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 (45 वीं)/2019/7152-7246 दिनाँक : 09 जुलाई, 2019
No. NRPC/ Comml/ 209/ RPC (45th)/2019/ Dated: 09th July, 2019

सेवा में / To,

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

विषय: उत्तरी क्षेत्रीय विद्युत समिति की 45 वीं तथा तकनीकी समंवय उप-समिति की 42 वीं बैठक का कार्यवृत्त ।

Subject: 45th meeting of Northern Regional Power Committee and 42nd meeting of TCC – Minutes.

महोदय / Sir,

उत्तरी क्षेत्रीय विद्युत समिति की 45 वीं बैठक दिनांक 08 जून, 2019 को तथा तकनीकी समंवय उप-समिति की 42 वीं बैठक दिनांक 07 जून, 2019 को गंगटोक सिक्किम में आयोजित की गयी थी । इन बैठकों के कार्यवृत की एक प्रति आपकी सूचना व आवश्यक कार्यवाही हेतु इस पत्र के साथ संलग्न है।

The 45th meeting of Northern Regional Power Committee was held on 08th June, 2019 and 42nd meeting of TCC was held on 07th June, 2019 at Gangtok, Sikkim. A copy of the minutes of the meetings is enclosed herewith for favour of information and necessary action.

भवदीय/Yours faithfully,

-sd-
(नरेश भंडारी)
(Naresh Bhandari)
सदस्य सचिव
Member Secretary

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33. Director (Operation), PGCIL, Gurgaon-122001, (Fax-95124-2571914/0124-2571802)
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41. Sh. B.S. Prasad, Station Director, Rosa Power Supply Company Ltd., (Fax-05842-300003)
42. Sh. Satish Jindal, Director and CEO (Trading), JSW Energy Ltd., New Delhi (Fax- 48178740)
43. Sh. Jaydeb Nanda, COO, Adani Power Rajasthan Ltd., Ahmedabad-380006 (Fax No- 079-25557176)
44. Sh. C.N. Singh, COO, Talwandi Sabo Power Ltd. Distt: Mansa, Punjab-151302(Fax: 01659-248083)
45. Sh. R.S. Sharma, MD, Lalitpur Power generation Company Ltd., Noida-201301(Fax: 0120-4045100/555, 2543939/40)
46. Sh. Ajit Kumar, Director (Commercial & Operations), PTC India Ltd., New Delhi (Fax- 011-41659144,41659145)
47. Sh. Athar Sahab, CEO, Nabha Power Limited, (Fax: 01762277251 / 01724646802)(email: atharsahab@larsentoubro.com)
48. Representative of Prayagraj Power Generation Co. Ltd.
49. Representative of BRPL (Delhi Private Discom)
50. Representative of Bajaj Energy Pvt Ltd (Member IPP < 1000 MW)
51. Representative of Kreate Energy Pvt Ltd (Member Trader)

List of TCC Members

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47. Head (O&M), Nabha Power Limited, (Fax: 01762277251 / 01724646802)(email: ravindersingh.lall@larsentoubro.com)
48. Representative of Prayagraj Power Generation Co. Ltd.
49. Representative of BRPL (Delhi Private Discom)
50. Representative of Bajaj Energy Pvt Ltd (Member IPP < 1000 MW)
51. Representative of Kreate Energy Pvt Ltd (Member Trader)

Special Invitee:

i. Member Secretary, WRPC, Mumbai-400 093.
ii. Member Secretary, SRPC, Bangalore-560 009
iii. Member Secretary, ERPC, Kolkata-700 033.
iv. Member Secretary, NERPC, Shillong-793 003.

INDEX

उत्तर क्षेत्रीय विद्युत समिति

NORTHERN REGIONAL POWER COMMITTEE

MINUTES
OF
42nd MEETING OF TECHNICAL COORDINATION SUB-COMMITTEE
&
45th MEETING OF NORTHERN REGIONAL POWER COMMITTEE

The 42nd meeting of Technical Coordination Sub-Committee (TCC) and 45th meeting of Northern Regional Power Committee (NRPC) were held on 7th and 8th June, 2019 respectively at Gangtok, Sikkim. The list of participants of the TCC and NRPC meetings is enclosed at Annexure- I & II. Shri Y. K. Raizada, Director (Technical), RVPN chaired the TCC meeting. Shri Kunji Lal Meena, CMD, RVNPN, chaired the NRPC meeting.

PROCEEDINGS OF 42nd MEETING OF T.C.C.

Shri N.S. Parameswaran, Executive Director, NHPC welcomed the members and participants to the 42nd TCC meeting.

Shri Naresh Bhandari, Member Secretary, NRPC welcomed the dignitaries on the dias and other members to the 42nd meeting of the Technical Coordination Committee. He informed that Shri Y.K. Raizada, Director (Technical), RVPN had taken over the charge of Chairperson TCC for the Financial Year 2019-20. He proposed following resolution in appreciation of the services rendered by Shri A.K. Kapoor, Director (Technical), PSTCL who had relinquished charge of Chairman, TCC after completion of his tenure on 31st March, 2019:

"Technical Coordination Committee places on record its deep appreciation of the outstanding service rendered by Shri A.K. Kapoor, Director (Technical), PSTCL during his tenure as Chairman, TCC. Shri A.K. Kapoor provided able guidance in various technical, commercial & administrative matters and made valuable contribution as Chairman of the Committee."

TCC adopted the resolution and placed on record its appreciation of the outstanding services rendered by Shri A.K. Kapoor during his tenure as Chairman, TCC.

MS, NRPC further informed that a large number of agenda items had been placed before TCC for deliberation covering various operational and commercial issues. Main

operational issues are revised SPS for 765 kV Agra-Gwalior, monsoon preparedness, telemetry availability, reactive compensation at 220/400 kV level, system study for capacitor requirement, DSM 5th Amendment, and commercial issues mainly outstanding dues of central generating companies and POWERGRID. He expressed hope that during the TCC deliberations, fruitful discussions would take place and members would be able to guide and recommend to NRPC, the solution to the various issues.

Shri Y.K. Raizada, Director (Technical), RVPN and Chairperson TCC extended his hearty welcome to all the delegates attending the 42nd TCC meeting. He informed that the maximum demand of Northern Region during this summer had already touched 60 GW due to prolonged heat wave and expressed his satisfaction over the fact that the region had been able to meet this demand without any significant event affecting grid security. He stated that utilities were facing a lot of problems due to DSM 4th amendment which was implemented w.e.f. 1st January 2019. The financial implications of these amendments created additional burden on already cash strapped DISCOMs. The issues were highlighted in the last meeting of TCC/NRPC as well wherein it was decided that NRPC may take up this issue with CERC on priority basis. The problems being faced by the utilities were duly conveyed to CERC. CERC took cognizance of the same and most of the issues have been addressed to a great extent in the recent DSM 5th amendment regulations issued by CERC to be implemented w.e.f. 03rd June 2019. He expressed hope that similar consensus would be seen on other issues as well. He highlighted that operational issues likely to occur during ensuing monsoon period would also be discussed in the TCC meeting and urged all utilities to ensure that all the activities as per discussion are completed in time in time.

In the end he thanked N.S. Parameswaran, ED, NHPC and his team of officers for hosting the meeting and for making excellent arrangements for comfortable stay of the members and participants at Sikkim and hoped for fruitful discussions in the meeting, which will facilitate safe, reliable and economic operation of NR power system.

PROCEEDINGS OF 42nd MEETING OF N.R.P.C.

Shri Janardan Choudhary, Director (Technical), NHPC welcomed the members and participants to the 45th NRPC meeting. A short film covering the history of NHPC, its hydro generating stations, achievements and CSR activities was shown. Members appreciated the film and the arrangements made by NHPC in hosting the meeting.

MS, NRPC welcomed the members to the 45th meeting of the Northern Regional Power Committee. He especially welcomed Shri. Kunji Lal Meena, CMD, RVPN who has taken over the charge of Chairperson, NRPC for the financial year of 2019-20. He informed that Shri. A. Venu Prasad had relinquished charge of Chairperson, NRPC after completion of his tenure on 31st March, 2019. On behalf of NRPC he proposed a resolution as given below in appreciation of the services rendered by Shri. A. Venu Prasad:

"Northern Regional Power Committee places on record its deep appreciation of the outstanding service rendered by Shri A. Venu Prasad, CMD, PSTCL during his tenure as Chairperson, NRPC. Shri A. Venu Prasad, provided able guidance in various technical, commercial & administrative matters and made valuable contribution as Chairperson of the Committee."

Members adopted above resolution.

MS informed that in the TCC meeting held on 07th June 2019, a number of operational items and Commercial items were listed on which detailed deliberation took place. Now, the recommendations of TCC, have been referred to NRPC for taking a view in the matter.

Shri Kunji Lal Meena, Chairperson, NRPC welcomed all delegates to the 45th NRPC Meeting. He thanked the entire team of NHPC for the excellent arrangements made by them in organizing this meeting at Gangtok, Sikkim. He informed that during the last 2-3 months, several policy & regulatory developments have taken place in the Indian power sector like CERC's regulation in regard to DSM 5th Amendment, Pilot project on Security Constraint Economic Despatch (SCED), etc. He urged NRPC Sectt. to present the details of these developments to the forum. He further urged all utilities to adhere to the decisions taken and timelines committed in the meeting. He concluded by thanking all the members for making time for the meeting and wished successful and conclusive deliberations in the meeting.

CONFIRMATION OF MINUTES OF LAST TCC AND NRPC MEETINGS

A.1 Minutes of 41st TCC and 44th NRPC meetings

Member Secretary, NRPC informed the Committee members that the Minutes of 41st TCC and 44th NRPC, held on 7th and 8th March 2019 respectively were circulated vide letter no. NRPC/Comml. /209/RPC (44th)/2019/5266-5360 dated 21st May 2019.

POWERGRID vide letter dated 06.06.2019 (enclosed as **Annexure–A.1.1**) has requested to amend the point B 36.2 as presented below:

Agenda Item	Points in Minutes	Modifications
B.36.2	On submitting the pre-charging study of above reactors, POWERGRID agreed to share the same.	The studies are available at CEA website along with agenda of 32nd SCM of NR. In case of any operational study, if required, the same can be carried out by NRLDC

NRLDC vide letter dated 06.06.2019 (enclosed as **Annexure–A.1.2**) has requested to amend the point B 16.2, B 40.1 and B 41.3 as presented below:

Agenda Item	Points in Minutes	Modifications
B.16.2	Representative of POSOCO highlighted the importance of AGC	The importance of all the three responses i.e., primary, secondary and tertiary responses has been stated in various CERC orders and also

Agenda Item	Points in Minutes	Modifications
	and stated that 50 paise mark-up was decided for RRAS which was also implemented for AGC pilot project which might be reviewed	practiced worldwide. POSOCO representative were of the view that to maintain frequency at 50 Hz, all responses are required. The following salient points were emphasized about the three responses: **Primary response**: Larger corpus of generation; for immediate arrest of frequency variation; no load set point change. **Secondary response**: Load set point change; To bring back frequency to its reference value. **Tertiary response**: Manual intervention; To restore secondary reserves Members appreciated the need of all the three responses in the grid. Representative of POSOCO highlighted the importance of AGC and stated that 50 Paise mark-up was decided for RRAS which was also implemented for AGC pilot project.
B.40.1	NRLDC representative stated that three FRC based events occurred during Jun-Sep'18	NRLDC representative stated that three FRC based events occurred during Oct`18-Jan'19.

Agenda Item	Points in Minutes	Modifications
B41.3	She highlighted that capacity building program will be free of cost for all SLDCs. She also requested all the constituents to participate in capacity building program to be scheduled in 2019 with full strength and enthusiasm.	She highlighted that capacity building program conducted by POSOCO have 5 slots reserved for SLDC nominees and will be free of cost for all SLDCs. She also requested all the constituents to participate in capacity building program to be scheduled in 2019 with full strength and enthusiasm.

Also, representative of NRLDC proposed following amendment of point B 22.1 in the meeting:

Agenda Item	Points in Minutes	Modifications
B22.1	Representative of NRLDC informed that WRLDC has gone forward with preparation of specifications for new Interface energy meters, meanwhile CEA has proposed 3rd Draft	Representative of NRLDC informed that Western Region (WR) has gone forward with preparation of specifications for new Interface energy meters, meanwhile CEA has proposed 3rd Draft Amendment of the

	Amendment of the Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006.	Central Electricity Authority (Installation and Operation of Meters) Regulations, 2006.

Members confirmed the last TCC and NRPC minutes along with the abovementioned amendments.

B. OPERATIONAL ISSUES

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

TCC Deliberation

B.1.1 POWERGRID informed that revised scheme has been implemented and Mock testing of the SPS was carried out on 01.05.19. In the meeting, members were apprised about the outcome of the mock testing of revised SPS for 765 KV Agra–Gwalior line.

B.1.2 The testing of the scheme was by and large OK with following observations:

- Communication problem at Nara (**Issue has been resolved on the same day of mock testing**)
- Non-increment of counter at Jamsher & Narwana (**POWERGRID agreed for necessary action**)
- Non-radial nature of mapped feeder (**Wrongly reported, most of the feeders are radial in nature**)
- Less than planned load observed during testing (**Utilities agreed to review the load relief on the connected feeders and present the details in 160th OCC meeting**)

B.1.3 TCC agreed to the procedure for calculation of MW relief of particular feeders, such as, take the yearly data and calculate the average of 30 days of minimum load period of that particular feeder for calculation of MW relief on the feeder.

NRPC Deliberation

B.1.4 NRPC noted the deliberations of TCC.

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

TCC Deliberation

B.2.1 Members were sensitized about the inordinate delay in the submission of data by the state utilities. It was stated that even after pursuing the matter since long, even sample data (of any one substation) has not been received from states like UP, Uttarakhand, Rajasthan, J&K and Chandigarh.

B.2.2 Representative of UPPCL, stated that the information which was required to be compiled in the provided format was huge and was also very cumbersome. As a case in point, he stated that the format required the information of reactive load shedding at 11 kV level, the data for which is not maintained at DISCOM level.

B.2.3 Representative of Punjab stated that the data to be furnished to CPRI in the desired format, required for creation of the same afresh. As the states were not being able to

submit the data in the format, appointment of some third party specialized agency for collection of the data may be explored as was also deliberated in previous meeting.

B.2.4 Members were of the view that if the states are not able to provide the data, the study should not be allowed to linger on and a call should be taken for hiring a third party (like CPRI itself) for the collection of data and the cost shall be booked to each state separately.

B.2.5 MS, NRPC stated that the study was pending since past year and 3 months of FY 2019-20 has also passed. In view of the same it is high time to complete the study at the earliest and requested states to submit the data in a time bound manner latest by 30.06.2019. For the states not able to submit the data by 30.06.2019, CPRI would be approached for collection of data of their states and if proposal is acceptable to CPRI then the costing would be booked to the respective states.

B.2.6 Rajasthan representative stated that as the data was pertaining to the DISCOMS, they were pursuing for the submission of the same but to no effect. He requested to intimate the higher management of DISCOMs for submission of the data as it would pressurize them for early submission of the same.

B.2.7 In the end MS, NRPC informed that the efforts being put by individual states would not be left to go in vain because of non-submission of data by some other state; and CPRI would be requested to explore for the separate study of each state (whosoever submits the data in time).

B.2.8 TCC advised all states to submit the data by 30.06.2019. For the states not able to submit the data by 30.06.2019, CPRI would be approached for collection of data of their states and if proposal is acceptable to CPRI then the costing would be booked to the respective states.

NRPC Deliberation

B.2.9 Chairman, NRPC advised for formation of a whats app group wherein all the members of NRPC shall be made a part of so that the top official of the utilities could be sensitized about such data submission and other agenda items regularly. He further advised to make one admin from each utility who could further add the officer responsible for any particular issue.

B.2.10 NRPC noted the deliberations of TCC and advised the states for ensuring the submission of data by 30.06.2019.

B.3 Reactive compensation at 220/400 kV level

TCC Deliberation

B.3.1 MS, NRPC informed that following reactors were approved in the 39th meeting of SCPSPNR and thereafter in 37th TCC and 40th NRPC meeting:

a) TCR of capacity 500 MVAr at Kurukshetra 400 kV bus.
b) Bus Reactors at 30 Nos. 220 kV sub-stations and 18 Nos. 400 kV level sub-stations subject to the availability of space.

It was also agreed that these reactors shall be provided by the owner of the substations.

B.3.2 **POWERGRID -** 500 MVAr TCR at Kurukshetra: Award placed in January 2019 with completion schedule of 22 months. PGCIL representative informed that 11 no. of 400 kV Bus Reactor and 6 no. of 220 kV Bus Reactor, which were earlier informed to be executed through TBCB project has been allotted to PGCIL for execution. Further, NIT for the said reactors has already been floated and Bid Evaluation is under Process. LoA is likely to be placed by end of June 2019.

