B.15.3 Load at Pampore, Zainkote was revived after restoration of downstream network. Valley load was restored after 3-4 days of the incident. During such contingencies, the non-availability of real time data for the Kashmir valley system is also a serious hindrance in system operation.
- B.15.4 TCC advised the following:
- NHPC to take up the matter with OEM to expedite the black start of Kishenganga HEP. NHPC confirmed that there are some contractual issues with BHEL and they are taking up the matter with them.
 - J&K and POWERGRID shall also consider the early snowfall in that area for pre winter maintenance

- J&K to facilitate for mock black-start exercise of Uri-I, Uri-II and Kishenganga generating units
- J&K to ensure healthy capacitor in service in view of low voltages during peak season. J&K to submit data for capacitor study.

NRPC deliberations

B.15.5 J&K representative stated that this year snowfall was unprecedented, and generally snowfall is in Dec-Feb months. Water content in snowfall was high and the trippings were not on account of trees or other reasons, but due to snowfall. J&K representative suggested that mock blackstart exercises of generating units in J&K may be carried out before Oct.

B.15.6 Chairperson NRPC emphasized on the need for mock blackstart exercise and asked utilities to make sure that the exercises are carried out on regular basis. NRPC noted the deliberations and asked NHPC and J&K to take necessary actions.

B.16 Reliability of Telemetry (Agenda by NRLDC)

TCC Deliberations

B.16.1 NRLDC representative stated that based on CERC/CEA regulations and decisions of TCC/NRPC, the telemetry integration is being ensured before charging of new system element at ISTS (super grid) level. However, the reliability of data is very poor leading to issues in real time grid operation and monitoring. There is no improvement in non – availability/intermittency of data in last one year. Month-wise non-availability of data was also presented in the meeting.

B.16.2 It was also highlighted that correct digital telemetry is not observed even after the availability of telemetry. Due to non-availability of proper status of CBs and Isolators, State Estimator is not able to form network model resembling to actual Power System Model via Topology Processor. Snapshot of CB availability of 220 KV and above (Based on snapshot of 28.10.2019) was presented in the meeting. Suspected/Inverted status of switches lead to formation of wrong topology and difficulty in smooth grid monitoring/operation.

B.16.3 The matter regarding availability of correct digital status is being regularly taken in various TeST / TCC meetings since 2016, but still there is negligible improvement in the availability of digital status.

B.16.4 The matter was also discussed during 16th TeST Meeting where it was decided that all constituents would submit the digital status availability report to NRPC/NRLDC on quarterly basis. It was also decided that constituents shall rectify digital status of the list (as attached in agenda) by 30th Nov 2019. However, same is still to be attended.

B.16.5 MS NRPC also expressed concern and stated that states are also financially hit due to poor/ bad telemetry. Thus, actions would not only improve visibility of data but also help them financially as decisions during grid operation are taken based on real-time data.

B.16.6 Chairperson, TCC stated that NRLDC/NRPC shall come up with list of stations which are critical for system operation and utilities be asked to take corrective actions for these immediately. Meanwhile, measures also need to be taken so that telemetry of other stations is also improved.

B.16.7 TCC asked members to honor the decision taken in the TeST sub-committee meeting and furnish the status regularly and take actions for improving telemetry as well as making correct digital status available to control centers.

NRPC deliberations

B.16.8 NRPC concurred with deliberation of TCC.

B.17 Status telemetry of TCSC / FSC (Agenda by NRLDC)

TCC Deliberations

B.17.1 Matter was also discussed in 42nd TCC Meeting, where UPPTCL was requested to procure the AI/DI card or take help from Haryana / HP to make FSC/TCSC status available.

B.17.2 UPPTCL representative stated that cabling work is pending from POWERGRID part. UPPTCL and POWERGRID were asked to arrange for integration of telemetry of Bareilly-Unnao FSC at the earliest. Further, TCC advised UPPTCL and POWERGRID to conduct separate internal meeting to resolve issues in providing telemetry at the earliest.

NRPC deliberation

B.17.3 UP SLDC representative stated that meeting with POWERGRID has been fixed on 16th Dec 2019 for resolving the issue. NRPC noted the same.

B.18 Communication availability from NLDC/ RLDCs to the nearest wide band node/ switchyard for the generating stations under AGC as per CERC order 319/RC/2018 dated 28th August 2019 (Agenda by NRLDC)

TCC Deliberations

B.18.1 NRLDC representative stated that as discussed in 43rd TCC and 46th NRPC meeting, Hon'ble Central Electricity Regulatory Commission (CERC), in the matter of Automatic Generation Control (AGC) implementation in India, has issued the direction that all thermal ISGS stations with installed capacity of 200 MW & above and all hydro stations having capacity exceeding 25 MW excluding the Run-of-River Hydro Projects irrespective of size of the generating station and whose tariff is determined or adopted by CERC, to install equipment at the unit control rooms for transferring the required data for AGC as per the requirement to be notified by the National Load Despatch Centre (NLDC). The CERC Order 319/RC/2018 dated 28th August 2019 is available at <http://www.cercind.gov.in/2019/orders/319-RC-2018.pdf>.

- B.18.2 In the Order, Hon'ble Commission directed the Central Transmission Utility (CTU) to commission communication facility from NLDC/ RLDCs to the nearest wide band node/ switchyard for the generating stations in a redundant and alternate path ensuring route diversity and dual communication. The list of plants identified for AGC operation by NLDC as per CERC Order was attached as Annexe-1 of agenda.
- B.18.3 The matter was discussed during 16th TeST Meeting held at NRPC on 14th November 2019 where CTU informed that for Northern Region only 4 plants are having dual connectivity with path redundancy. POWERGRID representative stated that work is in progress of 14 stations where work is expected to be completed by 2021. POWERGRID representative informed that they have also submitted tentative plan for redundant channel connectivity for remaining 12 stations amounting to Rs.38 Cr.
- B.18.4 TCC advised POWERGRID to put up the detailed plan of new OPGW requirement along with cost estimate for approval of members in NR-TeST sub-committee meeting and then approval plan may be put up in TCC meeting.

NRPC deliberation

- B.18.5 NRPC concurred with deliberations of NRPC.

B.19 Training programme on Power System Protection (Level-2 and Level-3) for Protection System Engineers

TCC Deliberations

- B.19.1 Members were apprised that as per the recommendations of a Group constituted by NRPC Sectt. on 26.08.2015 to suggest measures for improvement in protection system among the utilities of Northern Region, first batch of Level-2 and Level-3 protection system training was successfully conducted for 25 participants through POWERGRID. In the 40th TCC/ 43rd NRPC meetings, it was decided to conduct second round of Level-2 and Level-3 training (classroom as well as hands-on) for 50 engineers by engaging any of the OEM of relays and book the expenditure from NRPC fund.
- B.19.2 Members were informed that as per the decisions in 40th TCC/ 43rd NRPC meetings and considering the provisions in the 'Manual for Procurement of Consultancy & Other Services 2017', issued by Department of Expenditure to engage PSU for training services, POWERGRID was requested submit budgetary quote for 05 days each Level-2 and level-3 residential training program on protection system for 50 protection system engineers of NR with faculties exclusively from OEM(s) such as ABB, SIEMENS, GE, etc.
- B.19.3 It was informed that POWERGRID has submitted budgetary quote with program fee per participant as Rs. 66,500 /- (excluding GST) and venue for 05 days Residential training program will be POWERGRID Academy of Leadership (PAL), Manesar. It was deliberated that 25 No. of participants in each batch i.e. total 4 training programs (2 each for Level-2 & Level-3) may be conducted.
- B.19.4 It was deliberated that 02 Nos. of nominations from each utility will be requested and

1st batch of training program may be started in 3rd week of January 2020, depending upon the no. of nominations received. TCC recommended the training programme on Power System Protection (Level-2 and Level-3) for the approval of NRPC.

NRPC Deliberations

- B.19.5 Rajasthan representative suggested that training program like SLDC operator training may be organized on regular basis in institutions like NPTI. Further, he also highlighted that engineers participating in such training program should be preferably working in Protection area also. Members agreed that utilities to the extent possible should ensure that participants in such training program continue in Protection.
- B.19.6 NRPC approved the training programme on Power System Protection (Level-2 and Level-3) as per the offer of POWERGRID.

B.20 Requirement of good quality input data for State Estimator/Energy Management System (EMS) /Dynamic Security Assessment model for Indian power system (Agenda by NRLDC)

TCC Deliberations

- B.20.1 NLDC representative informed that SCADA/EMS upgradation at NLDC is scheduled for completion by mid 2020 along with standard features of EMS i.e. SE/CA and for first time, AGC and Dynamic Security Assessment are envisaged to be operationalized at NLDC.
- B.20.2 He highlighted that reliable telemetry and correct digital status is of prime importance as proper telemetry is not available from many substations which has impact on successful state estimation.
- B.20.3 NRLDC representative informed that even though the telemetry is available at some places, correct digital telemetry is not available. He also highlighted that proper status of CBs and Isolators is also required for SE to form network model resembling.
- B.20.4 He also informed that, based on CERC/CEA regulations and decisions of TCC/NRPC, the telemetry integration is being ensured before charging of new system element at ISTS (super grid) level.
- B.20.5 TCC advised that utilities shall take necessary actions for improving telemetry and digital status reporting in a time bound manner. NRLDC and SLDCs were requested to prepare list of nodes which are critical for grid operation as well as smooth running of SE. In accordance, actions shall be prioritized by utilities to improve telemetry for these nodes at first. TCC also requestd SLDCs to ensure availability of data telemetry before first time charging of elements.
- B.20.6 TCC urged all the utilities to furnish the status regularly and take actions for making correct digital status available to Control Centers. It was decided that same will be monitored in TeST meeting and feedback shall be given to TCC/ NRPC.