B.3.3 **PSTCL** – Sanction of PSDF funding has been accorded. Retendering has been done with the Bid opening date of **08.07.19.**

B.3.4 **Uttarakhand - 125 MVAr reactors at Kashipur**: Technical Bid for 125 MVAr reactor at Kashipur has been opened and is being evaluated. Further it was informed that funding for the reactor will be done through PSDF and the proposal is under DPR formation stage.

B.3.5 **DTL** – The updated status of the reactors is presented below:

S. No.	Sub Station	Voltage level (kV)	Reactor (MVAr)	Updated status
1	Peeragarhi	220	1x50	NIT to be floated by end of June 2019.
2	Mundka	400	1x125	
		220	1x25	
3	Harsh Vihar	220	2x50	
4	Electric Lane	220	1x50	Approval from the competent authority expected to be obtained by July 2019.
5	Bamnauli	220	2x25	
6	Indraprastha	220	2x25	
TOTAL			**450**	

B.3.6 **Rajasthan:**

Item	Background	Status
3 Nos. each of 25 MVAr (220 kV) reactors for Akal, Bikaner & Suratgarh.	-	PSDF funding sanctioned. Tendering under process.
1 No. of 25 MVAr (220 kV) reactor for Barmer& 125 MVAr (400 kV) reactor for Jodhpur, included in 450 MVAr (13x25 + 1x125 MVAr) proposal	Revised DPR for 450 MVAr approved Reactor after separating STATCOM was submitted vide letter dt. 12.10.2018 to POSOCO for approval.	RVPN submitted reply to the sought clarifications. TESG has examined the same and put up for approval of Appraisal Committee.

B.3.7 Representative of NLDC informed that CERC has uploaded draft notification of Central Electricity Regulatory Commission (Power System Development Fund) Regulations, 2019 in which certain amendments in the procedure of approval of PSDF funding has been proposed. that the proposal shall now be sent directly to Ministry of Power after the approval of Appraisal committee, Monitoring Committee and not to CERC. He requested all the utilities to go through the draft procedure available on

CERC website and submit their comments on the same.

NRPC Deliberation

B.3.8 NRPC noted the deliberations of TCC and appreciated the efforts of CERC by bringing draft notification of Central Electricity Regulatory Commission (Power System Development Fund) Regulations, 2019 so as to reduce the delays in the release of PSDF funding.

B.4 Database of Protection settings

TCC Deliberations

B.4.1 MS, NRPC informed that even after going with the tendering process three times, no bidder has been found to be suitable in the Technical evaluation due to lack of competition. He further stated that in the 8th NPC meeting held on 30.11.2018, the efforts of WRPC for in-house development of the database was appreciated and NRPC was suggested to seek assistance of WRPC in case no bidder comes up after retendering.

B.4.2 In view of the above it was proposed that rather than going for an external agency for creating the database of Protection setting, NRPC should proceed as being done by WRPC.

B.4.3 He brought out to the forum two options in view of the non-selection of third party and the advice of NPC.

B.4.4 **First option** was that all the STUs shall submit the protection setting data in a time bound manner so as to comply with the recommendations of Enquiry Committee on grid disturbance of 30th & 31st July 2012, 'Task Force on Power System Analysis under Contingencies'. Further it was informed that 13 utilities have already submitted the above data and others could also provide the same in a time bound manner. However, all utilities were requested to furnish the data afresh so as to cater to any changes made in the settings. For the first option, all the states were requested to appoint some **nodal officers (SE level or above)** for facilitating the collection of protection setting data. To facilitate manpower, it was also proposed that the States may depute their one or two officers in NRPC for some period on rotation basis.

B.4.5 **Second option** was to approach to any central agency like CPRI without any change in scope of work as already approved so that the approved PSDF funding could also be utilized. MS, NRPC clarified that NRPC so far has not discussed the matter with CPRI.

B.4.6 UP stated that the protection setting data was subject to changes with the changes in the network and it was necessary that the representative of the utilities should be able to extract the setting and accordingly update the same in the centralized database.

B.4.7 Members also stated that a portal may also be made on which the changes made in the protection settings could be updated in real time.

B.4.8 TCC was of the view that the Protection setting are already available with the substation personnel and any third party engaged would also require the help of the substation personnel for extracting the settings from the relay. Also, in case of some changes in the setting, the substation personnel shall have the responsibility of reflecting the changes accordingly in the centralized database and for that he should be well aware of how to extract the settings and getting it reflected in the centralized database.

B.4.9 In view of the above TCC decided to initially go for the first option and advised utilities to nominate the nodal officers at the earliest so that the database could be operationalized as soon as possible. TCC opined that matter may also be discussed with CPRI and its outcome may be informed in the next meeting.

NRPC Deliberations

B.4.10 HP stated that we have already lost a considerable amount of time. If the discussions with CPRI were to start again, it may take another one year just to finalize the things. Accordingly, it was better to go with the first option wherein nodal officers from each utility may be made responsible for collecting the data for their respective utilities and making it available to NRPC secretariat which can then make it available on Web portal. He also advised that this exercise needs to be completed within six months.

B.4.11 Considering the comments of HP, MS NRPC stated that if a third party is engaged then work may be completed in a professional manner. However, he advised all utilities to go forward for the collection of the data and appointment of nodal officers and by that time the possibility of CPRI collecting the data shall also be explored.

B.5 Downstream network by State Utilities from ISTS Stations

TCC Deliberations

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

S. No.	Substation	Downstream network bays	Commissioning status of S/s / Transformer	Planned 220 kV system and Implementation Status
1	400/220 kV, 3x315 MVA Samba	2 nos. bays utilized under ISTS. Balance 4 nos. to be utilized	Commissioned (1st & 2nd – Mar'13 3rd –Oct'16) Bays-Mar'13	• LILO of 220 kV Bishnha – Hiranagar D/c line. Target completion - Nov, 2019. • 220 kV D/c Samba (PG) – Samba (JKPDD) approved in 1st NRSCT. **PDD, J&K representative not present.**
2	400/220kV, 2x315 MVA New Wanpoh	6 Nos. of 220 kV bays to be utilized	Commissioned in Jul'14 Bays-Jul'14	• 220 kV New Wanpoh -Mirbazar D/c line. Target completion – March, 2019. • 220 kV Alusteng - New Wanpoh Line. Target completion - March, 2019. **PDD, J&K representative not present.**
3	400/220 kV, 2x315 MVA Parbati Pooling Station	2 Nos. of 220 kV bays to be utilized.	Commissioned in Dec'17	• 220 kV Charor- Banala D/c line (18 km). Target completion –Dec'18. **Expected by 30.06.2019.**

	(Banala)			
4	400/220 kV, 2x500 MVA Kurukshetra (GIS)	8 nos. of 220 kV bays to be utilized	Commissioned in Mar'17.	• LILO of one circuit of Kaul-Pehowa 220 kV D/c line at Bhadson (Kurukshetra). **Commissioned on 07.03.2019.** • LILO of one circuit of Kaul-Bastara 220 kV D/c line Bhadson(Kurukshetra). **Work awarded on 12.03.2018. Contractual completion date is 11.10.2019.** • 220kV D/c Bhadson (Kurukshetra) – Salempur with HTLS conductor equivalent to twin moose. **P.O issued on 15.10.18. Contract agreement signed on 30.11.2018. Likely date of completion 30.04.2020.**
5	400/220 kV, 2x500 MVA Bagpat GIS	8 nos. of 220 kV Downstream lines commissioned. Balance 3 Nos. of 220 kV bays to be utilized.	Commissioned in Mar/Jun'16	• Bagpat (PG) - Modipuram-II 220 kV D/c line. Target completion – **Under planning** • LILO of 220 kV S/c Muradnagar II –Baghpat (PG) at Baghpat SS. **Commissioned**
6	400/220 kV, 2x315 MVA Saharanpur	All 6 nos. 220 kV bays utilised.	Commissioned in May'16	• LILO of Khara-Shamli 220 kV S/C line at SRN(PG). • 220 kV SRN(PG)-Sarasawa D/C Line. • LILO of SRN-Nanauta 220 kV S/C line at SRN(PG). **Commissioned**
7	400/220 kV, 2x315 MVA Dehradun	Out of 6 bays, only two bays used. Balance 4 bays to be utilised.	Commissioned in Jan'17	• 220 kV Dehradun-Jhajra line. Target completion: Nov, 2021
8	400/220 kV, 2x315 MVA Sohawal	4 Nos 220 kV bays utilized. 2 Nos 220 kV bays to be utilized.	Commissioned in Jun'12	• 220 kV D/C Sohawal (PG) – Gonda • 220 kV D/C Sohawal (PG) – Gonda **Target completion- November, 2019.**
9	Shahjahanpur, 2x315 MVA 400/220 kV	Partially utilized. Balance 5 Nos. of 220 kV bays to be utilized.	Commissioned in Jun/Sep'14	• 220 kV D/C Shajahnapur (PG) - Azizpur D/C line. **Target completion –Dec., 2020.** • 220 kV D/C Shahajahanpur (PG) - Gola Lakhimpur line. **Target completion – Dec., 2019.**

10	02 nos. bays at Moga	Partially utilized. Balance 2 nos. of 220kV bays to be utilized.	Commissioned in Jun'15.	• Moga–Mehalkalan 220 kV D/c line. **Commissioned on 24.03.2019.**
11	Hamirpur 400/220 kV 2x 315 MVA Sub-station (Augmentation by 3x105 MVA ICT)	2 nos. bays utilized under ISTS. Balance 6 nos to be utilized	1st-Dec'13, 2nd – Mar'14 & 3rd Mar'19. 4 bays-Dec'13, 2 bays-Mar'14 2 bays-Mar'19	• 220 kV D/C Hamirpur-Dehan line. **Target completion - Apr, 2020.**
12	Kaithal 400/220 kV 1x 315 MVA Sub-station	July 2017 (Shifting of transformer from Ballabhgarh)	Commissioned	• 220 kV Kaithal (PG)- Neemwala D/c line - Target completion - 31.01.2020. • **Work awarded on 08.06.2018. Contractual completion date is 06.01.2020.**
13	Sikar 400/220kV, 1x 315 MVA S/s	2 Nos. of 220 kV bays	Commissioned	RVPNL had earlier requested to allocate the 220 kV bays for solar / wind developers but now have planned to utilize them with cable termination to overcome ROW issue. PGCIL to facilitate cable termination at their substation.
14	Bhiwani 400/220kV S/s	6 nos. of 220kV bays	Commissioned	• 220kV Bhiwani (PG) - Isherwal (HVPNL) D/c line. • Target completion - 31.06.2020. • Price bid opened on 27.12.18. • Case scrutinized and sent to DS&D for placing in the next HPPC meeting for decision regarding award. • Likely date of award is 30.06.2019. • Likely date of completion is 31.12.2020.
15	Jind 400/220kV S/s	6 nos. of 220kV bays	Commissioned	• LILO of both circuits of 220kV D/c Narwana – Mund line at Jind (PG). • Target completion - 31.06.2020. • Price bid opened on 27.12.18. • Case scrutinized and sent to DS&D for placing in the next HPPC meeting for decision regarding award. • Likely date of award is 30.06.2019. • Likely date of completion is 31.12.2020.
16	400/220kV Tughlakabad GIS	4x 500	Commissioned	• RK Puram – Tughlakabad (UG Cable) 220kv D/c line. • Target completion – 2020-21.

	(6 no of bays utilized out of 8 no of 220kV bays)			
17	400/220kV Kala Amb GIS (TBCB) (6 nos. of 220kV bays)	7x105	Commissioned (Jul'17)	HPSEBL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s. Details for remaining 4 nos. of line bays may be provided. **Target completion-2021**

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

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States in 40th SCPSPNR
1	400/220kV Dwarka-I GIS (8 nos. of 220kV bays)	4x 500	Sep'19	**DTL to update.**
2	220/66kV Chandigarh GIS (8 nos. of 66kV bays)	2x 160	Jun'19	**Chandigarh representative not present**
3	400/220kV Jauljivi GIS Out of these 8 nos. 220kV Line Bays, 4 nos. (Pithoragath-2, & Dhauliganga-2) would be used by the lines being constructed by POWERGRID and balance 4 nos. (Almora-2, Jauljivi-2) bays would be used by the lines being constructed by PTCUL.	2x315	Dec'2019	• 220kV Almora-Jauljivi line. **DPR by July, 2019.** • 220kV Brammah-Jauljivi line **Target completion: 2021**

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States in 40th SCPSPNR
4	400/220kV Sohna Road Sub-station (TBCB) (8 nos. of 220kV bays)	2x500	May'19	• LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road. • LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road. • NIT to be floated shortly. Case

				processed for permission of Election Commission of India. • Alternatively, to expedite the evacuation of power, the proposal for execution of work through EPC contractor M/s R S Infra at the rates defined in another contract is under process and deliberated in the HVPNL's internal review meeting dt. 24.04.19. **Target completion: 31.05.2020**
5	400/220kV Prithla Sub-station (TBCB) (8 nos. of 220kV bays)	2x500	May'19	• LILO of both circuits of 220kV D/c Sector-69 - Roj Ka Meo line at 400kV Sohna Road. • LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road. • NIT to be floated shortly. Case processed for permission of Election Commission of India. • Alternatively, to expedite the evacuation of power, the proposal for execution of work through EPC contractor M/s R S Infra at the rates defined in another contract is under process and deliberated in the HVPNL's internal review meeting dt. 24.04.19. • **Target completion: 31.05.2020**
6	400/220kV Kadarpur Sub-station (TBCB) (8 nos. of 220kV bays)	2x500	May'19	NIT floated on05.03.2019 with due date of submission on 22.04.2019 (opened on 23.04.2019 and under evaluation). **Target completion: 31.12.2020**

NRPC Deliberations

B.5.3 NRPC noted the deliberations of TCC.

B.6 Certification of 220KV D/C Charor-Banala line under construction by HPPTCL as Deemed ISTS (Agenda by HPPTCL)

TCC Deliberations

B.6.1 HPPTCL representative informed that they are constructing a 17.6 km long transmission line (Twin Moose, 200kv D/C), from 220/132KV substation of HPPTCL at Charor to 400/220KV Banala (Parbati pooling station) substation of PGCIL in Distt. Kullu for power evacuation of Malana-II HEP and small HEPs in Parbati river basin. Currently, the power of Malana-II (100MW) HEP is being evacuated through 220KV

line of AD Hydro upto 400/220KV Nalagarh substation of PGCIL as an interim arrangement.

B.6.2 He further informed that the 220KV Charor-Banala transmission line would terminate at Charor substation of HPPTCL, which is adjacent to M/s EPPL's Charor Subsation, on the completion of the same. The 220KV D/C Charor-Banala Transmission line of HPPTCL was expected to be completed by mid of June 2019. On completion, Charor-Banala line shall replace the LILO of AD Hydro near M/s EPPL's Charor substation.

B.6.3 It was stated that Charor-Balana 220KV D/C transmission line has been constructed for power evacuation and there are no drawl points or interfaces of distribution network and other intra-state transmission system at Charor substation and therefore HPPTCL was of the view that the line may be certified as ISTS by NRPC.

B.6.4 MS, NRPC in the meeting referred to the Central Electricity Regulatory Commission (Sharing of Inter State Transmission Charges and Losses) (Third Amendment) Regulations, 2015 which states as under:

"Certification of non-ISTS lines carrying inter-State power, which were not approved by the RPCs on the date of notification of the Central Electricity Regulatory Commission (Sharing of Transmission Charges and Losses) Regulations, 2009, shall be done on the basis of load flow studies. For this purpose, STU shall put up proposal to the respective RPC Secretariat for approval. RPC Secretariat, in consultation with RLDC, using WebNet Software would examine the proposal. The results of the load flow studies and participation factor indicating flow of Inter State power on these lines shall be used to compute the percentage of usage of these lines as inter State transmission. The software in the considered scenario will give percentage of usage of these lines by home State and other than home State. For testing the usage, tariff of similar ISTS line may be used. The tariff of the line will also be allocated by software to the home State and other than home State. Based on percentage usage of ISTS in base case, RPC will approve whether the particular State line is being used as ISTS or not. Concerned STU will submit asset-wise tariff. If asset wise tariff is not available, STU will file petition before the Commission for approval of tariff of such lines. The tariff in respect of these lines shall be computed based on Approved ARR and it shall be allocated to lines of different voltage levels and configurations on the basis of methodology which is being done for ISTS lines."