NRPC Deliberations

- B.20.7 NRPC concurred with the deliberations held in the TCC meetings and requested to take

necessary actions to ensure reliable telemetry.

B.21 Requirement of Unified Real Time Dynamic State Measurement (URTDSM) Scheme (Agenda by POWERGRID)

TCC Deliberations

B.21.1 NRLDC representative stated that space constraint / renovation at ERLDC, Kolkata related issues may be highlighted by POWERGRID at ERPC meeting. He informed that NIT is expected to be awarded by Janaury, 2020 and renovation work to be completed by March, 2020 as per feedback received from ERLDC.

B.21.2 POWERGRID highlighted that issue has been brought up at NRPC as NLDC back up is at ERLDC and project of URTDSM is being looked after by NR. He further stated that UPS and Battery Banks were supplied one year back and battery life is getting impacted due to no charging. POWERGRID requested that temporary space may be given so that UPS may be connected and Battery Banks may be commissioned which will arrest its deterioration.

B.21.3 TCC requested that issue may be taken up with ED, ERLDC to facilitate space for commissioning of Battery banks at the earliest to avoid further deterioration.

NRPC Deliberations

B.21.4 NRPC concurred with the TCC deliberations.

B.22 Signing of MoU between POWERGRID & HVPNL for HVPNL owned bays in POWERGRID Gurgaon & Jind substations (Agenda by POWERGRID)

TCC Deliberations

B.22.1 Members were apprised that issue has also been deliberated in last TCC/NRPC meetings wherein HVPNL was requested to resolve the issue and sign MoU by 15th October 2019 as issue is pending since 2013. Members were informed that MoU for HVPNL owned bays at Jind Sub Station has been signed on 14.11.19; however, MoU for HVPNL owned bays at Gurgaon Sub Station is yet to be signed.

B.22.2 HVPNL representative stated that matter is being taken up and there is some issue which will be resolved at the earliest. TCC requested HVPNL to resolve the issue and sign the MoU for Gurgaon substation by 1st week of January 2020.

NRPC Deliberations

B.22.3 NRPC concurred with the TCC deliberations and requested HVPNL to expedite signing of MoU for Gurgaon substation.

B.23 Requirement Frequent Tripping of 220kV Lines emanating from Meerut, Baghpat & Saharanpur Sub Station (Agenda by POWERGRID)

TCC Deliberations

B.23.1 UPSLDC representative informed that majority of the trippings are due to defective batch of insulators, which are being replaced at various locations. He stated that insulators are from 2 manufactures (Aditya Birla and Goldstar) and these are being replaced in steps from 3-4 months. He highlighted that no. of trippings have reduced in the months of October and November 2019. He informed that reasons of insulator failure are being looked into and detailed report of trippings will be shared at the earliest.

B.23.2 It was also highlighted that majority of the trippings have occurred in the early morning hours and night hours which prima-faie indicate that moisture might have caused trippings. TCC requested that detailed report of the trippings may be submitted within 10 days.

NRPC Deliberations

B.23.3 NRPC concurred with the TCC deliberations.

C . C O M M E R C I A L I T E M S

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

TCC Deliberations

C.1.1 THDC, SJVNL, NHPC and POWERGRID apprised the TCC members regarding the status of their outstanding dues. The details of the same are enclosed in the Agenda note of the meeting. Constituent wise details are as under:

C.1.2 **THDC**

- THDC informed that with regard to BRPL, total outstanding dues was approx. Rs. 144 Crore. However, he expressed major concern over LPSC which was pending since March, 2016. On the issue of energy bills, pending since August, 2019 in view of Payment Security Mechanism implemented by MoP w.e.f. 01st August, 2019, SJVN clarified that payment received from the beneficiaries for current energy bills are being adjusted against old outstanding dues first based on accounting philosophy of First-In-First-Out (FIFO), mutually agreed with the beneficiaries.
- BRPL stated that the above issue was actually related to apportionment of payment. Initially, THDC was adjusting payment against the energy bills only. Recently, they have changed their practice of adjustment. They are discussing the issue with THDC and resolve the issue bilaterally. BRPL further stated that they are making the payment for current energy bills and also have been trying their level best to clear the old outstanding dues on an early basis.
- BYPL was not present in the meeting and hence, latest status for the same could not be ascertained.
- PDD, J&K stated that the state of Jammu & Kashmir was re-organised into UT of Jammu & Kashmir and UT of Ladkha w.e.f. 9th August, 2019. Due to this re-organisation, the apportionment of assets and liabilities is being worked out between UT of Jammu & Kashmir and UT of Ladkha at present. He informed that they are not able to make payment due to their present transition phase i.e moving from the earlier Govt. treasury system to the current corporate structure. The payment would be done as the system gets stabilized after sometime. He also added that they are in the process to finalize the modalities to clear the current as well as past liabilities including the opening of LC.
- UPPCL was not present in the meeting and hence, latest status for the same could not be ascertained.
- THDC stated that UPPCL has not reconciled the LPS bills pertaining to THDC since Oct'18. TCC recommended that one-month time may be allowed to UPPCL for the reconciliation of the same and if no response from UPPCL is received, it would be treated as deemed reconciled.

- PSPCL stated that they had to make payment of around Rs. 1400 crore to their IPPs which has created financial instability in their system. He stated that till now, they had been making payment on regular basis. He further stated that the dues would be cleared shortly.
- RUVNL stated that the payment would be made tentatively by the end of December, 2019.
- Representative of UPCL was not present in the meeting and hence, latest status for the same could not be ascertained.

C.1.3 **SJVNL**

- MS, NRPC stated that as decided in 41st CSC meeting held on 19.12.2019, a meeting would be convened to resolve the payment issues related to GoHP and HPSEB.
- SJVNL expressed concern over non-payment against huge outstanding by J&K pertaining to SJVNL. He further opined that MoP's allocation order pertaining to J&K may be revised in view of re-organisation of state of J&K into two UTs. J&K PDD stated that, in general, in all allocation orders, name "J&K PDD or its successor" is mentioned. However, he stated that he will try to address this issue.
- Representative of RUVNL stated that the payment would be made tentatively by the end of December, 2019.

C.1.4 **NHPC**

- NHPC requested the defaulting entities to clear the outstanding dues on priority.

C.1.5 **POWERGRID**

- POWERGRID stated that out of total outstanding dues of the tune of approx. Rs. 3400 crores on all India basis, more than 50% outstanding dues of around Rs. 1800 crore, are attributed to NR constituents only. He also opined that a financial mechanism should be evolved to clear the huge outstanding dues. He requested all the defaulting entities to liquidate the outstanding dues on priority.

C.1.6 TCC advised the defaulting entities to make payment on priority.

C.1.7 MS, NRPC opined that DO letter for liquidation of outstanding payments, may be sent to Principal Secretary (Energy) each, of the concerned states by NRPC Secretariat. TCC agreed for the same.

NRPC Deliberations

C.1.8 MS, NRPC apprised the members regarding the deliberations and view taken during the TCC meeting.

C.1.9 NRPC concurred with the decisions of TCC.

C.1.10 NRPC expressed concern over non-payment of dues by defaulting entities and advised all members to clear the dues on priority.

C.2 Opening of Letter of Credit (LC)

TCC Deliberations

- C.2.1 POWERGRID presented the list of beneficiaries that are yet to submit the requisite LC. The details of the same were enclosed in the Agenda note of this meeting.
- C.2.2 MS, NRPC opined that DO letter for opening LC could be sent to Principal Secretary (Energy) each, of the concerned states by NRPC Secretariat. TCC agreed for the same.

NRPC Deliberations

- C.2.3 NRPC advised all constituents to open the LC on priority basis.
- C.2.4 NRPC concurred with the decisions of TCC.

C.3 Opening of Letter of Credit (LC)

TCC Deliberations

- C.3.1 NHPC intimated that the LC of Rs.274.806 Cr opened by JKPCCL on behalf of PDD, J&K in favour of NHPC Ltd. had expired on 13.11.2019.
- C.3.2 PDD, J&K reiterated the same view as expressed under Item C.1.2 above.
- C.3.3 TCC advised JKPCCL to open LC of requisite amount on priority as the same expired on 13.11.2019.

NRPC Deliberations

- C.3.4 NRPC advised JKPCCL to open LC of requisite amount as per provisions laid down in their PPA and in compliance to MoP's order related to Payment Security Mechanism implemented w.e.f. 01st August, 2019.

C.4 Non-payment of LPS by the beneficiaries

TCC Deliberations

- C.4.1 SJVNL stated that while releasing the amount of energy bills raised by SJVN Limited, the amount of late payment surcharge is being excluded by the beneficiaries.
- C.4.2 He stated that LPS is an integral part of energy bills which is imposed/charged in view of CERC regulation and provision contained in the Power Purchase Agreement for non-payment of dues. Hence, the non-payment of LPS is violation of Power Purchase Agreement and CERC guidelines on the subject.
- C.4.3 TCC advised the beneficiaries to make payment of energy bill including the amount of LPS, while making the payments.

NRPC Deliberations

- C.4.4 NRPC advised all constituents to make payment of energy bill including the amount of LPS, as per provisions laid down in their PPA and CERC regulations.

C.5 Consent from Beneficiaries for purchase of power from Dhaulasidh Hydro Electric Project (66 MW) in Himachal Pradesh

TCC Deliberations

C.5.1 SJVNL stated that Government of Himachal Pradesh has allotted Dhaulasidh Hydro Electric Project (66 MW) to SJVN Ltd on Memorandum of Understanding (MoU) Basis. The project is situated on river Beas in district Hamirpur & Kangra in the state of Himachal Pradesh. MoU for execution of Dhaulasidh HEP was signed with the Govt. of Himachal Pradesh on 25th September, 2019.