B.6.5 He further stated that it was not dependent on the PPA but on actual flow of power based on which the non-ISTS lines are certified for carrying inter-state power. He advised HP to wait for the commissioning of the line and thereafter submit their request for certification of line. Also it was further informed that as the data of the previous year (Q2 and Q4) was being considered for carrying out the load flow study, the line could only be certified during the next year.

B.6.6 Punjab representative expressed their concerns and stated that it is the responsibility of the generating stations to bring power to the pooling stations and now if the said line of HP is certified as ISTS in future, the additional liability should be borne by the generator and not the beneficiary state.

NRPC Deliberations

B.6.7 HPPTCL stated that the Charor-Banala line is not having any intra-state drawl point

and is purely carrying inter-state power.

B.6.8 Chairman, TCC stated that if it is clear that the state line is not having any intra-state drawl point then there may not be any point of going for study as being suggested by NRLDC.

B.6.9 NRLDC representative stated that if there is a regulation already present on any issue then it needs to be followed to every extent possible so as to avoid any kind of arbitrariness in the decision making.

B.6.10 HPPTCL further stated that if the certification would be issued in the next year it would have a huge financial ramification for HPPTCL. Also, for the next 05 years there was not any intra-state connection proposed on the Charor-Banala line.

B.6.11 In the end MS, NRPC requested HPPTCL to submit their request to NRPC Secretariat after the commissioning of the line and NRPC would act on the same accordingly.

B.7 RVPNL owned line connected directly to ISGS for certification as ISTS (Agenda by RVPNL)

TCC Deliberations

B.7.1 RVPN informed that the following intra–state transmission lines of RVPN were included in the list of RPC certified lines before notification of the CERC (Sharing of Transmission Charges and losses) Regulation 2010:

S. No	Name of transmission line	Line Length	Inter State Generating Station
1	220 kV S/C Anta-Kota line	67 kms.	Anta GTPP
2	220 kV RAPP(B)-Kota	44 kms.	RAPP(B)
3	220 kV RAPP(B)-RAPP(A)		RAPP(B)

B.7.2 He stated that the aforesaid lines were not certified for carrying ISTS power in the 40th TCC and 43rd NRPC as it was mentioned that they did not fulfill the criteria (as finalized by the Group) i.e. on the basis of average % utilization.

B.7.3 He further brought out that the above 3 lines are emanating from ISGS and have already been certified by RPC before the notification of the CERC Regulation 2010 vide letter No. NRPC/SE(C)/RTA/2011-12 dt. 8.06.2011. Therefore, as per CERC Regulation 2015, these lines do not need certification on the basis of % utilization appearing in POSOCO load flow studies.

B.7.4 TCC agreed to consider the above mentioned intra–state transmission lines of RVPN as ISTS lines as these lines are emanating from ISGS and had already been certified by RPC before the notification of the CERC Regulation 2010 vide letter No. NRPC/SE(C)/RTA/2011-12 dt. 8.06.2011.

NRPC Deliberations

B.7.5 NRPC approved the deliberations of TCC.

B.8 Phase nomenclature mismatch between BBMB and some interconnected stations of other power utilities

TCC Deliberations

B.8.1 MS, NRPC informed that the issue of mismatch of phase sequence nomenclature of BBMB system interconnected with other utilities was highlighted in the 34th PSC meeting wherein it was observed that the nomenclature of phases at BBMB end has inadvertently been marked as:

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

B.8.2 Based on the recommendation of 38th TCC and 41st NRPC meeting, BBMB drew a draft action plan for resolving the issue. The draft action plan was acceptable to all the concerned utilities except POWERGRID which had certain reservations regarding design constraint of tower, de-stringing and re-stringing of conductors, etc. To understand and resolve the above issues, a site visit was held on 27.05.2019 and 28.05.2019 to resolve the issues at Bhiwani, Rajpura, Panchkula & Panipat S/s. The MoM of the site visit by the committee was enclosed at Annexure-III to the agenda note.

B.8.3 POWERGRID stated that the difficulties which would be faced by POWERGRID and BBMB were brought out in the minutes of the meeting of the site visit by the committee. He further argued that the system has been in service for the past 15 years and no issue as such has ever been encountered due to nomenclature mismatch. Also, citing the various issues which would be faced by BBMB & POWERGRID for implementing the work at stations/lines as brought out by the committee after its site visit, he stated that it would be easier to make changes on the secondary side, if complete scheme needs to be revised. He stated that changes required on secondary side would require less effort and would be easier than efforts including shutdown required (for generating station also), modification at transmission line tower and other activities proposed to be done by POWERGRID as well as BBMB.

B.8.4 Rajasthan stated that the issue has already been resolved by them and proposed that if it was not possible for POWERGRID to make changes at their end, BBMB can also change the outgoing jumper at their end.

B.8.5 NRLDC stated that except at Rajpura, where some clearance issue would have come, at no other site such difficulties were encountered as being brought out by POWERGRID.

B.8.6 TCC decided that BBMB and POWERGRID would hold a separate meeting and decide on the methodology to be adopted to resolve the nomenclature issue.

NRPC Deliberations

B.8.7 NRPC noted the deliberations of TCC and advised POWERGRID to resolve the issue at the earliest as it has been pending since long.

B.9 Follow up of Major Decisions of NRPC

TCC Deliberations

Sl. No.	Name of the project / decision taken	Meeting in which approval was granted/ decision was taken	Updated Status
1.	Provision of Bus Reactors in Northern Region to Control Over Voltages	Provision of Bus Reactors in Northern Region to Control Over Voltages	Out of 17 no. reactors at 15 locations, 12 no. reactors at 10 locations have been commissioned. The status of reactors was as under: • **Nathpa-Jhakri (1x80 MVAr): Commissioned**- 22.04.2019 • **Chamera-I (1x125 MVAr):** Charged on 25 August 2018 • **Parbati-II (1x125 MVAr) and Parbati-III (1x80 MVAr):** NHPC informed that there is no space at Parbati-III and as such reactors will be installed at Parbati- II. Reactors at Parbati-II will be commissioned along with the commissioning of the project. The case for purchase of reactor is under tendering process.

Sl. No.	Name of the project / decision taken	Meeting in which approval was granted/ decision was taken	Updated Status
2.	Transmission system associated with Kishenganga HEP. Kishenganga – Wagoora 220 kV D/c	33rd Standing Committee Meeting held On 23/12/2013	POWERGRID had informed that completion schedule of Transmission system associated with Kishenganga HEP had been delayed due to unrest in Kashmir. The revised schedule was: Kishenganga – Wagoora 220kVD/c line – Stringing pending for 1.5- 2 Km because of **RoW issue.**
3.	Unified Real Time Dynamic State Measurement (URTDSM) Scheme.	Approved in 27th NRPC meeting held on 13th July, 2012 & 30th	• Supply: Completed (114 Sub-stations). • PMUs at 111 S/S have been installed and 102 S/S are

		November, 2012	integrated with NRLDC/SLDCs. • WAMS System Commissioned in NRLDC & SLDCs of Northern Region as well as in ER and NER. • Out of 6 Analytic Software which are being developed by IIT Bombay, 4 have been deployed at NRLDC, Prototype for one application is being tested and remaining one is under development. • In 41st TCC/44th NRPC, NRLDC informed that bugs are being observed in software and the feedback has been submitted to POWERGRID. • Installation of Line Parameter Estimation, Vulnerability Analysis of Distance Relay, Supervised Zone-3 Distance Protection, Linear State Estimator is done for NRLDC & Delhi, installation at SLDCs under progress.
4.	Fiber Optic based communication system in NR and Additional OPGW connectivity in Northern Region under Fiber optic expansion project	18th NRPC meeting held on 27th November 2010 and 28th NRPC meeting held in 22nd March 2013.	Fibre Optic Connectivity under Central sector has been completed with the deletion of Uri-Uri-II link from the scheme. OPGW connectivity under State Sector & Additional requirement of Central Sector is under progress and same shall be completed progressively. **NR-I & NR-III :** State Sector Completed – 1362 Kms out of 2071 Kms Central Sector (Addi. Req): 1800 Kms out of 1920 Kms completed. PSTCL representative stated that even though POWERGRID is stating that they have completed the fibre optic connectivity but it shall not be interpreted as **"Commissioned".** PGCIL stated that by completion means that the Mux has been commissioned and thereafter it was the responsibility of the state concerned to make further

			connections for flow of the data. In the last TCC/NRPC meeting also PSTCL had raised this issue and PGCIL agreed to depute their engineers at any two locations for demonstration of the same. It was successfully demonstrated that links have been commissioned. In this meeting also, PGCIL was requested to make the connections in any two of the locations of PSTCL and thereafter the same would be done by PSTCL themselves and if any problem would be encountered PGCIL would be approached for the same.
5.	Third party Protection audit of intra-state system / balance system not covered in Basic Protection Audit	27th NRPC meeting held on 30th November 2012.	UPPTCL: 68 No. 220 kV substations work awarded to CPRI and work at 14 substations completed. Rest to be completed by Nov 2019.
6.	Planning, procurement and deployment of Emergency Restoration System	In the 34th NRPC meetings 20th held on March, 2015	**DTL, PSTCL, UPPTCL and J&K** - 02 nos. of ERS procured. **RRVPNL** - Rajasthan informed that NIT has been floated on 10.01.2019 for procuring ERS and bids were opened on 10.03.2019 for technical evaluation. **TO be awarded by July`19** **HVPNL – To be awarded by June`19** **PTCUL** - DPR finalization is under process. **NIT likely to be done by 21st June 2019.** **HPSEBL** - Matter under consideration regarding fund availability.

NRPC Deliberations

B.9.1 NRPC noted the deliberations of TCC and advised members to ensure that the issues which are pending since long shall be completed at the earliest.

B.10 Connectivity to Naitwar Mori HEP (NMHEP) (2X30MW) of SJVN Ltd. in Uttarakhand (Agenda by SJVN)

TCC Deliberations

B.10.1 As the matter is sub judice in CERC, TCC decided not to deliberate on the issue any further.

B.10.2 However, the concerns of SJVN was noted by the TCC regarding the problem of evacuation of power to be faced when the NMHEP would get commissioned due to non-commissioning of the Mori- Dehradun transmission line.

NRPC Deliberations

B.10.3 NRPC noted the deliberations of TCC.

B.11 Training Program/Workshop on Protection System Auditors from CPRI.

TCC Deliberations

B.11.1 In 36th PSC meeting held on 19.09.2018, a proposal from Power System Division of Central Power Research Institute for conducting 3 days Training Program/Workshop at Bangalore on Protection Audit for Protection System Engineers was discussed. They have proposed training at 10,500 per participant exclusive of taxes. Participants have to make their own boarding and lodging arrangements. PSC recommended the training programmed to be organized by CPRI.

B.11.2 The training program for 1st batch of participants had been conducted during March'2019 at CPRI, Bangalore. The 2nd batch is proposed to be held in the month of June/July, 2019 and members were requested to send their nomination for the same.

NRPC Deliberation

B.11.3 NRPC noted the deliberation of TCC and appreciated the efforts of NRPC Secretariat.

B.12 Cyber Security Preparedness Monitoring

TCC Deliberations

B.12.1 Regarding the draft CMP for Transmission sector, POWERGRID, informed that comments of CERT-In has been incorporated and the same has been submitted on 17.05.2019 to CISO, MoP.

B.12.2 UPRVUNL, HVPN and Punjab in written reply to the agenda had submitted the information as desired in Point No B.12.1 of the agenda and the status of VAPT conducted in their respective organization and VAPT plan for the future.

B.12.3 UPPTCL in the meeting informed that annual audit of their website was being conducted by CERT-In certified auditors. Regarding the SCADA network it was informed that it is being maintained by SIEMENS and regular annual audit being conducted by them.

B.12.4 PGCIL representative as CISO, CERT-Trans. informed that as per IT Act, ISO 27001 lists down prerequisite requirement that a utility should ensure. He advised all the utilities to adopt ISO:270001 for ensuring information security management.

B.12.5 UPPTCL stated that in view of most of the relays, now being of numerical type, some kind of anti-hacking feature must also be incorporated so as to prevent any kind of

hacking at local level. In reply to this PGCIL representative informed that in their organization they were getting gap assessment to be done by the OEM in order to identify and shortcomings. Based on which, OEM will advise on the future course of action to be taken. He advised all utilities to get the gap assessment exercise done by the respective OEMs.

B.12.6 PSTCL opined that some centralized agency may be appointed for cyber security preparedness for ISTS elements only and the expenditure involved for the same may be got funded through PSDF.

B.12.7 On the suggestion of PSTCL for securing ISTS elements, PGCIL representative stated that in an integrated grid, securing only the ISTS network would not suffice. Any threat can erupt even from the DISCOM level. He stated that each state needs to secure its own network, as no centralized agency can practically perform this task for such a huge network.

B.12.8 TCC, Chairman and MS, NRPC were of the view that PGCIL may extend its help to the states by making some common standards and the compliance of which can be done by the respective states.

B.12.9 To the request of TCC, Chairman and MS, NRPC, PGCIL representative stated that considering the complexity of the issue, Ministry of Power has appointed a CISO in MoP and thereafter for each sector viz. Hydro, Transmission, Thermal and Distribution (*Details of nodal officers available at http://cea.nic.in/isac_nodalofficers.html*). PGCIL is having the responsibility of only the Transmission sector. Also, PGCIL is ensuring compliance to ISO 27001 and it advise every utility to go for the same.

NRPC Deliberations

B.12.10 NRPC noted the deliberations of TCC and advised all the utilities to take measures for ensuring cyber security in their system.

B.13 OPGW connectivity at NHPC power stations under central sector scheme (Agenda by NHPC)

TCC Deliberations

B.13.1 Regarding **URI-II** power station PGCIL representative informed that VSAT will be installed within 03 months (Award by July 19 and installation by August 19). Capital cost is being borne by PGCIL, however, recurring cost (Bandwidth and AMC charges) shall be borne by NHPC. The cost shall be around Rs. 3,400 per kbps per annum.

B.13.2 **Parbati-III**: OPGW on 3 Kms out of 6.5 Kms has been laid. Some additional commercial issues have risen on the part of PKTCL due to which the work has been pending and the same shall be completed after resolution of the issues. POWERGRID requested NRPC to call a meeting of POWERGRID and PKTCL to resolve the issue, if they fail to resolve the issue at their end, NRPC agreed.

B.13.3 **Sewa-II**: Connectivity is a part of Gladni-Hiranagar line of J&K which PGCIL is implementing as a consultancy project. Since Aug'16 the payment amounting to Rs 30-35 Cr is stuck at the end of J&K and PGCIL cannot proceed further due to lack of

fund being made available by J&K. POWERGRID asked NRPC to take the issue of pending payment with PDD, J&K.

NRPC Deliberations

B.13.4 NRPC noted the deliberations of TCC.

B.14 Delay in laying of OPGW through PGCIL (Agenda by PSTCL)

TCC Deliberations

B.14.1 PSTCL informed that there has been inordinate delay by PGCIL in carrying out the diversion work of OPGW on Lalton Kalan--Sahnewal line. Although, Amount of Rs. 5,82,000/- as sought by PGCIL was deposited in its account by PSTCL on dated 25.04.2019, but, work could not be commenced till 10.05.2010. Due to long delay, tripping occurred 4-5 times on said line as during de-stringing of OPGW, it was kept loose in cross arm of towers and consequently it touched the conductor during storm/heavy winds.

B.14.2 Representative of PGCIL stated that the work on the said line was not included in the AMC as brought out by PSTCL in the meeting. Further, he stated that the work was carried out separately for PSTCL. However, PGCIL informed that there have been in no instance, deliberate delay caused by PGCIL in conducting the work.

NRPC Deliberations

B.14.3 NRPC noted the deliberations of TCC.

B.15 Establishment of State-of-the-Art Unified Centralized Network Management System (U-NMS/ Meta NMS/ OSS) for ISTS Communication Network by CTU. (Agenda by POWERGRID)

TCC Deliberations

B.15.1 MS, NRPC briefed the committee about the CERC notified Communication Regulation which envisages Centralized Supervision System for ISTS Communication. As per the regulation clause no 7.2 (vii):

"*CTU shall be the Nodal Agency for supervision of communication system in respect of inter-State communication system and will implement centralized supervision for quick fault detection and restoration*."

B.15.2 Further he informed that in line with regulation, provisions of Centralized NMS and Centralized Monitoring by integrating its NMS with other users NMS, has been kept in the documents of Technical standard & Manual of Communication Planning Criteria being finalized by CEA. In addition to this guideline on availability of Communication system for ISTS has been submitted to CERC by CEA for which centralized NMS/OSS is considered essential.

B.15.3 He briefed the members about the functions and tentative cost Rs. 600 Cr. (excluding AMC cost and Civil Works) of U-NMS as being proposed by PGCIL.

B.15.4 HP representative raised concerns about the exorbitant cost being proposed by PGCIL

for the implementation of U-NMS. He further stated that individual states already have the facility to monitor the status of OPGW and the only thing which is required was the interconnection of the whole system.

B.15.5 PGCIL informed that NMS has already been provided with all the earlier packages. But due to different ULDC phases, different NMS are operational presently. It is becoming very difficult to man them and also the communication regulations which is to be notified shortly also contains the communication availability criteria. However, at present there is no mechanism by which the communication system availability (for each and every channel) could be verified. All kinds of NMS firstly need to be brought on the same platform for which the protocol needs to be broken and it would also require big data server. Considering the involvement of these activities, the cost was a bit higher.

B.15.6 HP representative stated that during the notification of ULDC phase II, all the equipment commissioned in respect of SCADA were notified as obsolete and all were replaced with new equipment under ULDC Phase-II. Similar thing could happen under this proposal of PGCIL also.

B.15.7 MS, NRPC stated that as far as the cost is concerned, it was for the entire country and not for the Northern region alone. Also, PGCIL representative clarified that the cost was an estimated cost and will be shared by all the DICs at the national level.

B.15.8 HP stated that it was not only related to the cost of the project but also with the life of the equipment to which PGCIL representative responded by saying that if the communication equipment commissioned earlier becomes obsolete and are replaced in future, provisions will be made in the tender for its integration in the U-NMS project.

B.15.9 Punjab also expressed concerns about the life of the equipment in any project which is being planned to be implemented. HP and Punjab were of the view that before planning any new requirement, CERC should in its order itself mention about the disposal process of the already installed equipment and the process to bear the cost implications of the new regulatory requirement.

B.15.10 Punjab was of the view that the regulatory requirement needs to be deliberated by the Forum of Regulators firstly and then should be brought to NRPC/TCC. No decision shall be taken in haste. Also, he advised for exploring PSDF funding for the implementation of the project.

B.15.11 NLDC also mentioned that as being proposed by PGCIL for utilizing the space of RLDC and NLDC, NLDC may not be able to provide space as they are already facing space constraint.

B.15.12 It was decided that the agenda would be taken up in the upcoming TeST Sub-committee meeting and thereafter would be brought to TCC/NRPC.

NRPC Deliberations

B.15.13 NRPC noted the deliberations of TCC and advised for deliberating the issue in the TeST meeting before bringing to NRPC/TCC.

B.16 Augmentation of transformation capacity in Northern Region (Agenda by POWERGRID)

TCC Deliberations

B.16.1 POWERGRID representative informed that Scheme involving Augmentation of Transformation capacity at following existing ISTS substations based upon operational constraints & requirement of system was discussed:

- 1x500MVA, 400/220kV ICT (3rd) along with ICT bays 400kV Saharanpur (PG) S/s
- 1x500MVA, 400/220kV ICT (5th) along with ICT bays 765/400/220kV Bhadla (PG) S/s

B.16.2 Further it was informed that the Transformer augmentation was agreed in the 40th Northern Region Standing Committee meeting & 1st Northern Region Standing Committee on Transmission (NRSCT) held on 22/06/2018 & 11/09/2018 respectively and as per the advice of 44th NRPC held on 19/03/2019, these elements were again discussed and agreed in the 3rd NRSCT meeting held on 24/05/2019.

B.16.3 TCC agreed for the above proposal to implement the scheme under ISTS as part of NRSS-XL.

NRPC Deliberations

B.16.4 NRPC approved the proposal of POWERGRID as per the deliberations held in TCC.

B.17 2 nos. of 400kV line bays (GIS) at 400kV Chamera (PG) S/s (Agenda by POWERGRID)

TCC Deliberations

B.17.1 POWERGRID informed that scheme involves implementation of 2 nos. of 400kV line bays (GIS) at Chamera Pooling Station (GIS) for termination of Lahal (HPPTCL) – Chamera 400kV D/c line under ISTS, and to be implemented under NRSS-XLI.

B.17.2 Further, he informed that this scheme was discussed and agreed in the 40th meeting of Standing Committee of Power System Planning of NR held on 22/06/2018 and as per the advice of 44th NRPC held on 19/03/2019, this scheme was again discussed and agreed in the 3rd NRSCT meeting held on 24/05/2019

B.17.3 TCC agreed for the above proposal to implement the scheme under ISTS as NRSS-XLI.

NRPC Deliberations

B.17.4 NRPC approved the proposal of POWERGRID as per the deliberations held in TCC.

B.18 2 nos. of 220kV line bays at 400kV Samba (Jatwal) (PG) S/s (Agenda by POWERGRID)

TCC Deliberations

B.18.1 POWERGRID informed that the scheme involves implementation of 2 nos. of 220kV line bays at Samba (PG) S/s for termination of Samba (Jatwal) (PG) S/s – Samba (JKPDD) 220kV D/c line under ISTS and to be implemented under NRSS-XLII.

B.18.2 Further, it was informed that this scheme was discussed and agreed in 1st NRSCT held on 11/09/2018 and as per the advice of 44th NRPC held on 19/03/2019, this scheme was again discussed and agreed in the 3rd NRSCT meeting held on 24/05/2019.

B.18.3 TCC agreed for the above proposal to implement the scheme under ISTS as NRSS-XLII.

NRPC Deliberations

B.18.4 NRPC approved the proposal of POWERGRID as per the deliberations held in TCC.

B.19 Transmission system for Solar Energy Zones in Rajasthan (Agenda by POWERGRID)

TCC Deliberations

B.19.1 POWERGRID informed that the scheme comprises transmission system for 8.9GW Solar Energy Zones in Rajasthan as a part of Govt. of India's initiative to establish 175 GW renewable capacity by 2022. Earlier, the scheme was discussed in 1st NRSCT meeting held on 11/09/2018. Subsequently, in 2nd NRSCT, the scheme was reviewed based on present Stage-II/LTA applications (3.1 GW) in Bhadla/Fatehgarh/Bikaner complex as well as future solar potential (5.8 GW) of these complexes. After detailed deliberations in 2nd NR SCT, following system was technically agreed for evacuation of 8.9 GW Solar power from Bhadla/Phalodi (3.55 GW), Fatehgarh (3.5 GW) & Bikaner (1.85 GW) complexes in two parts viz. Part-A and Part-B:

Part A

i. Establishment of 765/400kV, 2x1500MVA pooling station at suitable location near Phalodi/ Bhadla in Jodhpur (Bhadla-II PS)**

ii. Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Khetri

iii. Augmentation of transformation capacity at Bhadla (PG) by 400/220kV, 2x500MVA (6th & 7th) transformers

iv. LILO of both circuits of Ajmer–Bikaner 765kV D/c line at Bhadla-II PS

v. Bhadla-II PS–Bhadla (PG) 400kV D/c Line (Twin HTLS)*

vi. Bikaner(PG)–Khetri S/s 765kV D/c line

vii. Khetri – Jhatikara 765kV D/c line

viii. Khetri – Sikar (PG) 400kV D/c line (Twin AL59)

ix. **Augmentation with 765/400kV, 1x1500MVA transformer (3rd) at Moga S/s**

x. Augmentation with 765/400kV, 1x1000MVA, transformer (3rd) at Bhiwani (PG) S/s

xi. Establishment of 765/400kV, 3x1500MVA pooling station at suitable location near Fatehgarh in Jaisalmer Dist. (Fatehgarh-II PS)**

xii. Fatehgarh-II PS– Bhadla -II 765kV D/c line

xiii. LILO of both circuits of Fatehgarh (TBCB) – Bhadla (PG) 765 kV D/c line (op. at 400kV) at Fatehgarh-II PS so as to establish Fatehgarh (TBCB) – Fatehgarh -II 765 kV D/c line (to be op. at 400kV) and Fatehgarh-II-Bhadla (PG) 765kV D/c line

xiv. Charging of Fatehgarh-II PS –Bhadla section at 765kV level

xv. Ajmer (PG)– Phagi 765kV D/c line

xvi. 1x125 MVAr (420kV), 2x240 MVAr (765kV) Bus Reactor each at Fatehgarh-II PS, Bhadla-II PS & Khetri Substation

xvii. 1x240 MVAR Switchable Line reactors for each circuit at Jhatikara end of Khetri – Jhatikara 765kV D/c line

xviii. 1x240 MVAr Switchable line reactor for each circuit at each end of Bikaner – Khetri 765kV D/c line

xix. 1x330 MVAr Switchable line reactor for each circuit at Bhadla-II PS end for Ajmer - Bhadla-II PS 765kV line (after LILO)

xx. 1x240 MVAr Switchable line reactor for each circuit at Bhadla-II PS end for Bikaner-Bhadla-II PS 765kV line (after LILO)

% With Charging of Fatehgarh-II –Bhadla (PG) section at 765kV level, 2 nos. of 400kV spared bays at Bhadla (PG) S/s, which could be utilized for 400kV Bhadla-II – Bhadla (PG) D/c line (Twin HTLS)

**Space provision to be kept for 220kV level

Part B

Augmentation works to be taken up in above scheme after receipt of Stage-II connectivity/LTA applications at Fatehgarh-II PS, Bhadla-II PS & Bikaner (PG) S/s in Rajasthan (400/220kV ICT shall be taken up in progressive manner commensurate to stage-II connectivity/LTA applications on above pooling stations)

i. Augmentation with 765/400kV, 1x1500MVA transformer (3rd) at Bhadla-II PS

ii. Creation of 220 kV level at Bhadla-II PS with Installation of 400/220kV, 5x500MVA transformers at Bhadla-II PS*

iii. Augmentation with 765/400kV, 1x1500MVA transformer (4th) at Fatehgarh-II PS

iv. Creation of 220 kV level at Fatehgarh-II with Installation of 400/220kV, 5x500MVA transformers at Fatehgarh-II PS

v. Creation of 220 kV level at Bikaner (PG) with Installation of 400/220kV, 2x500MVA transformers at Bikaner (PG)*

vi. 220kV line bays for interconnection of solar projects at Fatehgarh-II PS (9 nos), Bhadla-II PS (9 nos) and Bikaner (4 nos) S/s

*220kV side will be implemented with hybrid (AIS+GIS) technology

B.19.2 Further, he informed that based on the discussion in 2nd NCT & 3rd ECT, finalized future scope/ provision to be kept at new substations/pooling stations, in addition to above Part-A/B scope was also agreed as under:

1) 765/400kV Bhadla-II pooling station

- 765/400kV ICT along with bays: 2 no.
- 400/220kV ICTs along with bays: 9 nos.
- 765kV line bays: 6 nos
- 400kV line bays: 6 nos.
- 220kV line bays: 16 nos
- 400kV bus reactor along with bays: 1 no.
- 765kV bus reactor along with bays: 1 no.

2) 765/400kV Fatehgarh -II pooling station

- 765/400kV ICT along with bays: 3 nos
- 400/220kV ICTs along with bays: 10 nos.
- 765kV line bays: 4 nos
- 400kV line bays: 6 nos.
- 220kV line bays: 18 nos
- 400kV bus reactor along with bays: 1 no
- 765kV bus reactor along with bays: 1 no

3) 765/400kV Khetri pooling station

- 400/220kV ICTs along with bays: 4 nos.
- 765kV line bays: 4 nos
- 400kV line bays: 4 nos.
- 220kV line bays: 7 nos

B.19.3 The above scheme was discussed in 44th NRPC held on 19.03.2019 wherein representative of Rajasthan and Punjab raised concerns. Accordingly, the scheme was referred back to Standing Committee of NR. Subsequently, the scheme was taken up for discussion in 3rd NRSCT meeting held on 24.05.2019 (Minutes awaited).

B.19.4 POWERGRID also informed that during the NRSCT meeting, it was also discussed that space for 2 nos. of 765 bays was to be provided by RVPN for Ajmer – Phagi 765kV D/c line. RVPN informed that space is available only for 1 no. of 765kV AIS bay at Phagi. For other bay, option of GIS bay may be considered. After deliberations, it was agreed that one bay may be implemented as AIS and for second bay, complete dia may be implemented as GIS. 1x240 MVAr Bus reactor at Phagi may be installed in second GIS bay. It was also discussed that the scheme has already been technically agreed in 2nd NRSCT meeting held on 13.11.2018. Standing Committee reiterated that the scheme has already been technically agreed and recommended that the scheme may be taken in next NRPC meeting for approval.

B.19.5 In the meeting it was informed that during the 3rd NRSCT meeting, PSTCL had raised certain observations regarding high short circuit level and high loading in the Punjab System due to addition of Bikaner – Moga 765kV D/c line, which is nearing completion. To study and resolve the issue a separate joint study meeting among PSTCL, CTU & CEA was held on 03/04.06.2019 at PSTCL (**MoM enclosed at Annexure-B.1**).

B.19.6 PSTCL representative in the meeting stated that splitting of the Bus bar at Moga has to be linked with the commissioning of Bikaner –Moga line to the extent possible. In case Bikaner-Moga line is commissioned earlier, the quantum of injection into the 400kV system through the 765/400 kV ICTs during the intermediate period shall be restricted to 2000 MW, as per preliminary studies.

Further, it was categorically stated by PSTCL that in **no case PSTCL will resort to any load shedding** and advised POWERGRID not to charge the line before finalizing the operational measures that need to be taken during the intermediate period so as to avoid overloading of Punjab system.

B.19.7 Based on the outcome of the meeting held on 03/04.06.2019, it was informed that with the proposed Moga bus split arrangement 3rd 1x1500 MVA. 765/400 kV transformer may not be required as part of the present scheme of Transmission system of Rajasthan Solar Energy Zone (8.9 GW).

B.19.8 Rajasthan stated that a lot of RE generators are coming in their state and meeting the RPO obligations of other states, it was leading to degradation of quality of power and other related issues in their state. Same concerns were stated in the NRSCT meeting which were not recorded citing the Technical mandate of the said committee. He expressed concern that this integration of renewable power in such a huge quantum may lead to an increase in the PoC charges and losses to be paid by Rajasthan.

B.19.9 He further stated that Rajasthan is of the opinion that there should be a separate corridor for evacuation of renewable power which is not being used by Rajasthan and it should not be connected with their system. PSPCL suggested that the capital cost for creating green corridor should be borne by the central government or through PSDF so that the burden of the same do not fall on the consumer.

B.19.10 TCC approved the scheme as presented by PGCIL except the augmentation with 765/400kV, 1x1500MVA transformer (3rd) at Moga S/s mentioned at ix in Part-A.

B.19.11 TCC noted the concerns as expressed by PSTCL & Rajasthan and advised PSTCL, POSOCO and CTU to finalise the operational measures in a separate meeting before the commissioning of the Bikaner-Moga line.

NRPC Deliberations

B.19.12 NRPC approved the proposal of POWERGRID as per the deliberations held in TCC meeting.

B.20 Provision of 125 MVAr bus reactors each at Jalandhar & Patiala (Agenda by POWERGRID)

TCC Deliberations

B.20.1 POWERGRID informed that 125 MVAr bus reactors, each at Jalandhar & Patiala were agreed under provision of bus reactors at various substations in the 39th meeting of SCPSPNR. During the meeting, it was also agreed that the identified bus reactors may be provided by the owner of the substation subject to the availability of space. Subsequently, in the 2nd meeting of Northern Region Standing Committee on Transmission (NRSCT) held on 13.11.2018, 125 MVAR bus reactors each at Jalandhar & Patiala were agreed to be installed by providing GIB interconnections along with GIS switchgear instead of AIS switchgear in view of the space constraints at Patiala and Jalandhar substations of POWERGRID.

B.20.2 Further, it was informed that the matter was taken up in the 44th meeting of NRPC held on 19.03.2019. During the meeting, NRPC in-principle approved 125 MVAr bus reactors subject to final approval regarding AIS or GIS reactor bay and their location from standing committee considering space constraint.

B.20.3 POWERGRID briefed about the discussion held in 3rd NRSCT meeting wherein it was decided that reactors may be installed with AIS switchgear at Jalandhar & Patiala after re-engineering & certain modifications including extension of substation by using double breaker switching scheme at Jalandhar S/S.

B.20.4 TCC agreed for the above proposal to implement 400kV, 125 MVAR bus reactors each at Jalandhar & Patiala S/S with AIS switchgear under ISTS as part of NRSS-XL.

NRPC Deliberations

B.20.5 NRPC approved the proposal of POWERGRID as recommended by TCC.