C.5.2 He stated that Dhaulasidh HEP is a run-of-river with a small live storage for peaking during lean season and is designed to generate annually 304 MUs in 90% dependable year and the commissioning of the project is expected by September, 2024.

C.5.3 He further stated that as per MoU signed with GoHP, 12% or staggered free power royalty slabs on mutual agreement basis as approved by GoHP and another 1% additional free power for Local Area Development Fund (LADF) of the energy generated from project after excluding auxiliary consumption and transformation losses (net energy) shall be given to the State Government at the interconnection point of the power station with the state/Central Transmission Utilities. SJVN would be in a position to offer the remaining power to interested States / UTs of the Northern Region as per the prevalent policies of Govt. of India issued from time to time.

C.5.4 He added that the Project is proposed to be financed in 80:20 debt equity ratio. The estimated project cost of Rs 654.21 Cr. (including IDC and Financing Charges) at December, 2018 price level has been proposed in the draft PIB proposal for Investment approval. The levelized tariff of the project is Rs 4.54 per kWh based on above mentioned project cost.

C.5.5 TCC urged the interested beneficiaries to convey their consent for purchase of power, indicating the quantum of power required from this Hydro project.

C.5.6 SJVN stated that they would again send letter to the beneficiaries for signing the PPA.

NRPC Deliberations

C.5.7 NRPC noted and concurred with the TCC deliberations.

C.6 Consent from Beneficiaries for purchase of power from Luhri Hydro Electric Project Stage-I (LHEP Stage-I) in Himachal Pradesh (210 MW)

TCC Deliberations

- C.6.1 Representative of SJVNL stated that Government of Himachal Pradesh has also allotted Luhri Hydro Electric Project Stage-I (LHEP Stage-I) (210 MW) to SJVN Ltd. on Memorandum of Understanding (MoU) Basis. The project is situated on river Satluj in district Shimla & Kullu in the state of Himachal Pradesh. MoU for execution of LHEP Stage-I was signed with the Govt. of Himachal Pradesh on 25th September, 2019.
- C.6.2 He stated that LHEP Stage-I is a run-of-river with Diurnal Storage type scheme and is designed to generate annually 758.20 MUs in 90% dependable year and the commissioning of the project is expected in May, 2025.
- C.6.3 He further stated that as per MoU signed with GoHP, 12% or staggered free power royalty slabs on mutual agreement basis as approved by GoHP and another 1% additional free power for Local Area Development Fund (LADF) of the energy generated from project after excluding auxiliary consumption and transformation losses (net energy) shall be given to the State Government at the interconnection point of the power station with the state / Central Transmission Utilities. SJVN would be in a position to offer the remaining power to interested States / UTs of the Northern Region as per the prevalent policies of Govt. of India issued from time to time.
- C.6.4 He added that the Project is proposed to be financed in 80:20 debt equity ratio. The estimated project cost of Rs 1743.77 Cr. (including IDC and Financing Charges) at January 2019 price level has been proposed in the draft PIB proposal for Investment approval. The levelized tariff of the project is Rs 4.44 per kWh based on above mentioned project cost.
- C.6.5 TCC urged the interested beneficiaries to convey their consent for purchase of power, indicating the quantum of power required from this Hydro project.
- C.6.6 Representative of SJVN stated that they would again send letter to the beneficiaries for signing the PPA.

NRPC Deliberations

- C.6.7 NRPC noted and concurred with the TCC deliberations.

C.7 Consent for purchase of power from Naitwar Mori Hydro Electric Project (NMHEP), 60 MW (2X30 MW) in Uttarakhand

TCC Deliberations

- C.7.1 Representative of SJVNL stated Government of Uttarakhand (GoUK) has allotted Naitwar Mori Hydro Electric Project (2X30 MW) on River Tons (a tributary of river Yamuna) in district Uttarkashi in the state of Uttarakhand to SJVN Ltd. A Memorandum of Understanding (MoU) for execution of Naitwar Mori HEP was signed with the GoUK on 21st November, 2005.
- C.7.2 He stated that the investment approval for implementation of the project has been accorded by MOP, GOI on 16.10.2017 with an estimated cost of Rs 648.33 Cr at October, 2016 price level. The power from the project shall be evacuated through 220 KV D/c line from NMHEP to Mori 220/132 KV S/s of PTCUL.
- C.7.3 He further stated that the Naitwar Mori Hydro Electric Project (2X30 MW) is a run-of-river type scheme and is designed to generate Annually 265.50 MUs in 90% dependable year and the commissioning of the project is expected in December, 2021.
- C.7.4 He further added that as per the condition of Memorandum of Understanding (MoU), 12% of the net energy shall be given to Government of Uttarakhand (GoUK) free of cost. SJVN would be in a position to offer the balance power being generated from project to interested states /UTs of the Northern Region as per the prevalent policies of Govt. of India issued from time to time.
- C.7.5 He also stated that the Project is planned to be financed on 70:30 debt equity ratio. The levelized tariff of the generated power is Rs 6.39 per Kwh based on above mentioned project cost and the final tariff shall be calculated by the appropriate Regulatory Commission.
- C.7.6 TCC urged the interested beneficiaries to convey their consent for purchase of power, indicating the quantum of power required from this Hydro project.
- C.7.7 Representative of SJVN stated that they would again send letter to the beneficiaries for signing the PPA.

NRPC Deliberations

- C.7.8 NRPC noted and concurred with the TCC deliberations.

C.8 Status of DSM Charges

TCC Deliberations

- C.8.1 NRLDC apprised the status of DSM charges payable to Pool Account. It was observed that there is a significant outstanding amount due since very long time by J&K and POWERGRID NR.
- C.8.2 Further, the payment against deviation charges are being received from different regions of POWERGRID viz. NR1, NR2 & NR3. In this regard, NRLDC referred to the special meeting held on 01st July 2016 regarding the methodology for application of DSM on POWERGRID HVDC Stations where in it was agreed that, Deviation charges for all the HVDC stations will be calculated separately and will be aggregated to POWERGRID (NR) as single pool member for payment / receipt of charges and payment against deviation charges for all three NR regions. POWERGRID agreed for the same.
- C.8.3 POWERGRID stated that they have filed petition for exempting them from making the payments of DSM pool account, however the same is still pending.
- C.8.4 TCC advised POWERGRID to make payments as per the accounts issued by NRPC sect. till stay order from commission. If after Commission's order, POWERGRID is exempted from payments, same shall be refunded back to POWERGRID.
- C.8.5 TCC also urged all concerned utilities having amount payable to pool, to clear the outstanding at the earliest in accordance with CERC Regulations and to avoid further increase of Delay Payment Interest.

NRPC Deliberations

- C.8.6 Members concurred with the TCC recommendations.

C.9 Delay payment interest

TCC Deliberations

- C.9.1 NRLDC stated that EPPL & Uttarakhand were deducting TDS on the payment of "delay payment interest" of pool accounts.
- C.9.2 As the residual amount after disbursement to the receivable entities in the pool accounts needs to be transferred to PSDF (Fund belonging to Govt. of India), deduction of TDS may be exempted from the payments of "delay payment interest" of pool accounts.
- C.9.3 Utilities were requested not to deduct TDS on payment of "delay payment interest" of pool accounts as the residual amounts in the pool accounts needs to be transferred to PSDF as per the regulations of the commission.

Members noted the same.

NRPC Deliberations

- C.9.4 Members noted the TCC discussions.

C.10 Status of LC against Deviation Charges delayed payment

TCC Deliberations

- C.10.1 NRLDC requested defaulting entities to maintain LC against deviation charge (as per Format issued by NRLDC) in accordance with CERC Regulations. He presented the list of defaulting entities as given in the agenda.
- C.10.2 Punjab informed that they have also opened LC. NRLDC asked Punjab to share the details with NRLDC.
- C.10.3 Rajasthan representative stated that only one payment was missed, however delay was due to time taken by bank. NRLDC representative stated that the rule is same for single default and multiple defaults.
- C.10.4 TCC urged all the defaulting entities to open LC of the required amount in accordance with CERC Regulations.

NRPC Deliberations

- C.10.5 Members concurred with the TCC recommendations.
- C.10.6 HP and Rajasthan expressed concern that if one bill is missed by utility, then opening of LC is not justified and same needs to be taken up with CERC. They also suggested that a mechanism may be devised such that utilities are notified in advance if there is any payment to be made.
- C.10.7 Chairperson, NRPC stated that utilities shall try and make sure that bills are not missed, so that there would not be any need for opening of LC.

C.11 Reactive Energy charges status

TCC Deliberations

- C.11.1 NRLDC apprised the current status of Reactive Energy Charges Pool Account and informed that J&K has a long outstanding dues and only after clearance of outstanding dues by J&K, the settlement of other constituents, who are supposed to receive amount from the pool, could be done. Payable utilities were requested to clear outstanding Reactive Energy charges payments at the earliest so that payment shall be made to receivable parties and to avoid further increase of Delay Payment Interest.
- C.11.2 TCC urged that J&K should release outstanding Reactive Energy charges at the earliest so that, settlement of other constituents from the pool may be carried out accordingly.

NRPC Deliberations

- C.11.3 Members concurred with the TCC recommendations

C.12 Congestion Charges

TCC Deliberations

- C.12.1 NRLDC apprised the current status of Congestion Charges Account.
- C.12.2 Utilities having amount payable to pool were requested to clear the outstanding at the earliest in accordance with CERC Regulations.
- C.12.3 NRLDC and HP representative stated that payment amount of HP (.12 lakhs) needs to be revised as discussed in commercial sub-committee meeting.
- C.12.4 It was agreed that NRPC sect. shall take up the matter with J&K govt. about pending status of different statutory pool accounts.

NRPC Deliberations

- C.12.5 Members concurred with the TCC recommendations

C.13 Reconciliation of Pool Accounts (July-19 to Oct-19)

TCC Deliberations

- C.13.1 NRLDC stated that reconciliation statement was not being received from utilities in a timely manner.
- ✓ Signed Reconciliation of Deviation charges from 01.07.2019 to 31.09.2019 has been received from **ADHPL, NHPC, APCPL, AZURE POWER, THDC and SJVNL only.**
 - ✓ Signed Reconciliation of RRAS & AGC charges from 01.07.2019 to 31.09.2019 has been received from **NTPC & APCPL.**
 - ✓ Signed Reconciliation of FRAS charges from 01.07.2019 to 31.09.2019 has not been received from any constituents.
 - ✓ Signed Reconciliation of Reactive Energy charges from 01.07.2019 to 31.09.2019 has been received from **Rajasthan only**
- C.13.2 NRLDC requested all constituents to reconcile the statement on regular basis and to avoid any further dispute. MS NRPC advised that NRLDC fee and charges and pool accounts should be considered deemed reconciled if reconciliation statement is not received within a month's time after quarter end.
- C.13.3 Members agreed that if reconciled statement is not received in time, it will be considered as deemed reconciled.

NRPC Deliberations

- C.13.4 Members concurred with the TCC discussion.

C.14 Status of AGC & Ancillary Services

TCC Deliberations

C.14.1 NRLDC informed that the payments towards Ancillary Services i.e. RRAS, AGC and FRAS has been settled up to Week 31 of FY 2019-20 & Interest on delay payment of RRAS service charges for FY 2016-17, FY 2017-18 & FY 2018-19.

C.14.2 There is no outstanding amount for payment of RRAS, AGC or FRAS.

C.14.3 Members noted the same.

NRPC Deliberations

C.14.4 Members noted the TCC discussions.

C.15 NRLDC Fee & Charges

TCC Deliberations

C.15.1 NRLDC informed that PDD J&K and Sorang HEP have outstanding dues to be paid towards NRLDC Fees and charges.

C.15.2 TCC requested PDD J&K and Himachal Sorang to clear all the outstanding amount towards NRLDC Fees and charges at the earliest.

C.15.3 The utilities having minor outstanding towards excess rebate deduction, incorrect computation of surcharge are requested to settle the same at the earliest.

C.15.4 Further, NRLDC stated that most of the users were not providing the details of Payment made / TDS Deduction as per the format given in agenda.

C.15.5 TCC requested all the users to provide the requisite details as per the format for easy reconciliation.

NRPC Deliberations

C.15.6 Members noted the TCC discussion.

C.16 Reconciliation of NRLDC Fee and charges

TCC Deliberations

C.16.1 NRLDC stated that they had sent the reconciliation statements of NRLDC Fee and Charges for the quarter-II, 2019-20 to all the users vide letter dated 25/10/2019.

C.16.2 He requested users to send the duly signed and verified copy of reconciliation statement. He further added that reconciliation from ADHPL, Koteshwar, NAPS, NRSS XXXI (B) and NTPC (for all stations) has been received. MS NRPC stated that NRLDC fee and charges and pool accounts should be considered deemed reconciled if reconciliation statement is not received within a month's time.

C.16.3 Members agreed that if reconciled statement is not received in time, it will be considered as deemed reconciled

NRPC Deliberations

C.16.4 Members concurred with the TCC discussions.

C.16.5 MS NRPC suggested that an online mechanism may be developed so that reconciliation process is made easier.

C.17 Reconciliation of STOA (Short Term Open Access) Charges disbursement:

TCC Deliberations

C.17.1 TCC requested all SLDCs/STUs to sign and send the statement for easy reconciliation and to avoid any further dispute.

NRPC Deliberations

C.17.2 Members noted the TCC discussions.

C.18 Status of Outstanding STOA Delay Payment Interest

TCC Deliberations

C.18.1 NRLDC gave details of outstanding STOA delay payment interest. The applicant wise outstanding interest amount computed till 13.11.2019 was presented in the meeting. Arunachal Pradesh Power Corporation has large outstanding since long and trading window for the same has also been closed for now.

C.18.2 TCC urged all the defaulting entities to make timely payment.

NRPC Deliberations

C.18.3 Members noted the TCC discussion.

C.19 Status of AMR as on 08.11.2019

TCC Deliberations

C.19.1 NRLDC stated that there is some improvement in data submission to NRLDC by Tuesday particularly after switching over of 88 locations to OPGW. However, data from all locations are required for calculation of losses and preparation of weekly regional energy account. Non-availability of data from any station 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. POWERGRID was not present in the 41st CSC meeting for deliberation of the same.

C.19.2 TCC urged POWERGRID to co-ordinate with M/s Kalkitech and complete the task

NRPC Deliberations

C.19.3 Members noted the TCC discussion.

C.20 Integration of AMR System with Elster Meters

TCC Deliberations

C.20.1 NRLDC informed that, POWERGRID confirmed that both M/s Kalkitech and M/s Synergy are able to integrate Elster make meter with AMR system in last Commercial subcommittee meeting held on 12th September, 2019.

C.20.2 POWERGRID mentioned that around 268 meters are yet to be integrated and would be integrated by end of December 2019 except for J&K .

C.20.3 TCC urged POWERGRID to complete the task.

NRPC Deliberations

C.20.4 Members noted the TCC discussion.

C.20.5 NRLDC mentioned that though Elster make meters are being integrated, there are reliability issues at some locations such as

- The meters have become faulty after integration
- Data reading is shown as zero or inconsistent
- Low voltage indication (*) is not getting reflected, etc.

C.20.6 POWERGRID informed that they are aware of the issues and these have been rectified

C.20.7 NRLDC informed they will provide feedback to POWEGRID after analyzing data of next week

C.20.8 HP representative expressed concern on delay in the integration process as on numerous occasions there is revision of pool accounts.

C.20.9 NRPC urged POWERGRID to complete the task as early as possible.

C.21 Status regarding procurement of DCD/Meters

TCC Deliberations

C.21.1 NRLDC representative stated that 130 nos. of DCD and 240 nos. of meters have to be procured and bid opening of the tender was due on 3rd and 4th October 2019. POWERGRID was asked to update the latest status on procurement of DCD/ meters

C.21.2 POWERGRID informed that LOA has been placed and procurement shall be done by Mar'20

C.21.3 TCC noted the information.

NRPC Deliberations

C.21.4 Members noted the information.

C.22 AMR data through Fibre Optic Network

TCC Deliberations

- C.22.1 NRLDC representative stated that as informed by M/s Kalkitech, AMR communications through optical fibre link at 64 locations of POWERGRID and other utilities have been configured. Further, balance 58 locations of POWERGRID are in progress.
- C.22.2 POWERGRID informed that nearly 1000 meters from ~88 locations have been shifted on Fibre Optic network.
- C.22.3 NRLDC requested to explore shifting of other meters including those in state control areas on Fibre Optic network wherever feasible. POWERGRID agreed for the same
- C.22.4 TCC noted the information.

NRPC Deliberations

- C.22.5 POWERGRID representative stated that balance works would be completed by 31 Dec 2019.
- C.22.6 Members noted the information.

C.23 Time drift Correction in Interface Energy Meters

TCC Deliberations

- C.23.1 NRLDC stated that there was a significant improvement in time drift correction in Interface Energy Meters and at present only 4% of meters have time drift as per NRLDC record. He appreciated efforts taken by all the utilities in this regard.
- C.23.2 In minutes of 43rd meeting of TCC & 46th meeting of NRPC, POWERGRID informed that the time corrections of balance meters shall be done by next TCC meeting. Further, NRLDC vide its letter Ref. No./NRLDC/MO/Metering/3/ dated 04-11-2019 has requested to all utilities for time drift Correction of Interface Energy Meters listed above.
- C.23.3 He further informed that NRLDC was regularly uploading the discrepancy report on weekly basis indicating the time drift in meters and also replacement/rectification required in SEMs. He requested all constituents, in whose premises the meters were installed, to take suitable action for time correction based on the weekly discrepancy report of NRLDC.
- C.23.4 NRLDC informed there is significant improvement in time drift correction, however, it is observed that for HVPNL, PTCUL and POWERGRID-NRII, still there are several meters for which there is need for time drift correction.
- C.23.5 TCC asked members to regularly monitor and take corrective actions for time drift correction in whose premises the meters are installed

NRPC Deliberations

C.23.6 Members noted the information.

C.24 Replacement/Rectification of SEM meters

TCC Deliberations

C.24.1 NRLDC is regularly uploading the Discrepancy report of meters on weekly basis on NRLDC website. The discrepancy report also contains the details where replacement/rectification of energy meter is required. POWERGRID in its capacity as CTU is to ensure that such rectification/replacement is carried out at the earliest to ensure proper energy account.

C.24.2 NRLDC informed that there are 8 nos. of defective meters located in POWERGRID NR-II which are yet to be rectified/replaced, since long. TCC urged POWERGRID to immediately take necessary actions. POWERGRID agreed for the same

NRPC Deliberations

C.24.3 Members concurred with the TCC discussions.

C.25 Maintaining the Letter of Credit for power supplied from NJHPS & RHPS

TCC Deliberations

C.25.1 SJVNL stated that Ministry of Power (MOP), GOI order no. 23/22/2019-R&R dated 28-06-2019 read with (I) Corrigendum, has made it mandatory for the discoms to open unconditional Letter of credit, failure to comply with its order may result into non-injection of power to state utility as well as denial of Short term/long term access from the energy market.

C.25.2 He further stated that as per the Power Purchase Agreement, Beneficiaries are supposed to submit a confirmed, revolving, irrevocable Letter of Credit in favour of SJVN for an amount equivalent to 105% of average monthly billing of preceding 12 months with appropriate bank as mutually acceptable to parties. The LC shall be kept valid at all the time during the validity of the Power Purchase Agreement.