B.21 400/220kV ICT augmentation at Bhadla-II, Fatehgarh-II and Bikaner S/s (Agenda by POWERGRID)

TCC Deliberations

B.21.1 POWERGRID stated that the agenda is a part of the scheme "**Transmission scheme for Solar Energy Zones in Rajasthan**" mentioned at B.19. The augmentation works under the scheme (Part B) have been agreed to be taken up after receipt of Stage-II Connectivity/LTA applications at Fatehgarh-II PS, Bhadla-II PS & Bikaner (PG) S/s in Rajasthan (400/220kV ICT shall be taken up in progressive manner commensurate to Stage-II Connectivity/LTA applications on above pooling stations). The matter regarding Connectivity/LTA at Fatehgarh-II PS, Bhadla-II PS & Bikaner (PG) S/s was discussed in 20th & 22nd Connectivity/LTA meeting of NR constituents held on 26.02.2019 & 25.04.2019 respectively wherein LTA and Connectivity was agreed/in-principle agreed for grant at Fatehgarh-II PS Bhadla-II PS & Bikaner (PG) with following details:

Sr. No.	Substation	Stage-II Connectivity (MW)	LTA (MW)
1	Fatehgarh-II PS	1790	600

2	Bhadla-II PS	300	-
3	Bikaner	600	-

B.21.2 Accordingly, it was informed that the following scope of works is proposed to be taken up at Fatehgarh-II, Bhadla-II & Bikaner (PG):

- Creation of 220 kV level at Bhadla-II PS with Installation of 400/220kV, 1x500MVA transformes at Bhadla-II PS
- Creation of 220 kV level at Fatehgarh-II with Installation of 400/220kV, 2x500MVA transformers at Fatehgarh-II PS
- Creation of 220 kV level at Bikaner (PG) with Installation of 400/220kV, 1x500MVA transformer at Bikaner (PG)
- 220kV line bays for interconnection of solar projects at Fatehgarh-II PS (7 nos), Bhadla-II PS (1 nos) and Bikaner (2 nos) S/s

It was informed that the above scope of works was also discussed and agreed in 3rd NR SCT.

B.21.3 Further, it was informed that applications are being received from various applicants in a progressive manner and based on the applications received at Fatehgarh-II, Bhadla-II & Bikaner substations, the scope of works mentioned under Part-B of the Transmission System for Solar Energy Zones in Rajasthan (8.9 GW) would need to be taken up in a progressive manner.

B.21.4 TCC agreed for the above proposal to implement the scheme under ISTS as part of Transmission System for Solar Energy Zones in Rajasthan.

NRPC Deliberations

B.21.5 NRPC approved the proposal of POWERGRID as per the deliberations held in TCC.

B.22 Provision of spare ICT and Reactors in already agreed transmission scheme "Transmission system for Solar Energy Zones in Rajasthan". (Agenda by POWERGRID)

TCC Deliberations

B.22.1 POWERGRID informed that this agenda is a part of the scheme "Transmission scheme for Solar Energy Zones in Rajasthan" mentioned at B.19. Provision of spares was inadvertently missed out during the approval of above scheme. Accordingly, it is proposed to provide following spare ICTs and Reactors in the respective schemes:

Approved in the 3rd ECT meeting held on 21.12.2018	**Corresponding Spare ICT / Reactors units to be additionally included**
Establishment of 2x1500MVA, 765/400kV, Bhadla-II PS with 765kV (2x240MVAR) & 400kV (1x125 MVAR) bus reactor	• 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit) • 1x80 MVAR, 765kV , 1-ph Reactor (spare unit) *(for both 1x240MVAr bus reactor and 2x240MVAr line reactor on Bikaner – Bhadla-II 765kV D/c line (after LILO))*

Approved in the 3rd ECT meeting held on 21.12.2018	**Corresponding Spare ICT / Reactors units to be additionally included**
Establishment of 3x1500MVA, 765/400kV, Fatehgarh-II PS with 765kV (2x240MVAR) & 400kV (1x125 MVAR) bus reactor	• 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit) • 1x80 MVAR, 765 kV , 1-ph Reactor (spare unit)
Establishment of 2x1500MVA, 765/400kV, Khetri PS with 765kV (2x240MVAR) & 400kV (1x125 MVAR) bus reactor	• 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit) • 1x80 MVAR, 765 kV , 1-ph Reactor (spare unit) *(for both 1x240MVAr bus reactor and 2x240MVAr line reactor on Bikaner – Khetri 765kV D/c line at Khetri end)*

Approved in the 3rd ECT meeting held on 21.12.2018	**Corresponding Spare ICT / Reactors units to be additionally included**
330MVAr switchable line reactors at Bhadla-II end for each circuit of Ajmer–Bhadla-II 765kV D/c line (after LILO at Bhadla-II)	• 1x110 MVAR, 765kV, 1-ph Reactor (spare unit)
240MVAr switchable line reactors at Jhatikara end for each circuit of Khetri–Jhatikara 765kV D/c line	• 1x80 MVAR, 765 kV, 1-ph Reactor (spare unit)
240MVAr switchable line reactors at Bikaner end for each circuit of Khetri–Bikaner 765kV D/c line	• 1x80 MVAR, 765 kV, 1-ph Reactor (spare unit)

B.22.2 POWERGRID informed that the above spare ICTs/ Reactors have been discussed and agreed in 3rd NR SCT.

B.22.3 TCC agreed for the above proposal to implement spare ICTs and Reactors under ISTS as part of Transmission System for Solar Energy Zones in Rajasthan.

NRPC Deliberations

B.22.4 NRPC approved the proposal of POWERGRID as per the deliberations held in TCC.

B.23 Monsoon Preparedness:

TCC Deliberations

B.23.1 NRLDC representative informed that Northern region usually meets its maximum demand and energy consumption (As per SCADA data, last year maximum demand met was 61653MW & energy consumption was 1420 MUs on 10th Jul'18) during Jul-Sept i.e. in Monsoon season. As on date, NR maximum demand during this summer has already touched ~ 61.9 GW on 4th Jun 2019. The demand is anticipated to further increase in coming month. During Monsoon period the demand expected to be high throughout the time, hydro generation is also high during this scenario. Sudden thunderstorm, rainfall, large hydro outage out on silt causes load-generation mismatch leading to variations in voltage, frequency, MW loading, poses day to day challenges for grid operation. Though all the above are known phenomena, practices to be followed to combat such situation has been deliberated and agreed in TCC meeting.

(i) Weather Monitoring and Load Forecasting: Following points were discussed

(a) Dedicated weather monitoring website by IMD-POSOCO for SLDC/ RLDCs**:**

- IMD-POSOCO has jointly developed a dedicated weather portal especially designed for RLDC/SLDCs operators.
- NRLDC representative stated that radar image at various locations helped in anticipating & tracking likely thunder storm/weather warning due to cyclone Fani and probable action afterwards.
- All the SLDCs/State agencies have been requested to continuously monitor these dedicated websites for operational planning and demand forecast.

(b) Temperature & Humidity transducer at various locations in NR**:**

- NRLDC representative has shown the current status of location wise telemetry status of temperature & humidity transducer of NR.
- NRLDC representative further requested POWERGRID and state utilities to correct the telemetry of these transducer.
- He further informed that weather related information is very helpful for system operation and data telemetry needs to be improved. Punjab has recently installed temperature & humidity transducer at four new sub-stations. Similarly, other utilities can also plan for installation of new transducer at its sub-station.
- POWERGRID informed that S-900 RTU will be replaced soon and these temperature & humidity transducers would also be implemented along with new RTU.
- *Members agreed for installation of new temperature & humidity transducer in its control area.*

(c) Load forecasting by SLDCs on daily basis and mapping in SCADA**:**

- In line with CERC direction and various decision in OCC/TCC meetings, load forecasting on daily basis has been started by states/SLDCs of NR. State load forecasting details has been received on regular basis through FTP except from

Himachal Pradesh and Uttrakhand. Himachal Pradesh is not sending the details on weekends and Uttrakhand is not regular in submitting the details.

- NRLDC representative requested all the state utilities to incorporate load forecast details in its SCADA so that same could be accessed automatically through NR SCADA.
- NRLDC representative also showed pattern of forecast error for the period of 21st Apr-10th May 2019. Most of the utilities have average forecast error more than 8% which should be come under 2%.

(ii) Load generation Portfolio management: NRLDC representative stressed upon maintaining the load generation portfolio for secure and reliable grid operation during peak demand period of Northern Region. Some of the measures were discussed during the meeting:

(a) Maintenance of Reserve**:** NRLDC representative thrust upon maintaining the reserve equivalent to largest generating unit in state control area to meet any exigency.

Need for Maintaining adequate reserves:

- Sudden outage of hydro station on silt
- Sudden outage of wind generation
- Any big generation/transmission contingency

The following actions were suggested:

- Proper forecasting of load and planning for load management
- Increasing/Decreasing the internal generation within state control area
- Making power purchases from the market through bilateral/ Power Exchange
- Re-starting of units under reserve shutdown at state as well as Inter-state level / keeping hot reserves

Members agreed to look into the employment of above measures.

(b) Maximize internal generation**:** NRLDC representative informed that most of the Northern Region states would met their maximum demand in upcoming months. He also suggested to all the state utilities to maximize the internal generation both at 400 & 220 kV voltage level for secure and reliable grid operation.

(c) Load Crash**:** NRLDC representative informed that load crash during thunder storm/ heavy rainfall is the likely phenomena and discussed in details in last TCC meeting. He further informed that demand reduction due to rainfall is sustain for larger duration compare to reduction due to dust storm. All the constituents may consider this factor and plan accordingly

NRLDC representative once again suggested all the concerned utilities to monitor the weather portal continuously and take prior measures.

Load Staggering**:** Frequency excursions at hourly boundary at the time of sudden load changes especially by Haryana and Rajasthan were presented. NRLDC representative further stated that high frequency may result in high voltage which has led to overvoltage tripping in past also.

On the other hand, it has been observed recently that low frequency led to the tripping of ICTs on over flux. NRLDC representative once again requested all the concerned utilities to kindly stagger the load for smooth grid operation.

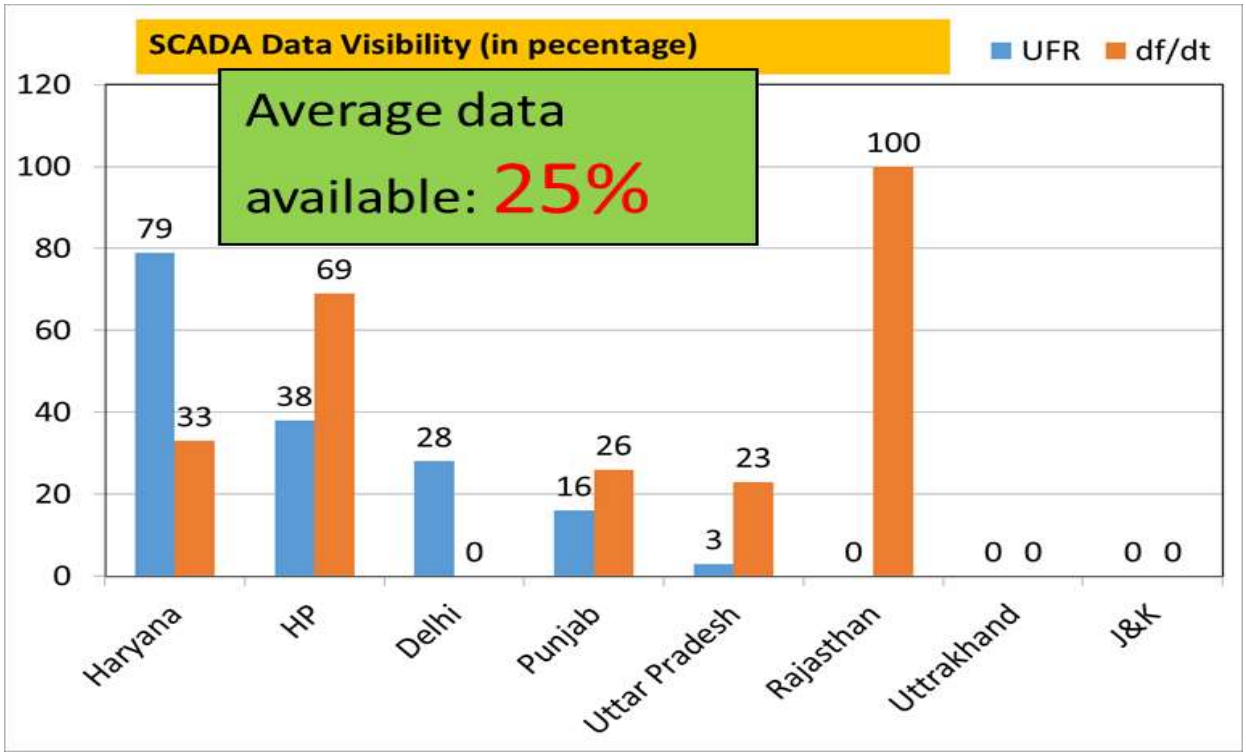
(iii) Better Forecasting of Silt and planned action for hydro outages: NRLDC representative stressed upon forecasting of silt in view of upcoming monsoon season. In case of outage of hydro generation on high silt, prior information should be communicated to NRLDC and hydro generation outage should be gradual with ramp and unit closing in staggered manner. This point was also discussed in 41st TCC/ 44th NRPC meeting, HEP (Hydro Electric Project) of NR shall follow the agreed action.

(iv) Ensuring defense mechanism: NRLDC representative suggested to ensure the healthiness of defense schemes like UFR, df/dt, SPS, islanding schemes etc.

NRLDC representative informed that new SPS scheme (Agra-Gwalior SPS, Dhauliganga SPS, Tehri-Koteshwar pool SPS and Unnao SPS) yet to be mapped despite of decision in OCC/TCC meeting. Further the following were once again suggested as approved earlier:

- Mapping of SPS signal in SCADA, SPS feeders CB status, analog data in SCADA or Station Event log.
- Periodic mock testing of SPS schemes (at least once in half year) and certification of healthiness by utility.
- Timely updating the scheme in case of any network or schematic changes.

He also informed about the current status of UFR, df/dt mapping in control room SCADA. Available data telemetry of the feeders mapped in UFR and df/dt is ~**25%** of the total feeders mapped under UFR and df/dt. State wise mapping of UFR and df/dt in control room is presented below:



Further the following were suggested:

- All the UFR and df/dt relays needs to be mapped and centrally monitored in respective state load despatch centres.
- SCADA data of alternate feeders (data telemetry available) to be mapped in case of data telemetry of main feeders is not available. All the utilities shall expedite the telemetry/mapping of all the feeders.
- SCADA data (Analog and Digital) availability of feeders (main/ alternate) comes under UFR and df/dt needs to be improved.
- Periodic mock testing of SPS schemes (at least once in half year) and certification of healthiness by utility.
- Timely updating the scheme in case of any network or schematic changes.

Members agreed for the same.

(v) Reactive Power Management: NRLDC representative stated that in last two three years, it has been observed that voltage profile during NR peak demand period has been improved. Low voltages have been experienced at some locations. Following actions were once again suggested in view of peak demand period (July-Sep) of NR:

i. Switching ON Capacitor/Switching OFF reactor as per system requirement
ii. Tap Optimization at 400/220kV by NRLDC and 220/132kV by respective state control area based on scatter plots of ICTs, offline studies, NRPC RE account etc.
iii. Dynamic reactive support from Generator as per their capability curve.
iv. Synchronous condenser operation [in case water can be stored]
v. SCADA Displays for better visualization

Members assured to look into the employment of above measures.

(vi) Telemetry: NRLDC represented stated that Real time data is of utmost importance for monitoring & supervision purpose and therefore, it is very essential to ensure the data availability at control centers for smooth Grid operation. NRLDC representative stressed upon availability of Telemetry for smooth operation of grid. He raised concern for poor data telemetry (still less than 75%) despite of continuous follow up in various OCC/ TCC meeting. Following were the facts presented during the meeting:

- Total data telemetry available for NR is less than 75%
- Data availability of Punjab, Uttrakhand, NJPC, THDC and IPP/JV/ Patran was less than 50%
- Reliability of data from newly integrated sub-stations is still very poor.
- Though the telemetry integration is ensured before charging the new element, the reliability of telemetry is not at all ensured.
- Reliability of telemetry for some of the stations is poor since its integration.

Members assured affirmative actions for improvement in the data telemetry**.**

(vii) Important documents i.e. updated power maps, operating procedure, telephone directory, etc. shall be maintained at control room. NRLDC representative requested all the state utilities to prepare the document in line with NRLDC so that updated information will

always be available with SLDCs. As approved in 159th OCC meeting, NRLDC representative once again suggested to Renewable rich states (Rajasthan, Punjab, Haryana and Uttar Pradesh) to kindly prepare separate power maps for RE generations and its connectivity at 33 kV voltage level and above.