C.25.3 He added that in compliance to the above, all the beneficiaries have submitted the Letter of credit except for PDD, J&K. LC submitted by PDD, J & K had expired on 13.11.2019. He requested PDD, J&K to submit the LC of requisite amount Rs 16.75 Crore (for NJHPS) & Rs 6.71 Crore (or RHPS) on priority.

C.25.4 He also stated that other beneficiaries may be requested to renew their LC at least one week prior to the expiry of the Letter of credit, in compliance to MOP's order.

C.25.5 TCC reiterated the same views as discussed under under Cl. C.2 above.

NRPC Deliberations

C.25.6 NRPC noted and concurred with the TCC deliberations.

D . I T E M S F O R N R P C

D.1 Reimbursement of Expenditure of NRPC Sectt. for FY 2019-20 by the members of NRPC

- D.1.1 Member Secretary, NRPC stated that in the 42nd NRPC meeting held on 28.06.2018, it was decided to contribute the amount of Rs. 10.0 Lakh per member for the year 2018-19 towards reimbursement of NRPC Secretariat expenditure to GoI, for the year 2018-19, for meeting the expenditure for meetings at Secretariat and other expenditure as approved by Chairperson, NRPC.
- D.1.2 He informed that in the 45th NRPC meeting, contribution @ Rs. 10 Lakh per member, was approved for the financial year 2019-20.
- D.1.3 He added that in the 46th NRPC meeting, all members have agreed to make their payments for current year as well of the past years (if due). For current FY 2019-20, contribution has been received from 15 members so far and is still awaited from balance 27 members.
- D.1.4 He requested that since three quarters of FY 2019-20 is almost over, members may expedite the contribution at the earliest.
- D.1.5 He opined that from next financial year onwards, 30th April may be considered as cut-off date, for making contribution by all the Members, for that year. Chairperson, NRPC stated that due to budget related issues in the month of April, 30th June may be considered as cut-off date instead of 30th April.

Members of the committee agreed for the same.

D.2 Reimbursement of Expenditure of NRPC Sectt. by the members of NRPC for the previous years

- D.2.1 Member Secretary, NRPC informed that contribution from some of the members towards reimbursement of expenditure of NRPC Sectt. for previous financial years, is still pending despite several reminders. Contributions from some of the constituents, have been pending since FY 2012-13.
- D.2.2 The committee requested members to expedite the contribution for NRPC Sectt..

D.3 Capacity Building Programme for Northern Regional Constituents (proposed to be funded through PSDF)

- D.3.1 Member Secretary, NRPC stated that in 45th NRPC meeting held on 08.06.2019, NRPC proposed a capacity building programme for studying the power exchange of Nordic countries, role of TSO (Transmission System Operator), Renewable Energy in power trading, EV integration with grid etc. to be carried out for Northern Region Constituents.
- D.3.2 He further stated that this programme would benefit the participants from the Central Transmission Utility (CTU), State Transmission Utilities (STUs), Distribution Companies, State Load Despatch Centres (SLDCs), Generators (including ISGS) of Northern Region, Power System Operation Corporation (POSOCO), Northern Regional Power Committee (NRPC) Secretariat, Central Electricity Authority (CEA) and Ministry of Power.
- D.3.3 He informed that, in the last NRPC meeting held on 24.09.2019, it was proposed that the programme can have 4 batches of 15 participants each (five days for each batch). The tentative tenure of the programme is for one year w.e.f. 01.04.2020. After detailed deliberations, it was decided that POWERGRID would execute the programme.
- D.3.4 He apprised the committee that POWERGRID vide letter no. NRPC/Commercial/209/RPC(46th)/2019 dated 09.10.2019 was requested to furnish the complete proposal including estimated cost details for preparing the DPR for PSDF funding.
- D.3.5 He informed that in response to the above, POWERGRID vide e-mail dated 15.11.2019 has shared the detailed programme after discussion with the Nordic agencies and the same is enclosed as Annexure - III.
- D.3.6 Representative of POWERGRID presented the detailed report and commercial implication of the program.

Members approved the program in-principle.

D.4 HOSTING OF NEXT MEETINGS OF NRPC / TCC

As per agreed roster for hosting of meetings, the next meetings of TCC (45th) & NRPC (48th), which would become due in March/April, 2020, may be hosted by Uttarakhand.

D.5 eOffice Implementation at NRPC Secretariat

- D.5.1 Members were informed that in 43rd meeting of NRPC, held on 30th October, 2018, an agenda regarding implementation of e-office project in NRPC Secretariat, was placed before the Members of the Committee. After deliberation, NRPC approved an estimated cost as Rs. 45-50 Lakhs without any recurring cost for implementation of NICNET in NRPC secretariat to be met through NRPC fund.

- D.5.2 MS, NRPC further informed that according to above decision, estimated cost for implementation of e-office in NRPC Secretariat, was sought from NIC who gave estimated cost of Rs. 81 Lakhs for establishment of LAN and wi-fi setup over NICNET vide their email dated 01st January, 2019. Simultaneously, NIC also advised NRPC sectt. to take up the matter with designated agencies (MTNL/POWERTEL/RAILTEL) for acquiring the leased lines. Accordingly, the matter was taken up with POWERTEL for acquiring 2 links of 100 Mbps each. M/s POWERTEL vide their letter dated 22nd February, 2019 gave an estimated cost of Rs 20.93 lakhs per year excluding taxes on recurring basis for initial 2 years and from 3rd year onwards, Annual Service Fees i.e. recurring charges equal to bandwidth charges, were to be levied. Besides, one-time charge @ Rs.10.465 lacs was also quoted as Bandwidth charges by POWERTEL, to be borne by NRPC secretariat.
- D.5.3 He further stated that as the cost proposed by NIC was going much beyond the estimated expenditure approved by NRPC, a matter was taken up with NIC for alternate solution who advised that NRPC Secretariat may look into the option of Virtual Private Network (VPN), which is available free of cost for the users having NIC email id, and in this scenario, NRPC Secretariat would have to bear cost for license of e-office package along with minimal recurring cost every month.
- D.5.4 He further highlighted that a meeting with NIC officials was held on 28.11.2019 at NRPC secretariat wherein costing of the eOffice implementation was deliberated which as below:
- (i) eOffice Premium Package: 17Lakhs excluding taxes (Approx.) for 5 years (0-100 Users)
 - (ii) Hardware deployment cost at NIC Shastri park: 1.20 Lakh excluding taxes (Approx.) Monthly [*Option-1*]
 - (iii) Hardware deployment cost at NDC Bhuwaneshwar: 1.20 Lakh excluding taxes (Approx.) Monthly- [*Option-2*]
 - (iv) Bandwidth requirement is minimum 8Mbps. NRPC would take action accordingly.
- D.5.5 Keeping in view of above, members were apprised that complete installation would be 35-40 lakhs for the first year from 2nd year to 5th year, it would have yearly recurring charges approx. 18 Lakh (considering bandwidth increase charges) which may be met from NRPC fund. It was also proposed that Member Secretary, NRPC may be authorised to implement the project from NRPC fund.
- D.5.6 NRPC approved the cost for eOffice Implementation at NRPC Secretariat.

Annexure - I**List of Participants for 44th TCC meeting held on 10.12.2019 at Jaisalmer, Rajasthan**

S. No.	Name of Officer	Designation	Organisation
1.	<u>BBMB</u>		
	Sh. H.S. Chugh	Member(P)	BBMB
	Sh. Sukhwinder S. Bhumra	CE	BBMB
	Sh. Rajesh Gupta	CE/TS	BBMB
2.	<u>DELHI</u>		
	Sh. Harjiwan Vyas	ED	Delhi SLDC
	Sh. S.M. Verma	Director (T)	IPGCL/PPCL
	Sh. Satyendra Prakash	AGM (T)	IPGCL-PPCL
	Sh. Anuj Kr. Gupta	DGM	DTL
	Sh. Naveen Gel	MRG (CO)	Delhi SLDC
	Sh. Mukesh Sharma	Director	DTL
3.	<u>BRPL</u>		
	Sh. Sanjay Shrivastav	V.P.	BRPL
4.	<u>HARYANA</u>		
	Sh. R.K. Sodha	Dir (T)	HVPN
	Sh. Sunil Seth	CE	HVPNL
	Sh. Narendar Singh	CE	UHBVNL
	Sh. Ashok Kumar Singla	CE.	HPGCL
	Sh. R.K. Kaushik	SE	SLDC
	Sh. Amit Nagpal	SE	HPGCL
	Sh. Gaurav Gupta	XEN	UHBVN
5.	<u>HIMACHAL PRADESH</u>		
	Sh. R.S. Jacia	Dir (T)	HPSEB
	Sh. Desh Raj	SE	HPSLDC
	Sh. P.R. Bodh	SE	HPSEBL
	Sh. Jogindar Singh	Dy. C.E.	HPSEBL
6.	<u>HPPTCL</u>		
	Sh. Keshav Singh	Dir	HPPTCL
7.	<u>J&K</u>		