B.23.2 **Members assured affirmative actions for the Monsoon preparedness in line with discussed points. Consolidated information of important decisions is given below:**

- *States agreed to reduce the actual and forecast error through improved forecasting.*
- *Member agreed to install new temperature & humidity transducers in its control area.*
- *Mapping of SPS signal in SCADA, SPS feeders CB status, analog data in SCADA or Station Event log for newly commissioned SPS scheme. (**Time frame**: before 30th Sep 2019)*
- *Mapping of Mundra-Mahendergarh SPS signal is available at Mahendergarh end control centre. Adani shall provide the details to NRLDC control centre. (**Time frame**: before 31st July 2019)*
- *State utilities shall check the SCADA Mapping of UFR and df/dt display in view of complete data, % of data available and mapping of alternate feeders till the time of non-availability of data. (**Time frame**: before 30th Sep 2019)*
- *No shutdown/ charging code shall be issued by NRLDC for ISTS lines in case of non-availability of data telemetry of that particular element. SLDC may also follow the same practice for improvement of data telemetry in its control area.*
- *Renewable rich states like Rajasthan, Punjab, Haryana and Uttar Pradesh etc. shall prepare separate power maps for RE generations and its connectivity at 33 kV voltage level and above.*

NRPC Deliberations

B.23.3 NRPC noted the deliberations of TCC.

B.24 Synchronous condenser operation for Voltage regulation & System Stability

TCC Deliberations

B.24.1 NRLDC representative stated that high/low voltage is being experienced in NR grid despite of continuous effort by system operators. He further stated that synchronous condenser operation is very helpful in view of MVAR support (both absorption and generation) & System Inertia.

B.24.2 NRLDC representative asked about the current status of action on remedial measures in Larji HEP (hydroelectric plant), RSD and other HEP (hydroelectric plant).

B.24.3 HPPTCL representative informed that issue has been taken up with generators and will ensure the proper functioning of synchronous condenser operation.

B.24.4 Punjab representative confirmed that tender has been issued to BHEL for modification in RSD plant to use it in synchronous condenser operation.

B.24.5 Rajasthan representative informed that hydroelectric plants of RRVUNL are very old and synchronous condenser operation is not possible.

B.24.6 Uttrakhand representative informed that synchronous condenser operation is not possible in Shravanti Gas station.

B.24.7 NHPC representative confirmed that synchronous condenser operation is possible only in Chamera-II HEP, other NHPC plants have design limitations. He further informed

that if machines have provision to spin in the air after depleting the water level in draft tubes, it can run in synchronous condenser operation otherwise not.

B.24.8 TCC suggested that if any hydro generator is showing inability for synchronous condenser operation than its written submission will suffice, a separate certificate from OEM needs not to be submitted to NRPC/ NRLDC.

B.24.9 NRLDC representative requested to all the concerned utilities to explore the possibilities in HEP & Gas units to run in synchronous condenser operation.

B.24.10 Members agreed to explore the possibility of synchronous condenser operation in other HEP (hydroelectric plant) & gas units. Members were also requested to explore the possibility of converting retired/retiring thermal generators to be used as a synchronous condenser operation. All the utilities agreed to explore the possibility to encourage more units in synchronous condenser operation for voltage regulation and system stability.

NRPC Deliberations

B.24.11 NRPC noted the deliberations of TCC.

B.25 Reliability Issues:

TCC Deliberations

B.25.1 NRLDC representative informed that Punjab, Delhi and UP has calculated its TTC/ ATC in co-ordination with NRLDC. As per data available at NRLDC, TTC/ATC of NR states along with constraint for peak demand met period is tabulated below:

- Delhi:
  - TTC- 6800MW & ATC: 6500MW
  - N-1 non-compliance at 400/220kV Mundka and Harsh vihar ICTs (inter –connecting transformer)
  - Revival of 400kV Bamnauli-Tughlakabad D/C lines on normal towers which are in service through ERS may be expedited.
  - Delhi was requested to expedite the commissioning of 400 kV Gopalpur sub-station and associated transmission system
- Uttar Pradesh:
  - TTC- 12700MW & ATC: 12100MW
  - N-1 non compliances at 400/220kV Agra(PG) and 400/132kV Mau ICTs
- Punjab:
  - TTC- 6800MW & ATC: 6200MW
  - N-1 non-compliance are at 400/220kV Amritsar, Rajpura, Mukatsar etc.
  - 220kV Voltages at Sahnewal, Ghulal, Kohara, Gaunsgarh and underlying 220kv network at Amritsar, Ludhiana

Delhi and Uttar Pradesh representative gave consent during the meeting.

B.25.2 Haryana and Rajasthan are exchanging the base case with NRLDC, TTC computation report is still awaited from these SLDCs. All the other states i.e. Uttarakhand,

Himachal Pradesh, Jammu & Kashmir & Chandigarh are yet to start the TTC/ATC study.

B.25.3 Punjab representative raised concern about reduction in its TTC/ ATC compared to last year. He further informed that non-compliance at Rajpura and Mukatsar ICT will be relieved after commissioning of one more ICT each at Rajpura & Mukatsar before next paddy season. He requested NRPC to send the instruction to CTU for expedite the commissioning of one more ICT at Amritsar (PG). He further stated that for this year, certificate will be provided to RLDC for automatic actions from SLDC in case of N-1 non-compliance however during calculation of TTC/ ATC for Punjab state, these criteria may be relaxed in view of high demand period of Punjab.

B.25.4 POWERGRID representative informed about space constraint at Amritsar (PG).

B.25.5 NRLDC representative also supported that installation of one more ICT each at Amritsar, Rajpura and Mukatsar will relieve the current constraints in Punjab. NRLDC representative further stated that as per CERC regulation on Measures to relieve congestion in real time operation, "TTC means the amount of electric power that can be transferred reliably over the inter-control area transmission system under a given set of operating conditions considering the effect of occurrence of the worst credible contingency." He also stated that all the utilities shall abide these regulations in calculating the ATC/ TTC.

B.25.6 **Action Points decided during the meeting:**

- Regarding reduction in TTC of Punjab from last year, NRLDC representative informed that last year Punjab internal generation was ~5600 MW in view lower generation in Talwandi Sabo due to coal shortage. However, this year internal generation considered to be 6035MW, hence Punjab ATC has been reduced from 6400 MW to 6200 MW. On request of Punjab, NRLDC agreed to carry out joint study again on 12.6.19.
- A joint visit of Punjab, POWERGRID & CTU representative shall be planned to look into the space constraint.
- Delhi representative agreed to put SPS till the time of commissioning of new ICT at Mundka station.
- Delhi was requested to expedite the commissioning of 400 kV Gopalpur sub-station and associated transmission system.

NRPC Deliberations

B.25.7 NRPC noted the deliberations of TCC.

B.26 Mock Testing of SPS for 765 kV Agra-Gwalior D/C:

TCC & NRPC Deliberations

B.26.1 The point has already been discussed under Agenda B.1

B.27 Grid Events in NR during Feb-Apr'19 periods:

TCC Deliberations

B.27.1 A total 70 number of CEA standard based Grid Events have been occurred in Northern Region in Feb'19 to Apr'19 periods.

B.27.2 NRLDC raised concern regarding poor reporting (less than 40% in view of detailed

report) of grid events despite of continuous agenda in OCC/ TCC agenda.

B.27.3 Constituents were requested to discuss plans for reducing such tripping events and for quality analysis and implementation of remedial measures.

B.27.4 Members agreed to carry out the detailed analysis and share the remedial measures report to NRPC/ NRLDC within stipulated time frame.

NRPC Deliberations

B.27.5 NRPC noted the deliberations of TCC.

B.28 FRC of NR control area from Feb-Apr'19:

TCC Deliberations

B.28.1 NRLDC representative stated that **six** FRC based events occurred during Feb-Apr'19. The following was summarized from the response of Central, State generators and State control area response presented:

- Among the State control area, Punjab, Rajasthan have showed improvement in the FRC. The reason for above could be observed as the improvement in FRC of state control area.
- Among the central generators, Jhajjar TPS, Dulhasti HEP, Karcham HEP, Jhakri HEP, Dadri stg-2 TPS, Rihand stg-1, 2 TPS and Singrauli TPS have good FRC of more than 50% of ideal response. The response of almost all other stations is less than 40% of ideal response.
- Among the state control area generators, Punjab and Rajasthan generators showed good response.

B.28.2 The central generating entities were requested to improve the FRC. SLDCs were also requested to impress upon the state generators for delivering adequate primary response.

B.28.3 Members agreed to look into the remedial measures for further improvement.

NRPC Deliberations

B.28.4 NRPC noted the deliberations of TCC.

B.29 Loss of Solar Generation in Rajasthan due to LVRT issue in solar generators:

TCC Deliberations

B.29.1 NRLDC representative informed that there was Solar generation outage both in Rajasthan system and also in Inter-State Solar generation during outage of Bhadla-Bikaner line on R-Y phase to phase fault. The fault was cleared within 100msec.

B.29.2 Rajasthan representative stated that LVRT non-compliant intra state solar generators have been identified and details will be shared with NRPC/ NRLDC.

B.29.3 TCC advised that Notice may be issued to non-complaint solar generators by Rajasthan SLDC (for intra-state solar generators) and NRLDC (for ISTS connected solar generators).

NRPC Deliberations

B.29.4 NRPC noted the deliberations of TCC.

B.30 Switchgear issue of 400 kV Mahendergarh-Dhanonda double ckts:.

TCC Deliberations

B.30.1 NRLDC representative briefed the house about the issue and informed that this issue was already discussed in 159th OCC meeting and separate meeting on 24th may 2019, however decision of the meeting yet to be implemented by HVPNL.

B.30.2 TCC agreed for proposal of bypassing the 400 kV Dhanonda station and implement it before 09th June 2019 and suggested HVPNL & Adani to expedite the isolator replacement process respectively at Dhanonda & Mahendergarh station. Haryana representative also agreed to implement the bypass arrangement before 09th June 2019.

B.30.3 NRLDC has already raised concern about non-utilization of line capacity due to lower rating of isolators and station end equipments at various locations. It was also mentioned in quarterly operational feedback of NRLDC and also discussed in various OCC meetings but measures are yet to be done at utilities end.

B.30.4 **General Advisory:** Since lines are having quad moose conductor but due to isolator/ end equipment rating of lower capacity (2 kA), its line capacity is not being fully utilized therefore the isolator/station end equipment should be upgraded in line with conductor configuration/ rating. All the utilities shall take actions accordingly.

NRPC Deliberations

B.30.5 NRPC noted the deliberations of TCC.

B.31 Insulator replacement in Punjab control area:

TCC Deliberations

B.31.1 NRLDC representative raised concern about multiple times tripping in 400 kV Punjab ring during last winter. He further shared the experience of multiple element tripping at 400 kV Makhu on 23rd Dec 2018 and another event on 25th Dec 2018 wherein multiple element tripped at 400kV Muktsar, Dhuri, Talwandi Sabo TPS, Nakodar & Rajpura during fog conditions also leading to complete outage of Talwandi Saboo station.

B.31.2 In view of the above, NRLDC representative requested the completion of replacement of Porcelain Insulator by Polymer Insulator before onset of this winter season.

B.31.3 Punjab representative stated that they have raised the query about tripping status in the lines with polymer insulator in NR and is it required to replace in complete line or in polluted zone?

B.31.4 POWERGRID representative shared it experience of polymer insulator and stated that tripping has been drastically reduced in NR. With regard to complete replacement or partial replacement in the line, POWERGRID informed that pollution mapping has been done by CPRI few years back and they had replaced the insulator considering the feedback.

B.31.5 NRLDC representative suggested that Punjab can primarily check the locations of tripping in last two three years and replace the Conventional Insulator with Polymer Insulator on those locations and also take proactive action for identifications of other location prone to the pollutions.

B.31.6 TCC suggested Punjab to kindly expedite its action plan to avoid the fog related tripping in its control area during upcoming winter.

NRPC Deliberations

B.31.7 NRPC noted the deliberations of TCC.

B.32 Real time data telemetry from Renewable Generators:

TCC Deliberations

B.32.1 NRLDC representative stated that telemetry of Renewable generation required for real time visibility & forecasting of Renewable generation.

B.32.2 Rajasthan representative updated that telemetry of 2929 MW of Solar generation and 4246 MW of Wind Generation is available. He also informed that 2500MW wind data telemetry is not available due to payment issue between wind generators and lease line owner.

B.32.3 NRLDC representative requested to all the renewable rich states to explore the possibility to map all the data in control centre otherwise whole purpose of REMC will be defeated.

B.32.4 TCC suggested to all the renewable rich states to explore the possibility to map all the renewable related data in control centre.

NRPC Deliberations

B.32.5 NRPC noted the deliberations of TCC.

B.33 Status Telemetry of TCSC/ FSC:

TCC Deliberations

B.33.1 POWERGRID informed that due to non-availability of AI/DI card at Unnao (UP), the status could not be integrated. UPPCL was requested to procure the AI/DI card or take help from Haryana / HP and after that FSC/TCSC status can be made available. UPPTCL agreed for the same.

NRPC Deliberations

B.33.2 NRPC noted the deliberations of TCC.

B.34 Telemetry from Kurukshetra HVDC as per agreed in the separate meeting

TCC Deliberations

B.34.1 POWERGRID informed that they had taken up the matter with OeM for the same. However, OEM support is not available in this regard. POWERGRID agreed to take-up the issue once again with the OeM.

NRPC Deliberations

B.34.2 NRPC noted the deliberations of TCC.

B.35 Communication connectivity for Shifting of Terminal Server (NRLDC, SCADA) at Site

TCC Deliberations

B.35.1 NRLDC representative apprised about need for shifting of Terminal servers from NRLDC to some other sites as in case of some disaster happening at NRLDC, data will not be available at Back-up NRLDC also and will defeat the purpose of Back-up NRLDC. POWERGRID informed that the communication channels are available and shifting of Terminal Servers can be done by NRLDC.

B.35.2 It was agreed that POSOCO and POWERGRID shall mutually discuss and resolve the issue of terminal server shifting at the earliest.

NRPC Deliberations

B.35.3 NRPC noted the deliberations of TCC.

B.36 Establishment of Reliable Communication System for NRLDC / NLDC (Agenda by PGCIL)

TCC Deliberations

B.36.1 PGCIL informed that presently fibre connectivity has been established for NRLDC/NLDC through DTL transmission lines for reporting of telemetry & PMU data and connectivity of ICCP, PDC, video conferencing and VOIP/speech data. At present data is reporting through two following links:

- OPGW on 220kV Badarpur-Mehrauli line via Tughlakabad and 66kV Mehrauli-Vasant Kunj then underground OFC cable up to NRLDC and
- Maharanibagh to Lodhi Road to NRLDC via AIIMS (underground OFC).

B.36.2 Recently, OPGW flashover occured on 16.04.2019 (0030hrs) between Mehrauli-Tughlakabad link due to clearance issue after reconductoring of line. Subsequently, underground fibre was also cut on the same day (23:57 hrs) near AIIMS, resulting outage of 70 sub-station telemetry data along with complete outage in PMU data for 10-11 hours.

B.36.3 For smooth grid operation and 100% data availability at NRLDC and NLDC, following new OPGW/OFC links need to be installed to ensure communication availability as per Communication Regulation'2017.

Sl. No.	Link Name	Length	OPGW	Constituent Name	Purpose
1	220kV Mehrauli – Vasant Kunj	6.4 Kms	48F OPGW	Central Sector	for NRLDC Redundancy (existing link is on 66 kV line (DISCOM line), 66kv lines being shifted to underground XLPE Cable.

2	220KV Okhla - Tughlakabad	6.8 Kms	48F OPGW	Central Sector	for Mehrauli -Badarpur link Protection for NRLDC redundancy
3	220KV Tughlakabad – R K Puram (New DTL transmission line to be constructed)	Approx. 20 Kms	48F OPGW	Central Sector	
4	220kV Bamnauli-Mehrauli via DAIL	16Kms	48F OPGW	Central Sector	for Mehrauli -Badarpur link Protection for NRLDC redundancy
5	220kV Bamnauli-Pappankala-I	8.47 Kms	48F OPGW	Central Sector	for redundancy of Dwarka area data
6	220kv Mandola - Wazirabad – Ckt- I & II	15 Kms	48F OPGW	Central Sector	for DTL SLDC redundancy
7	220kV IP Power – RPH (Rajghat)	1.8 Kms	48F OPGW	DTL	DTL requirement for redundancy
8	Underground OFC cable laying in Delhi area for NRLDC & NLDC Protection 1. Okhla to NRLDC - 13 Kms 2. Mehrauli to NRLDC - 8 Kms 3. R K Puram to NRLDC - 4 Kms	**(Approx. 25 Kms)**	48F OPGW	Central Sector	For NRLDC/NLDC Redundancy in Delhi area

B.36.4 It was informed that the scheme shall be implemented by POWERGRID under Reliable Communication Scheme on tariff route basis and investment to be recovered as per CERC notification as per earlier approval in NRPC meetings.