	Sh. B.A. Dar	Secretary	JKPPD
	Sh. Sanjay Sharma	Nodal Officer(T)	JKPPD
8.	<u>PUNJAB</u>		
	Sh. Paramjit Singh	CE/PPR	PSPCL
	Sh. Sanjeev Gupta	CE/PS	PSTCL
	Sh. Y.P.S. Baath	CE SLDC	PSTCL
	Sh. A.K Kapur	Director/T	PSTCL
	Sh. N.K Sharma	Director/DMT	PSPCL
9.	<u>RAJASTHAN</u>		
	Sh. B.P. Chauhan	CE(TCC-Jodhpur)	RVPN
	Sh. R.P. Sharma	CE	SLDC – RAJ.
	Sh. A.K. Arya	SE	SLDC – RAJ.
	Sh. C.L. Koli	SERVUN	RVUNL
	Sh. M.M. Raina	C.E.	RVPN
	Sh. Sita Ram Meena	SE	RVPN
	Sh. S.K. Baswal	CE(PPD)	RVPNN
	Sh. A.K. Middha	Dy. CE	RRVUNL
	Sh. Sona Shishodia	XEN (P&D)	RVPNL
10.	<u>UTTAR PRADESH</u>		
	Sh. S.P. Chaubey	CE (T.O.)	UPRVNL
	Sh. A.J. Siddiqui	SE	UPSLDC
	Sh. Pankaj Saxena	EE	UP-STU
	Sh. Zahir Ahmad	SE	UPSLDC
11.	<u>UTTRAKHAND</u>		
	Sh. Anil Kumar	Dir. (P)	PTCUL
	Sh. A.Sharma	SE	PTCUL
	Sh. Sachin Rawat	SE	PTCUL
12.	<u>NHPC</u>		
	Sh. Suprakash Adhikari	GM (O&M)	NHPC
	Sh. Santosh Kumar	DGM (Comml)	NHPC
	Sh. Rahul Ranjan	SM (E&C)	NHPC

13.	<u>NTPC</u>		
	Sh. K.K. Singh	RED (North)	NTPC
	Sh. H. Harchandani	GM (Comml)	NTPC
14.	<u>Sterlite Power</u>		
	Sh. Naveen Singh	AVP-BD	Sterlite
	Sh. Farukh Aamir	VP-BD	Sterlite
15.	<u>PGCIL</u>		
	Sh. Y.K. Dixit	CGM	Power Grid
	Sh. Sunil Agrwal	ED (Adm.)	Power Grid
	Sh. D.K. Singh	ED (NR-I)	Power Grid
16.	<u>SJVN</u>		
	Sh. Romesh Kapur	CGM	SJVNL
17.	<u>THDCIL</u>		
	Sh. R.K. Verma	DGM	THDC
18.	<u>NRLDC</u>		
	Sh. S.S. Barpanda	ED, NRLDC	POSOCO
	Sh. M.K. Agarwal	GM, NRLDC	POSOCO
	Sh. M.M. Hassan	GM, NRLDC	POSOCO
	Sh. Gaurav Malwiya	Dy. Mgr.	POSOCO
19.	<u>NLDC</u>		
	Smt. Minaxi Garg	ED	POSOCO
	Sh. N. Nallarasam	Sr.GM	POSOCO
20.	<u>APCPL</u>		
	Sh. G. Krishna Moorthy	CEO	APCPL,
	Sh. P. Mediratta	AGM	APCPL
21.	<u>Adani Power Raj. Ltd.</u>		
	Manoj Taunk	GM	APL
22.	<u>JHAJJAR POWER (CLP)</u>		
	Sh. Divyadeep Gupta	Manager	CLP Jhajjar
	Sh. Mukesh Mandal	AGM	CLP Jhajjar
23.	<u>Kreate Energy Pvt Ltd.</u>		

	Sh. Arun Kumar	CEO	KREATE
	Sh. Shashwat Srivastave	DGM	KREATE
	Sh. Ashok Aggarwal	Dir.	KREATE
24.	<u>NRPC</u>		
	Sh. Naresh Bhandari	MS	NRPC
	Sh. R. P. Pradhan	SE(Commercial)	NRPC
	Sh. Saumitra Mazumdar	SE(Operation)	NRPC
	Sh. Ratnesh Kumar	EE(O)	NRPC
	Sh. Kaushik Panditrao	AE (O)	NRPC
	Sh. Akshay Dubey	AEE (O)	NRPC
25.	Others		
	Sh. H.L. Choudhary	Sr. VP (Comml)	PTC India Ltd.
	Sh. Manoj Saba	VP	PTC India Ltd.

Annexure – II**List of Participants for 47th NRPC meeting held on 11.12.2019 at Jaisalmer, Rajasthan**

S. No.	Name of Officer	Designation	Organisation
1.	<u>BBMB</u>		
	Sh. H.S. Chugh	Member(P)	BBMB
	Sh. Sukhwinder S. Bhumra	CE	BBMB
	Sh. Rajesh Gupta	CE/TS	BBMB
	Sh. Rakesh K. Sharma	Dir/Power	BBMB
2.	<u>DELHI</u>		
	Sh. Harjiwan Vyas	ED	Delhi SLDC
	Sh. S.M. Verma	Director (T)	IPGCL/PPCL
	Sh. Satyendra Prakash	AGM (T)	IPGCL-PPCL
	Sh. Naveen Vyas	MGR (T)	Delhi SLDC
	Sh. Mukesh Sharma	Director	DTL
3.	<u>BRPL</u>		
	Sh. Sanjay Shrivastav	V.P.	BRPL
4.	<u>HARYANA</u>		
	Sh. R.K. Sodha	Dir (T)	HVPN
	Sh. Sunil Seth	CE	HVPNL
	Sh. Narendar Singh	CE	UHBVNL
	Sh. Ashok Kumar Singla	CE.	HPGCL
	Sh. Gaurav Gupta	XEN	UHBVN
5.	<u>HIMACHAL PRADESH</u>		
	Sh. R.S. Jacia	Dir (T)	HPSEB
	Sh. Suneel Grover	MD	HPSLDC
	Sh. Desh Raj	SE	HPSLDC
	Sh. P.R. Bodh	SE	HPSEBL
	Sh. R. K. Sharma	MD	HPPTCL
	Sh. Jogindar Singh	Dy. C.E.	HPSEBL

	Sh. Keshav Singh	Dir	HPPTCL
6.	<u>J&K</u>		
	Sh. B.A. Dar	Secretary	JKPPD
	Sh. Sanjay Sharma	Nodal Officer(T)	JKPPD
7.	<u>PUNJAB</u>		
	Sh. Paramjit Singh	CE/PPR	PSPCL
	Sh. Sanjeev Gupta	CE/PS	PSTCL
	Sh. Y.P.S. Baath	CE SLDC	PSTCL
	Sh. A.K Kapur	Director/T	PSTCL
	Sh. N.K Sharma	Director/DMT	PSPCL
8.	<u>RAJASTHAN</u>		
	Sh. R.P. Sharma	CE	SLDC – RAJ.
	Sh. A.K. Arya	SE	SLDC – RAJ.
	Sh. C.L. Koli	SERVUN	RVUNL
	Sh. S.K. Baswal	CE(PPD)	RVPNN
	Sh. A.K. Middha	Dy. CE	RRVUNL
	Sh. Sona Shishodia	XEN (P&D)	RVPNL
9.	<u>UTTAR PRADESH</u>		
	Sh. S.P. Chaubey	CE (T.O.)	UPRVNL
	Sh. A.J. Siddiqui	SE	UPSLDC
	Sh. Pankaj Saxena	EE	UP-STU
	Sh. Zahir Ahmad	SE	UPSLDC
10.	<u>UTTRAKHAND</u>		
	Sandeep Singhal	MD	PTCUL
	Sh. Anil Kumar	Dir. (P)	PTCUL
	Sh. A.Sharma	SE	PTCUL
	Sh. Sachin Rawat	SE	PTCUL
11.	<u>NHPC</u>		
	Sh. Suprakash Adhikari	GM (O&M)	NHPC
	Sh. Santosh Kumar	DGM (Comml)	NHPC
	Sh. Rahul Ranjan	SM (E&C)	NHPC

12.	<u>NTPC</u>		
	Sh. K.K. Singh	RED (North)	NTPC
	Sh. H. Harchandani	GM (Comml)	NTPC
13.	<u>Sterlite Power</u>		
	Sh. Naveen Singh	AVP-BD	Sterlite
	Sh. Farukh Aamir	VP-BD	Sterlite
14.	<u>PGCIL</u>		
	Smt. Seema Gupta	Dir. (Opr)	POWERGRID
	Sh. Y.K. Dixit	CGM	POWERGRID
	Sh. Sunil Agrwal	ED (Adm.)	POWERGRID
	Sh. D.K. Singh	ED (NR-I)	POWERGRID
15.	<u>SJVN</u>		
	Sh. N.L. Sharma	CMD	SJVNL
	Sh. R.K. Bansal	Dir.	SJVNL
	Smt. Geeta Kapur	Dir. (HR)	SJVNL
	Sh. Romesh Kapur	CGM	SJVNL
16.	<u>THDCIL</u>		
	Sh. R.K. Verma	DGM	THDC
17.	<u>NRLDC</u>		
	Sh. S.S. Barpanda	ED, NRLDC	POSO
	Sh. M.K. Agarwal	GM, NRLDC	POSO
	Sh. M.M. Hassan	GM, NRLDC	POSO
	Sh. Gaurav Malwiya	Dy. Mgr.	POSO
18.	<u>NLDC</u>		
	Smt. Minaxi Garg	ED	POSO
	Sh. N. Nallarsan	Sr.GM	POSO
19.	<u>APCPL</u>		
	Sh. G. Krishna Moorthy	CEO	APCPL,
	Sh. P. Mediratta	AGM	APCPL
20.	<u>Adani Power Raj. Ltd.</u>		
	Manoj Taunk	GM	APL

21.	<u>JHAJJAR POWER (CLP)</u>		
	Sh. Divyadeep Gupta	Manager	CLP Jhajjar
	Sh. Mukesh Mandal	AGM	CLP Jhajjar
22.	<u>Sterlite Power</u>		
	Sh. Naveen Singh	AVP-BD	Sterlite
	Sh. Alok Nigam	AVP-BD	Sterlite
	Sh. Farukh Aamir	VP-BD	Sterlite
23.	<u>NRPC</u>		
	Sh. Naresh Bhandari	MS	NRPC
	Sh. R. P. Pradhan	SE(Commercial)	NRPC
	Sh. Saumitra Mazumdar	SE(Operation)	NRPC
	Sh. Ratnesh Kumar	EE(O)	NRPC
	Sh. Kaushik Panditrao	AE (O)	NRPC
	Sh. Akshay Dubey	AEE (O)	NRPC
24.	<u>Others</u>		
	Sh. H.L. Choudhary	Sr. VP (Comml)	PTC India Ltd.
	Sh. Manoj Saba	VP	PTC India Ltd.