B.36.5 TCC recommended the proposal of PGCIL for Establishment of Reliable Communication System for NRLDC / NLDC to NRPC for its approval.

NRPC Deliberations

B.36.6 NRPC noted the deliberations of TCC and approved the proposal of PGCIL for Establishment of Reliable Communication System for NRLDC / NLDC.

C. COMMERCIAL ISSUES

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 this meeting.

C.1.2 THDC intimated that BYPL had total outstanding of Rs. 274 crore out of which Rs. 147 crore was LPS. However, it is only making payment of Rs. 2 crore/month.

C.1.3 THDC informed that even though UP had assured that it would be making a monthly payment of Rs 175 crore per month to clear its outstanding dues, it only received that amount in the month of March 2019 and payment from UP reduced after that.

C.1.4 UPPCL informed that they had paid Rs. 175 crore in the month of March, but could only pay 75 crore during April and May since revenue collection during these months is low and they did not get dues from UP Government.

C.1.5 SJVNL informed that GoHP and UPPCL had huge LPS outstanding and urged them to clear the same.

C.1.6 NHPC pointed out that LPS reconciliation was not being done by UPPCL.

C.1.7 POWERGRID appreciated the efforts by representative of UP in clearing their dues and urged him to make timely payment in the future.

C.1.8 PDD, J&K was not present in the meeting.

C.1.9 TCC requested the above defaulting entities to clear their outstanding dues at the earliest.

NRPC Deliberations

C.1.10 NRPC expressed concern over non-payment of dues by defaulting entities and advised all members to clear the dues in a timely manner.

C.2 Opening of Letter of Credit (LC)

TCC Deliberations

C.2.1 SJVNL, THDCIL, POWERGRID and NHPC presented the list of beneficiaries that are yet to submit the requisite Letter of Credit for the FY 2019-20. The details of the same were enclosed in the Agenda note of this meeting.

C.2.2 MS, NRPC requested the utilities to open LC on priority basis as per provisions in the PPA/CERC regulations.

NRPC Deliberations

C.2.3 NRPC advised all constituents to open the LC as per provisions in their PPA and CERC regulations.

C.3 Non-payment of LPS by the beneficiaries

TCC Deliberations

C.3.1 SJVNL stated that while releasing the amount of energy bill raised by SJVN Limited, the amount of late payment surcharge is being excluded by the beneficiaries. Uttar Pradesh, Government of Himachal Pradesh and Jammu and Kashmir have huge outstanding LPS.

C.3.2 He further stated that the 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.3.3 TCC advised the concerned utilities to make payment of energy bill including the amount of LPS while making the payments in future.

NRPC Deliberations

C.3.4 NRPC concurred the views of TCC.

C.4 Recent CERC Orders/draft Regulations

C.4.1 **Central Electricity Regulatory Commission (Deviation Settlement Mechanism and related matters) (Fifth Amendment) Regulations, 2019**

C.4.2 A presentation by was made by NRPC on CERC's DSM 5th Amendment Regulations, 2019. The salient provisions of the Regulations which are as below, were explained:

(i) The definitions of Time block DSM, Daily base DSM, UMCP for IR deviation have been included in the principal regulations

(ii) Cap rate for all Generators has been changed to 303.04 paise/unit

(iii) Frequency above which Additional charge would be levied for OI/UD has been increased from 50.05 Hz to 50.1 Hz. A cap rate of 303.04 paise/unit would be applicable for additional deviation in this case.

(iv) Clause (10) of Regulation 7 regarding Additional Charge due to sustained deviation has been modified.

a. For the period up to 31.03.2020: If the sustained deviation from schedule continues in one direction (positive or negative) for 12 time blocks, the regional entity (buyer or seller), shall correct its position by making the sign of its deviation from schedule changed or by remaining in the range of +/- 20 MW with reference to its schedule, at least once, latest by 13th time block, such range being a subset of volume limit as specified under Regulations 7(1) & 7(2) of these Regulations. Provided that each violation of the requirement under this clause shall attract an additional charge of 10% of the time block DSM charge payable or receivable as the case may be.

b. For the period from 01.04.2020: If the sustained deviation from schedule continues in one direction (positive or negative) for 6 time blocks, the regional entity (buyer

or seller), shall correct its position, by making the sign of its deviation from schedule changed or by remaining in the range of +/- Central Electricity Regulatory Commission 20 MW with reference to its schedule, at least once, latest by 7th time block such range being a subset of volume limit as specified under Regulations 7(1) & 7(2) of these Regulations. Provided that violation of the requirement under clause (b) of this Regulation shall attract an additional charge as specified in the table below:

No. of violations in a Day	Additional Charge Payable
From first to fifth violation	For each violation, an additional charge @ 3% of daily base DSM payable / receivable
From sixth to tenth violation	For each violation, an additional charge @ 5% of daily base DSM payable / receivable
From eleventh violation onward	For each violation, an additional charge @ 10% of daily base DSM payable / receivable

(v) Exemption in sustained deviation charges has been provided in the following cases:

a. renewable energy generators which are regional entities

b. run of river projects without pondage

c. any infirm injection of power by a generating station prior to CoD of a unit during testing and commissioning activities, in accordance with the Connectivity Regulations.

d. any drawal of power by a generating station for the start-up activities of a unit

e. any inter-regional deviations.

f. forced outage of a generating station in case of collective transactions on Power Exchanges.

C.4.3 **Central Electricity Regulatory Commission (Sharing of inter-State Transmission Charges and Losses) (Sixth Amendment), Regulations, 2019**

C.4.4 SE, NRPC stated that CERC had notified Central Electricity Regulatory Commission (Sharing of inter-State Transmission Charges and Losses) (Sixth Amendment), Regulations, 2019 on 27.03.2019. The salient provision of the Regulations are:

C.4.5 No transmission charges and losses for the use of ISTS network shall be payable for the generation based on solar and wind power resources for a period of 25 years from the date of commercial operation of such generation projects if they fulfill the following conditions:

(i) Such generation capacity has been awarded through competitive bidding process in accordance with the guidelines issued by the Central Government;

(ii) Such generation capacity has been declared under commercial operation between 13.2.2018 till 31.3.2022;

(iii) Power Purchase Agreement(s) have been executed for sale of such generation capacity to all entities including Distribution Companies for compliance of their renewable purchase obligations.

C.5 Difference between Real Time SCADA data and SEM data causing huge financial burden on PSPCL- Availability of SEM data on Real Time Basis (Agenda by PSPCL)

TCC Deliberations

C.5.1 PSPCL stated that they are taking all the necessary steps to maintain Grid Discipline yet huge DSM charges are being imposed due to lack of availability of reliable and accurate real time data. He further stated that the system operator operates the system based upon the real time data whereas the actual post facto SEM data, on the basis of which DSM account is prepared, indicates huge variation from the real time SCADA data. The daily variation between Real Time and SEM data variation for the period from 01.01.2019 is attached as Annexure-XIII of the agenda of the meeting.

C.5.2 He mentioned that availability of reliable telemetry is of utmost importance to have a reliable and dependable display of SCADA data. However, the telemetry provided is quite fragile as some of the drawal points get suspected very frequently. Despite raising the issue of availability of accurate real time data at various forums, no positive result has yielded so far. The DISCOMs are paying staggering amount of DSM charges without any of their fault as the responsibility to upgrade and maintain the infrastructure of telemetry lies with CTU/RLDC/STU/State SLDC. DISCOMs are being unnecessarily penalized on account of deficiency in providing adequate services by other constituents.

C.5.3 He further added that since the issue is related with availability of accurate real time SCADA data and has not been addressed, it is therefore proposed that SEM data on real time basis may be made available by CTU from various ISTS drawal points so that DISCOMs have to bear only those DSM charges which are actually due to them as per the in force DSM Regulations.

C.5.4 ED, NRLDC stated that team effort is required by all utilities in order to minimize SCADA vs SEM mismatch which is necessary both from operational and commercial point of view.

C.5.5 SE, NRPC informed the members that CERC had advised Haryana and Punjab to share latest data of mismatch and location with NRPC and also to take up the issue in NRPC fora and if it still remain unresolved than NRPC may write to the CERC in this regard.

C.5.6 Representative of NRLDC stated that some mismatch is SEM/SCADA data would always be there since the accuracy class of SEMs and Transducers is different. Taking that into account, CERC has allowed ±20 MW dead band while calculating sustained deviation in the recent DSM 5th amendment regulations.

C.5.7 Some members expressed concern that the dead band allowed is not sufficient. NRPC stated that the same issues were highlighted in the public hearing on 5th amendment, based on which the dead band has been increased from 10 MW to 20 MW. He further suggested that utilities may again give submission in writing regarding the same for submission to CERC.

NRPC Deliberations

C.5.8 MS, NRPC informed that a meeting of CERC and Chairpersons/Member Secretaries of all RPCs is scheduled to be held on 24.06.2019.

C.5.9 The committee urged all utilities to submit their issues regarding DSM and other regulations for deliberation in that meeting.

C.6 Status of DSM Charges

TCC Deliberations

C.6.1 NRLDC apprised the status of DSM charge payable to Pool Account. It was observed that there is a significant outstanding amount since long by J&K, Punjab and POWERGRID NR.

C.6.2 Punjab informed that they had paid the DSM charges excluding Additional surcharge due to sustained violation.

C.6.3 POWERGRID informed that they had filed the petition before CERC and will pay the DSM charges based on the outcome of petition filed before CERC in this matter.

C.6.4 NRLDC informed that CERC has published the notification on DSM (5th Amendment) Regulation, dated 28.05.2019 which comes in to force with effect from 03rd June 2019. The outstanding shown is based on the prevailing regulations which are in force at this time. Since no stay order has been granted and CERC 5th amendment is applicable w.e.f. 03.06.2019, all constituents should honour the CERC Regulations and make timely payment and avoid any further interest surcharges.

C.6.5 TCC urged all members to make timely payments to avoid late payment surcharge. CERC Regulations should be followed as there is no stay order from CERC/High Court.

NRPC Deliberations

C.6.6 Members concurred with the TCC discussions.

C.7 Status of LC against Deviation Charges delayed payment

TCC Deliberations

C.7.1 Representative of NRLDC informed that except Punjab and Chandigarh, none of the defaulting constituents have opened the LC in compliance to CERC Regulations.

C.7.2 TCC urged all the entities to open the LC of the required amount in accordance with CERC Regulations.

NRPC Deliberations

C.7.3 Members concurred with the TCC discussions.

C.8 Reactive Energy charges status

TCC Deliberations

C.8.1 Representative of NRLDC apprised the current status of Reactive Energy Charges Pool Account Status. It was informed that J&K has a long outstanding for payment of Reactive Energy charges to the Pool Account.

C.8.2 TCC urged that J&K should release outstanding RE charges payments at the earliest so that, receivable parties will be paid and to avoid further increase of Delay Payment Interest.

NRPC Deliberations

C.8.3 Members concurred with the TCC discussions.

C.9 NRLDC Fee & Charges

TCC Deliberations

C.9.1 Representative of NRLDC informed that Sorang HEP and PDD J&K have outstanding amount to be paid towards NRLDC Fees and charges.

C.9.2 He stated that except UP, all other utilities have paid the Performance Linked Incentive (PLI) bill for the financial year 2017-18 (Provisional) which has been raised by NRLDC in line with the CERC (RLDC Fees and charges) Regulations, 2015. The bill was raised in accordance with proviso (6) of Regulations 29 of CERC Regulations.

C.9.3 TCC requested that UP, PDD J&K and Himachal Sorang clear all the outstanding amount towards NRLDC Fees and charges including PLI charges at the earliest

NRPC Deliberations

C.9.4 Members noted the TCC discussions.

C.10 Reconciliation of Pool Accounts (Jan-19 to March-19):

TCC Deliberations

C.10.1 Representative of NRLDC stated that reconciliation statement was not being received from utilities in a timely manner.

a) Signed Reconciliation of pool account was Signed Reconciliation of Deviation charges from 01.01.2019 to 31.03.2019 has been received from ADHPL, NTPC, and THDC only.

b) Signed Reconciliation of RRAS & AGC charges from 01.01.2019 to 31.03.2019 has been received from NTPC Only.

c) Signed Reconciliation of FRAS charges from 01.01.2019 to 31.03.2019 has not been received from any constituents.

d) Signed Reconciliation of Reactive Energy charges from 01.01.2019 to 31.03.2019 has been received from Rajasthan only.

C.10.2 NRLDC requested all constituents to reconcile the statement on regular basis for easy reconciliation and to avoid any further dispute.

C.10.3 Members agreed that if reconciled statement is not received in time, it will be

considered as deemed reconciled.

NRPC Deliberations

C.10.4 Members concurred with the TCC discussions.

C.11 Status of AGC & Ancillary Services

TCC Deliberations

C.11.1 NRLDC informed that the outstanding payments towards Ancillary Services i.e. RRAS, AGC and FRAS has been settled upto Week 05 of FY 2019-20. There is no outstanding amount for payment of RRAS, AGC or FRAS.

C.11.2 Members noted the same.

NRPC Deliberations

C.11.3 Members noted the TCC discussions.

C.12 Reconciliation of STOA (Short Term Open Access) Charges disbursement:

TCC Deliberations

C.12.1 TCC requested all SLDCs/STUs to sign and send the statement for easy reconciliation and to avoid any further dispute.

NRPC Deliberations

C.12.2 Members noted the TCC discussions.

C.13 Reconciliation of Outstanding STOA Delay Payment Interest:

TCC Deliberations

C.13.1 Representative of NRLDC gave details of outstanding STOA delay payment interest. There was no STOA delay payment interest liability by any applicant (till 30th April 2019) except Northern Railway and Greenko Budhil.

C.13.2 He informed that NRLDC has blocked the above Utilities for further applying for STOA applications, till clearance of all outstanding dues. Members noted the same.

NRPC Deliberations

C.13.3 Members noted the TCC discussions.

C.14 Status of AMR as on 25.05.2019

TCC Deliberations

C.14.1 NRLDC stated that there has been some improvement in meter data communication to NRLDC in time. Still there is a need for further improvement.

C.14.2 POWERGRID informed that around 1300 Meter data is reporting out of 1504 meters integrated with AMR. While informing the status based on location wise data availability, NRLDC stated that even if data of a single meter is not available, they have

to coordinate with the substation for the data again. Data from all locations are required for calculation of losses and preparation of weekly regional energy account.

C.14.3 Non-availability of data from some of the location is making it difficult for NRLDC to process the meter data for loss calculation and timely submission of data to NRPC for preparation/issuance of weekly energy accounts.

C.14.4 TCC urged POWERGRID to coordinate with M/s Kalkitech and ensure that meter data from all sites are regularly provided to NRLDC by Tuesday

NRPC Deliberations

C.14.5 Members concurred with the TCC discussions.

C.15 Integration of AMR System with Elster Meters

TCC Deliberations

C.15.1 Representative of NRLDC stated that the issue of integration of Elster make meters with AMR system was discussed in the 41st TCC / 44th NRPC meeting also. POWERGRID in the 41st TCC informed that due to poor response from M/s Kalkitech, they have identified other vendor for above purpose.

C.15.2 The issue was also discussed in the recent Commercial Sub-Committee Meeting of NRPC. He requested POWERGRID to update the status regarding integration of Elster make meters and progress of work by new Vendor identified by POWERGRID.

C.15.3 POWERGRID informed that they had identified a new vendor namely M/s Synergy for integration of Elster make meters with AMR. The vendor is expected to integrate the Elster make meter by 25th June 2019 and after that they will proceed for further integration of Elster make meters with AMR system.

C.15.4 TCC urged POWERGRID to expedited the integration of Elster make meter with AMR system

NRPC Deliberations

C.15.5 Members noted the TCC discussions.

C.16 AMR data through Fibre Optic Network

TCC Deliberations

C.16.1 POWERGRID was urged by the Committee to expedite the process of switching AMR data through Fibre Optic Network

C.16.2 TCC further requested all utilities to submit the information sought by POWERGRID from utilities for cost estimation of shifting of AMR data on OPGW as per the format attached with the minutes of 37th CSC meeting at the earliest. All utilities agreed to provide the data by 30.06.19. POWERGRID informed that they shall migrate data of AMR (on wideband locations) by 31.12.19, if data from all utilities are received by 30.06.19.

NRPC Deliberations

C.16.3 Members noted the TCC discussions.

C.17 Status regarding procurement of DCD:

TCC Deliberations

C.17.1 NRLDC informed that the location wise requirement of DCD and quantity of DCD to be procured was provided to POWERGRID vide NRLDC Letter dated 01.10.2018.