Annexure - III

Detailed Report
On

NRPC TRAINING PROPOSAL:

**TRAINING AT NORDIC COUNTRIES FOR
OFFICERS OF VARIOUS LEVELS FROM NRPC
CONSTITUENTS**

1. ABOUT NORTHERN REGIONAL POWER COMMITTEE

In pursuance of the provisions of sub-paragraph 55 of Article 2 of the Electricity Act, 2003, Northern Regional Electricity Committee was constituted on May 25, 2005 and amended on May 9, 2008, with northern utilities of the Union Territory of Chandigarh, Haryana, Himachal Pradesh, Jammu and Kashmir, Punjab, Rajasthan, Uttar Pradesh, Uttarakhand and Delhi states.

Functions-

- For regional level operation analysis to improve grid performance
- For convenience of interstate / inter-regional transfer of power
- To facilitate all the activities of the scheme related to Inter State / Intra-State Transmission System with CTU / STU
- For the coordination of the plans of maintenance of construction machines of different generating companies of the region, interstate production companies, whose annual supply of power is in the area and review of the maintenance program on monthly basis.
- To plan the outage of the transmission system on a monthly basis
- To conduct operational planning including safety studies for the steady operation of the grid
- Through the review of the need for reactive compensation through the System Study Committee and to start the plan to maintain the proper voltage through the monitoring of installed capacitors
- In order to have a consensus on all issues related to economy and efficiency in the operation of electricity system in this area

Sub-committees of NRPC-

- Operation Co-Ordination Sub-Committee (OCC)
- Protection Sub-Committee (PCC)
- Commercial Sub Committee (CCM)
- Other Sub Committees as decided as per requirement

SUMMARY OF PROPOSAL

1.	Name of the requesting Organization/ Utility:	Northern Regional Power Committee (NRPC)
2.	Short Summary of Project / Scheme / Activity:	
	a. Name and Location of the Project/ Scheme/Activity:	Study programme on power market at Nordic Countries (Norway, Sweden, Denmark, and Finland) for Power System Engineers of Northern Regional Constituents.
	b. Objective of the Project / Scheme	<ol style="list-style-type: none"> 1. To understand the factors that contributed to the success of the power market liberalization in the Nordic region. 2. Capacity building programme to handle trading of power short term surplus power on the Power exchange 3. Price discovery in Nord-pool. 4. Determination of transmission tariff and sharing of charges and losses transmission charges and losses. 5. Financial settlement of power trades, imbalances. 6. Forwards, futures and options market in power, their operation procedures, hedging etc. 7. Retail supply market 8. Market clearing and settlement 9. Market surveillance 10. Imbalance settlement procedure 11. Roles and responsibilities of various stakeholders 12. Reporting and information sharing 13. Optimum power reserve estimation 14. Real time operation of unmanned hydro plant 15. Efficient maintenance practices of transmission grids 16. Better Understanding of the regulatory and policy framework of the power market 17. EV Integration in the Grid along with Hydrogen powered vehicle

	c. Authorized Person For this Project/ Scheme / Activity	Member Secretary, NRPC E-mail ID : ms-nrpc@nic.in Land line No : 011-26511211 Fax No : 011-26865206
	d. Nature of the Project/Scheme/ Activity: Inter - State / Infra - State	Training and Capacity Building
	e. Identified Beneficiaries	Personnel from the State Transmission Utilities (STUs), Distribution Companies, State Load Dispatch Centers (SLDCs), Generators, ISTS Licensees in Northern Region, Power System Operation Corporation (POSOCO) and Northern Regional Power Committee (NRPC) Secretariat, All NRPC board members and TCC members. Participation from Central Electricity Authority (CEA), Ministry of Power, Gol has also been envisaged.
	f. Merits of the scheme	Nordic Countries runs the largest market for electric vehicle and electrical energy in Europe, measured in volume traded (TWh) and in market share. The study programme will contribute towards capacity building and assist the development of a commercially viable and vibrant power market in India. It will also give an unique opportunity to the Indian participants to learn from the best industry practices and most enriching experiences of Nordic countries in running one of the most successful power market and other new innovations in the world.
	g. Limitations, if any	No limitations
	h. Time frame for Implementation	FY 2020-21 Total of 3 batches with 20 officials in each
	i. Estimated Cost of Project/Scheme /Activity	INR 9,55,86,000.00 (Rupees nine crores fifty five lakhs eighty six thousand only)
Date: _____		Signature: _____ Name: _____ (Authorized Representative)

DETAILED PROPOSAL (DP)**1. Details of the Requesting Organization/Project Entity:****1.1. Details of Organization/Entity-**

Name of Organization/Entity	Northern Regional Power Committee
Acronym or Abbreviation (if applicable)	NRPC

1.2. Details of Head of the Organization-

Name (Mr/Ms/Mrs)	Mr. Naresh Bhandari
Designation	Member Secretary NRPC
E-mail Address	ms-nrpc@nic.in
Landline No.	011-26511211
Fax No.	011-26865206
Address	18-A, Qutab Institutional Area, Shahid Jeet Singh Marg
City	Katwariya Sarai, New Delhi
Postal Code	110016

1.3. Details of Project In-charge/Project Manager (Authorized Person) for this project/scheme/activity (Not below the rank of Dy. General Manager/Superintending Engineer)-

Name (Mr/Ms/Mrs)	Mr. Naresh Bhandari
Designation	Member Secretary NRPC
E-mail Address	ms-nrpc@nic.in
Landline No.	011-26511211
Fax No.	011-26865206
Address	18-A, Qutab Institutional Area, Shahid Jeet Singh Marg
City	Katwariya Sarai, New Delhi
Postal Code	110016

2. Justification of the Proposal:

2.1. Analysis of the Objective-

- The Electricity Act 2003 brought radical changes in the power sector by unbundling and corporatization of the vertically integrated power supply system and thereby promoting competition, within the value chain, not only between peer agencies but also across entities dealing in different areas (in the power supply chain). Also, by identifying electricity trade as a distinct activity, Electricity Act 2003, along with pursuant regulations from the CERC, paved the way for a paradigm shift in the power sector.
- The Indian power sector is already growing and is to grow further for the overall development of the country. The growth also encompasses the concept of sustainability so that due care is taken to minimize socio-environmental impact which otherwise is generally accepted as a collateral for development. This calls for foresight, meticulous planning and development or selection of the right technology. The best possible way to select the right path for such growth is to have a role model or at least set a reference.
- The Nordic countries promise such a possibility. Though their consumption of energy per capita is among the highest in the world, The Nordic countries generate only moderate emission levels of greenhouse gases compared to other developed countries of a similar size. Despite continuous economic growth in the region, however, the demand for energy has remained stable over the last ten years. The Nordic countries have a strong position worldwide in energy innovation credited to strong national support for this sector. These countries account for more than 30% of the world's market in the production of wind energy technology, have a share of almost 30% of all the biomass-based generation of heat and power in the industrialized world and around 10% of the total scientific knowledge production. Energy innovation is a very important economic activity in the Nordic countries assuming approximately 6% of total revenues and employment in the region while the export of energy technology and equipment accounts for approximately 5-9% of total industrial exports. Nordic Countries also spot runs the largest market for electrical energy in Europe, measured in volume traded (TWh) and in market share. It operates in Nordic Countries, Denmark, Sweden, Finland, Estonia, Latvia, Lithuania, Germany and the UK. More than 80% of the total consumption of electrical energy in the Nordic market is traded through Nord Pool Spot.
- An understanding of the three pillars of energy policy, namely **energy efficiency**, **security of supply** and the **environmental impact** of energy usage has clearly been a part of the discourse in the Nordic countries.
- This study tour will enable the participants to experience & understand the Nordic power sector. The participants will generally discover the growth path undertaken by

the Nordic power system and various contributors to it like policies, technologies and change in consumption patterns etc.

- The fundamentals of power market — such as licensing electricity traders and ensuring open, non-discriminatory access to transmission services and the shift in the philosophies of generation, transmission and distribution activities, which have facilitated power trading.
- The capacity building programme will include Grid operation and transmission planning & implementation, deliberations on the policy and regulatory framework of Nordic power sector.
- The training program will include all the key issues related to a competitive power market, price determination, congestion management, imbalance management, reference price, risk management, market surveillance and new innovations. The participants will learn about the successful working of Europe's leading power exchange, the integrated power markets, and the financial derivative market.
- The training program will also focus upon new technological innovation like Integration of Electric Vehicles with the grid, usage of Hydrogen fueled vehicles, operational unmanned working of hydro station etc.

2.2. Identified Source of Funding-

The programme is to be funded fully from PSDF. As mentioned in the Para 6.3(111) of the guidelines/procedure for disbursement of PSDF approved by Government of India that up to 100 % grant to be given in case the project (Capacity Building) mentioned under Para 5.1(e) of the same.

2.3. Details of Activities for Project/Scheme/Activity-

- The programme will be within a period of one year (FY 2020-21).
- The batch size will be 20 each and number of batches will be 3.
- The training program will be held in Nordic Countries (involving at least 2 countries*). A sample program plan is enclosed in **Annexure-A**.
- The participants will be from various utilities of Northern Region including SLDCs, STUs, Generators, ISTS Licensees, DISCOM, POSOCO, NRPC Sect, NRPC Board members and TCC members, CEA and Ministry of Power.
- The training/study tour will comprise of classroom sessions and field visits.

2.4. Executing Agency-

- POWERGRID for an on behalf of NRPC.
(POWERGRID will execute the program on turnkey basis for NRPC)

2.5. Time line for Implementation of Project Scheme/Activity-

- The program is to be completed in one year, extendable on mutual consent basis

Duration of Project (in Months)	Within 12 Months
Likely Start Date	01.04.2020
Likely Completion Date	31.03.2021

** At the regional level the differences in terms of the geographical distribution of energy production and demand are pronounced. In terms of the generation of hydro power, the Norwegian regions, especially in the south, dominate. Sweden, on the contrary, has a more heterogeneous supply mix, as hydropower dominates in the north while the major urban regions in the south are supplied by nuclear power plants. In Denmark, thermoelectric generation is the main source of electric energy while wind energy generates approximately 20% of the country's total energy supply. In Finland, nuclear energy is dominant in the south along with thermoelectric generation from natural gas and biomass. Hydropower generation is however rather modest in Finland and is mainly found in its northern regions.*

Summary of Detailed Project Report (DPR)

Objective:	Capacity building of the personnel involved in Grid Operation, transmission planning & implementation and overall policy & decision making towards creation of efficient power markets and participation in power trading.
Executing Agency:	The programme is to be executed by Northern Regional Power Committee (NRPC) and all the arrangements like designing modules in consultation with power system experts of NR utilities and coordination with Nordic Countries, signing of contract with Norwegian agencies, selecting travel partner, Visa etc. shall be undertaken by Power Grid Corporation of India Ltd.
No of Programs and participants:	3 batches with 20 participants each. The participants will be the officers from the SLDCs, transmission utilities/distribution companies, Generators etc in Northern Region and NRPC sect., NRPC Board Members and TCC Members, Representatives from Ministry of Power as well as from CEA and representative from POSOCO will be invited for each training programme. Details of participants will be obtained at appropriate time. Nominated officers must have at least 3 years' service left.
Venue of Programme:	The training programme will be held at various establishments and installations of different organizations in Nordic Countries (i.e Norway, Denmark, Sweden and Finland). <i>The sample program plan at Annexure-A envisages the program in Norway and Finland.</i>
Duration of Programme:	1 day in India (briefing, priming & departures) and 6 days in Nordic Region
Reference:	POWERGRID a 'maharatna' CPSU has an established learning and development wing which caters not only to the internal employees but also to the employees of other organizations both in India & abroad. POWERGRID is operating its state of the art learning and development institute called the POWERGRID Academy of Leadership at Manesar, Gurgaon. POWERGRID has successfully organized study tours for the senior officials of Indian power sector organizations to the Europe (power sector) in the past. POWERGRID is also having MoUs with various Nordic agencies for collaborations in learning & development.
Course Content:	The tentative content of the training/study tour will be as follows- <ul style="list-style-type: none"> ▪ Overview of the Nordic Region Power Sector. ▪ Understanding market design in Nordic countries and Europe. Power market model, Regulatory environment, Financial as well as physical power trading etc. Integration of power market, market coupling. Surveillance and

	<p>transparency in power market. Effect of renewable energy in power trading.</p> <ul style="list-style-type: none">▪ Power flow management, Re-dispatch and other congestion management strategies, Imbalance handling mechanism.▪ Role of transmission system operator-TSO/ISO models.▪ Understanding the distribution system management (interaction with DSO).▪ Emerging energy ecosystem, e.g.: EV Integration with Grid.▪ Innovations in energy, e.g.<ul style="list-style-type: none">▪ Energy storage.▪ Hydrogen usage in powering vehicles.▪ Unmanned hydro stations.▪ Renewable generation.▪ Innovative approaches for renewable handling.
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Total Cost of Training during one year (details in Annexure.1):

No of Programs of 6 days Duration	Total in INR
3 batches of 20 participants each	9,55,86,000.00

- Cost is inclusive of all taxes.
- Final payment will be made on the basis of actuals.

Terms of payment: As per timelines and as per PSDF regulations/ disbursement procedure

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Financial Implication of the Scheme:

(Guidelines: The financial implications of the proposal may be worked out as accurately as possible and should be detailed in this section. Further, the manner in which the expenditure is proposed to be borne may also be clearly indicated. Please provide the project cost estimate for its scheduled duration along with a break-up of year-wise, component-wise expenses segregated into non-recurring and recurring expenses.)

1. Summary-

S/N	Item	Amount in INR
1.	Total Cost Estimate	
2.	Funding Proposed from PSDF	
3.	Contribution from Internal Sources	Nil
4.	External Borrowings	Nil

2. Details-**2.1. Cost Estimate:**

Details Mentioned in Annexure 1

3. Funding:**3.1. Funding Proposed from PSDF as grant:**

The programme is to be funded completely from PSDF. As mentioned in the Para 6.3 (111) of the guidelines/procedure for disbursement of PSDF approved by Government of India that up to 100 % grant to be given in case the project (Capacity Building) mentioned under Para 5.1 (e) of the same.

3.2. Contribution from Internal Sources

Nil

3.3. External Borrowings

Nil

Annexure-1**Details of Cost Estimate calculations:**

(The amounts shown against respective heads will be subject to modifications or adjustments amongst each other as per requirement during time of execution, without changing the overall cost implication as estimated for the program)

S/N	Items (For a batch of 20 persons)	Amount in INR
1.	Program fee covering classroom sessions at different organizations/academies and field visits.	2,60,00,000.00
2.	Boarding and Lodging	
3.	Local and international travel while overseas (road, air etc.)	
4.	Air fare (to & fro)+Visa+ Insurance	52,00,000.00
3.	Airport transfers India	50,000.00
4.	Incidental charges (\$50 per person for 6 days)	4,32,000.00
5.	Miscellaneous and Contingencies	1,80,000.00
	Total (1 batch):	3,18,62,000.00

Total for 3 batches (60 person) = INR 9,55,86,000.00 (Including taxes)

(As submitted by POWERGRD)

Annexure-A**Program plan:**

POWERGRID has explored various options and has worked out the following program plan as sample which will involve tour of two of the Nordic countries viz: Norway and Finland who are the pioneers in power sector research.

Day		Activity	Place of stay
Day-0	Saturday	Arrival at PAL, Manesar De-briefing and priming	Pal, Manesar
Day-1	Sunday	Departure to Oslo, Norway from IGI Airport, New Delhi	Oslo (Norway)
Day-2	Monday	Class room - Smart Energy Markets, Emerging Energy Ecosystem Visit - Statnet (TSO)	Oslo (Norway)
Day-3	Tuesday	Visit- NVE (Regulator), Nord Pool	Oslo (Norway)
Day-4	Wednesday	Visit: Hydrogen Forum (Hydrogen Fuel Research) Travel to Geilo (road), night stay.	Geilo (Norway)
Day-5	Thursday	Travel to Edjford Visit - Sima power plant (unmanned hydro) Travel to Bergen (Road) Bergen to Helsinki (Finland) by Air	Helsinki (Finland)
Day-6	Friday	Visit - Finnish DSO, VTT Technical Research Centre (Energy Storage technology)	Helsinki (Finland)
Day-7	Saturday	Visit - Offshore wind Departure from Helsinki to IGI Airport, New Delhi	---
<ul style="list-style-type: none"> • <i>The road journeys will be in chartered bus. The longest road journey will be from Oslo to Geilo of around 3 and 1/2 Hours. The rest of the journeys will be between 1 to 2 Hours (as seen from Google maps).</i> • <i>The flight from Bergen to Helsinki will take approx. 2 Hours.</i> • <i>Delhi to Oslo flight is 12 Hours long and Helsinki to Delhi flight is 7 Hours long (approximately).</i> 			

Scope of services:

The following will be the scope of services for organising and conducting the program-

1. Warm up and introductory session at PAL, Manesar.
2. Class-room sessions at Norway & Finland.
3. Field visits at Norway & Finland.
4. Accommodation in Executive Rooms at Pal, Manesar and in 5 star or equivalent hotels* in Norway & Finland, all on single occupancy.
5. Air journey from India and back (from IGI Airport, New Delhi)
6. Airport transfers - India and abroad.

7. All local and international travel overseas pertaining to the program (air journeys in economy class and road journeys in chartered buses).
8. Training kit comprised of strolley/duffle bag, writing pad, pen and blazer.

*(subject to availability of such hotel at the particular place & time of visit)

Further remarks:

- *Considering the intensity of the program spouse or any other accompanying person will not be allowed under the program.*
- *The participants will have to strictly stick to the program plan at all times.*
- *Still, if any participant tend to extend his/her overseas stay with the approval of NRPC or other concerned authority and at his/her own expense, the airport transfer for the final return journey to India will also not be provided (which otherwise will be provided as mentioned above).*
- *The scope of services under the program will be deemed to conclude with the arrival of the participants at IGI Airport, New Delhi back from abroad.*

(As submitted by POWERGRD)

Brief Details of the Project Appraisal by CTU/STU/RPC

The applicant utility shall submit project appraisal by CTU / STU / RPC in the given format and a copy of the Appraisal Report should be attached at Annexure. The proposal is being submitted by NRPC.

Item	Details to be filled by Applicant Utility	
Appraisal By:	CTU <input type="text"/> STU <input type="text"/> RPC <input type="text"/>	
Submission to CTU / STU / RPC for approval	The proposal placed to NRPC on2019	
Name of the Scheme	Training Program/Study tour for Power System Engineers of various constituents of Northern Region.	
Details of the Appraisal Report by CTU/STU / RPC (Attached at Annexure)	NRPC has approved the project on2019	
Summary of observations from CTU/ STU/RPC Appraisal Report	Summary of Proposal Appraised	
	Technical Observations	
	Financial Observations	
	Compliance of Grid Standards/ Codes by the Applicant	
	Limitations / Shortcomings pointed out by CTU/STU/RPC if any	
	Recommendations of CTU/STU/RPC	