C.17.2 POWERGRID informed that they will procure the DCDs along with meters. At present only 75 meters are available in NR-I and there is a need for further procurement of meters.

C.17.3 NRLDC informed that they had requested POWERGRID to provide the number of procured DCDs, availability of DCDs and SEMs in POWERGRID store, to assess the SEMs/DCDs future requirement in Northern Region. However, the data is received from NR-I only on 06th June 2019. The status from NR-II and NR-III is still awaited. After receiving the complete information NRLDC shall be in a position to work out the meter requirement.

C.17.4 POWERGRID informed that the consolidated status will be sent by 20th June 2019.

NRPC Deliberations

C.17.5 Members noted the TCC discussions.

C.18 Ensuring Healthiness of Metering System:

TCC Deliberations

C.18.1 NRLDC apprised the current status of Reactive Energy Charges Pool Account Status. It was informed that J&K has a long outstanding for payment of Reactive Energy charges to the Pool Account.

C.18.2 TCC urged that J&K should release outstanding RE charges payments at the earliest so that, receivable parties will be paid and to avoid further increase of Delay Payment Interest.

C.18.3 NRLDC requested that all entities in whose premises the meter is installed should periodically carry out the following activities for ensuring healthiness of metering system:

a) Routine check-up of PT supply to meters

b) Intimation regarding faulty meters

c) Regarding delay in Meter data to NRLDC

d) Healthiness of DCD

e) Regular monitor the time drift in meters and take corrective actions

C.18.4 Members agreed that all entities will ensure healthiness of metering system in whose premises the meters are installed

NRPC Deliberations

C.18.5 Members concurred with the TCC discussions.

C.19 Time drift Correction in SEMS

TCC Deliberations

C.19.1 NRLDC informed that it is regularly uploading the discrepancy report on weekly basis indicating the time drift in meters and also replacement/rectification required in special energy meters. All constituents in whose premises the meters are installed are required to take corrective action for time correction based on the weekly discrepancy report of NRLDC.

C.19.2 He further stated that NRLDC has asked all constituents including generating stations, transmission licensee to submit the reports to NRLDC regarding actual time drift in meters and corrective action taken by them. However, it is yet to receive the compliance report from them except POWERGRID, BBMB, NTPC, NPCL, DTL, PUNJAB, UP and NHPC.

C.19.3 He requested that all these utilities shall ensure the time correction of the SEMs in their respective premises and submit the report to NRLDC. Summary for last two weeks' time drift status of SEMs was shown and observed that there is a suspected time drift in approximately 450 meters.

C.19.4 It was proposed that if time drift is less than 15 minutes then respective entity in whose premises the meters are installed should take the corrective action.

C.19.5 If the time drift is more than 15 minutes, then respective entity should provide the details to NRLDC and NRLDC shall coordinate with CTU for rectification/replacement of meters.

C.19.6 Representative of Rajasthan pointed out that POWERGRID has placed an LOA to M/s Kalkitech for time drift correction through AMR system also. However, it is observed that time drift correction through AMR has not been carried out date till date.

C.19.7 POWERGRID was requested to provide the status of time drift correction through AMR system.

NRPC Deliberations

C.19.8 Members noted and concurred with the TCC discussions.

D. ITEMS FOR NRPC

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

D.1.1 MS, NRPC proposed that keeping in view the budget estimates approved by GoI for the financial year 2019-20 and expenditure likely to be incurred towards outsourcing of

staff, conduct of various meetings, leasing of vehicle, petrol for vehicles, AMC of software, training etc through NRPC fund and balance amount available in the NRPC Fund, the per member contribution for the year 2019-20 may be retained at Rs.10.0 lakh.

D.1.2 The committee approved Rs. 10 Lakh per member as the contribution for the financial year 2019-20.

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

D.2.1 MS, NRPC informed that contribution from some members towards reimbursement of expenditure of NRPC Sectt. for previous financial years is still pending despite several reminders. Some of these contributions are pending from FY 2012-13. Even for FY 2018-19, almost half of the members have not deposited their contributions.

D.2.2 The committee requested members to expedite the contribution at the earliest.

D.3 Membership in NRPC for Rotational Members

D.3.1 MS, NRPC proposed that the following utilities may be considered for membership for the year 2019-20

D.3.2 Government of India, Ministry of Power under the provision of Section 2, Subsection 55 of the Electricity Act 2003 had established the Northern Regional Power Committee in place of erstwhile Northern Regional Electricity Board vide its resolution dated 25.05.2005

State Owned DISCOMs

Haryana: Dakshin Haryana Bijli Vitaran Nigam Ltd.

Rajasthan: Ajmer Vidyut Vitran Nigam Ltd.

Uttar Pradesh: Paschimanchal Vidyut Vitaran Nigam Ltd.

Private DISCOM

BSES Rajdhani Power Ltd

Generating companies (installed capacity < 1000MW)

Bajaj Energy Pvt. Ltd

Energy Trader

Kreate Energy (I) Pvt. Ltd.

D.3.3 He also informed that during FY 2018-19, by rotation Uttar Haryana Bijli Vitaran Nigam Ltd. was supposed to be the Discom member from Haryana. Letter regarding the same was also sent to UHBVNL. However, the name of Dakshin Haryana Bijli Vitaran Nigam Ltd. (DHBVNL) was erroneously mentioned as the Discom member from Haryana for FY 2018-19 in the agenda and minutes of 39th TCC/42nd NRPC held

on 27.06.2018. Hence, the same may be modified to UHBVNL in the said minutes.

D.3.4 Members noted and concurred with the proposal of MS, NRPC.

D.4 Capacity Building Programme for Northern Regional Constituents (proposed to be funded through PSDF)

D.4.1 MS, NRPC informed that a capacity building programme is proposed to be carried out for Northern Region Constituents through PSDF funding wherein it is proposed to study the power exchange of Nordic countries to assist the development of a commercially viable and vibrant power market in India. Nordic countries are running one of the most successful power exchanges in the world.

D.4.2 This program 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) and Northern Regional Power Committee (NRPC) Secretariat. Participation from Central Electricity Authority (CEA) and Ministry of Power, is also envisaged.

D.4.3 The following would be covered in this capacity building programme at NORD POOL Academy:

- To understand the factors that contributed to the success of the power market liberalization in the Nordic region.
- Capacity building programme to handle trading of short-term surplus power on the Power exchange
- Price discovery in NORD pool.
- Determination of transmission tariff and sharing of transmission charges and losses.
- Financial settlement of power trades, imbalances.
- Organization of forwards, futures and options market in power, their operation procedures, hedging etc.
- Retail supply market, Market clearing and settlement, Market surveillance, Imbalance settlement
- Roles and responsibilities of various stakeholders, Reporting and information sharing, Optimum power reserve estimation, Real time system operation and management
- Efficient maintenance practices of transmission grids
- Better Understanding of the regulatory and policy framework of the power market in European countries.
- Learning the best industry practices in Nordic power market

D.4.4 Members appreciated the proposal made by MS, NRPC and authorized Member

Secretary, NRPC to prepare the DPR, attend PSDF meetings on behalf of NRPC and do needful for getting PSDF grant for above projects.

D.5 HOSTING OF NEXT MEETINGS OF NRPC / TCC

D.5.1 MS, NRPC informed that as per agreed roster for hosting of meetings, the next meetings of TCC (43rd) & NRPC (46th) is to be hosted by Rajasthan which would become due in October 2019.

D.5.2 Chairperson, NRPC stated that Rajasthan would prefer to host the meeting in the month of December 2019 /January 2020. If needed, some other utility may host the meeting before that.

D.5.3 NRPC informed that as per the roster, POWERGRID is supposed to host the meeting after Rajasthan.

D.5.4 POWERGRID informed that they would consult their management and explore the possibility of hosting the meeting in the month of September/October 2019.

Annexure-I

List of participants of 42nd Meeting of NRPC held 07.06.2019 at Gangtok

S. No.	Name of Officer	Designation	Organisation
1.	**BBMB**		
	Sh. Harminder Singh	Member (P)	BBMB
	Sh. Rajesh Gupta	CE	BBMB
	Sh. Anil Gautam	Dy CE	BBMB
2.	**DELHI**		
	Sh. Naveen Goel	Manager SO	Delhi SLDC
	Sh. S.M. Verma	Director(T)	DTL
	Sh. Satyendra Prakash	AGM(T)	IPGCL
3.	**HARYANA**		
	Sh. Ashok Singh	SE	HVPNL
	Sh. Vikram Pal	SE	HPGCL
	Sh. V.K. Sethi	Director	HPGCL
	Sh. Rakesh Jolly	CE	HVPNL
4.	**HIMACHAL PRADESH**		
	Sh. Arun Goyal	Director(P)	HPPTCL
	Sh Deepak Uppal	CE	HPSEB
	Sh. C.L. Thakur	CE	HPSLDC
5.	**PUNJAB**		
	Sh. Parmjeet Singh	CE/PPR	PSPCL
	Sh. Sanjay Gupta	CE/TS	PSTCL
	Sh. YPS Baath	CE SLDC	PSTCL
	Sh. DAK Kapur	Director/T	PSTCL
	Sh. NK Sharma	Dir/ Dist.	PSTCL
6.	**RAJASTHAN**		
	Sh. C.L. Koli	SE/RVPN	RRVUN
	Sh. A. K. Arya	SE(SOLD)	RVPN
	Sh. R.P. Sharma	CE(LD)	SLDC
	Sh. S.K. Biswas	CE (PDD)	RVPNN

S. No.	Name of Officer	Designation	Organisation
	Sh. V.K. Raizada	RVPN	D(T)
7.	**UTTAR PRADESH**		
	Sh. Zahir Ahmad	SE	UPSLDC
	Sh. AJ Siddiqui	SE	IPSLDC
	Sh. S.P. Chaubey	CE	UPRVUNL
	Sh. Chander Mohan	Dir(Op)	UPPTCL
	Sh. Ashutosh Kr	ED	UPPCL
	Sh. Brijesh Singh	EE	UPRVUNL
8.	**UTTRAKHAND**		
	Sh. Anil Kumar	Dir(Project)	PTCUL
	Sh. Kamla Kant	CE(C&R)	PTCUL
	Sh. S.K. Tamta	CE	UPCL
9.	**NHPC**		
	Sh. Vijay Kumar	SM(E)	NHPC
	Sh. Prashant Kaul	ED (Comml)	NHPC
	Sh. N.S. Parameshvaran	ED(O&M)	NHPC
	Sh. S.K. Mishra	DGM (E)	NHPC
	Sh. V.K. Sinha	GM(O&M)	NHPC
	Sh. R.K. Verma	DGM(HR)	NHPC
	Sh. Virendra Kumar	SM(E)	NHPC
10.	**NPCIL**		
	Sh. K.P. Singh	Associate Director	NPCIL
11.	**NTPC**		
	Sh. Harchandani	GM	NTPC
12.	**PGCIL**		
	Sh. K.N. Singh	CGM	POWERGRID
	Sh. Y.K. Dixit	CGM	POWERGRID
	Sh. Ashok Pal	CGM (CTU-PY)	POWERGRID
	Sh. Rajesh Verma	Sr. DGM	POWERGRID

S. No.	Name of Officer	Designation	Organisation
13.	**SJVN**		
	Sh. R.K. Bansal	Director(E)	SJVNL
	Sh. Romesh Kapoor	CGM	SJVNL
14.	**THDCIL**		
	Sh. Neeraj Verma	AGM	THDCIL
15.	**NRLDC**		
	Sh. Nitin Yadav	Manager	NRLDC
	Sh. M.K. Agarwal	GM	NRLDC
16.	**NLDC**		
	Sh. N. Nallarasan	Sr. GM	POSOCO
17.	**APCPL**		
	Sh. C.K. Samarta	GM	APCPL
	Sh. Amit Hooda	Manager	APCPL
18.	**JHAJJAR POWER (CLP)**		
	Shashi Saini	Manager	CLP
19.	**Adani Power Raj. Ltd.**		
	Sh. Manoj Taunk	GM	APL
20.	**Member Trader**		
	Sh. Arun Kumar	CEO	Kreate Energy
	Sh. Ashok Agarwal	Director	Kreate Energy
21.	**Nabha Power**		
	Sh. Rajesh Kumar	Head-O/M	NPL
	Sh. Chaturanan Das	Mgr. Comm	NPL
22.	**NRPC**		
	Sh. Akshay Dubey	AEE	NRPC
	Sh. Ratnesh Kumar	EE	NRPC
	Sh. Naresh Bhandari	MS	NRPC
	Sh. R P Pradhan	SE (C)	NRPC
	Sh. Ratnesh Kumar	EE (C)	NRPC
23.	**OTHERS**		

S. No.	Name of Officer	Designation	Organisation
	Kreate Energy Shashwat	DGM	Kreate Energy
	Sh. Ashok Agarwal	Director	Kreate

Annexure-II

List of participants of 45th Meeting of NRPC held 08.06.2019 at Gangtok

S. No.	Name of Officer	Designation	Organisation
24.	**BBMB**		
	Sh. Harminder Singh	Member(P)	BBMB
	Sh. Rajesh Gupta	Ce	BBMB
	Sh. Anil Gautam	Dy CE	BBMB
25.	**CEA**		
	Sh. B K Sharma	Pr. CE (GO&D)	CEA
26.	**DELHI**		
	Sh. Naveen Gel	MRG(co)	Delhi SLDC
	Sh. S.M. Verma	Director (T)	DTL,IPGCL/PPCL
	Sh. Satyendra Prakash	AGM(T)	IPGCL-PPCL
27.	**HARYANA**		
	Sh. Ajmer Singh	Dir.(T)	HVPNL
	Sh. V.K. Sethi	Dir	HPGCL
	Sh. Ashok Kumar Singla	SE	HVPNL
	Sh. Vikram Pal	SE	HPGCL
	Sh. Rakesh Jolly	CE	HVPNL
28.	**HIMACHAL PRADESH**		
	Sh. Arun Goyal	Director(P)	HPPTCL
	Sh. J P Kalta	MD	HPSEBL
	Sh. Suneel Grover	MD	HPSLDC
	Sh. R K Sharma	MD	HPPTCC
29.	**PUNJAB**		
	Sh. Paramjit Singh	CE/PPR	PSPCL
	Sh. Sanjeev Gupta	CE/PS	PSTCL
	Sh. YPS Baath	CE SLDC	PSTCL
	Sh. AK Kapur	Director/T	PSTCL
	Sh. NK Sharma	Director/DMT	PSPCL
30.	**RAJASTHAN**		

S. No.	Name of Officer	Designation	Organisation
	Sh. CL Koli	SERVUN	RRVM
	Sh. AK Arya	SE(SOLD)	RVPN
	Sh. RP Sharma	CE(LD)	SLDC
	Sh. SK Baswal	CE(PPD)	RVPNN
	Sh. YK Raizada	Director(T)	RVPN
31.	**UTTAR PRADESH**		
	Sh. Zahir Ahmed	SE	UPSLDC
	Sh. AJ Siddiqui	SE	UPSLDC
	Sh. SP Chaubey	CE	UPRVUNL
	Sh. Chandra Mohan	Dir(Op)	UPPTCL
	Sh. Ashutosh Kumar	ED	UPPTCC
	Sh. Brijesh Singh	EE	UPRVNL
32.	**UTTRAKHAND**		
	Sh. Anil Kumar	Dir.(Pro)	PTCUL
	Sh. Kamal Kant	CE(C&R)	PTCUL
	Sh. SK Tamta	CE (Coml.)	UPCL
33.	**NHPC**		
	Sh. Janardan Choushary	D(T)	NHPC
	Sh. Prashant Kaul	ED(Coml.)	NHPC
	Sh. NS Parameshwaran	ED(O&M)	NHPC
	Sh. VK Sinha	GM(O&M)	NHPC
	Sh. SK Mishra	DGM(E)	NHPC
	Sh. RK Verma	DGM(HR)	NHPC
	Sh. Virendra Kumar	SM(E)	NHPC
	Sh. Vijay Kumar	SM(E)	NHPC
	Sh. Rahul Ranjan	SM(E&C)	NHPC
	Sh. Deepak Rawat	SM(E)	NHPC
	Sh. Vipin Kuamr		
	Sh. Vinit Kumar		
	Sh. Jitendra VR. Mishra	AM(E)	NTPC

S. No.	Name of Officer	Designation	Organisation
34.	**NPCIL**		
	Sh. KP Singh	Asso(Dir)	NPCIL
35.	**NTPC**		
	Sh. K.K. Singh	ED, RED(North)	NTPC
	Sh. H Harchandari	GM	NTPC
36.	**PGCIL**		
	Sh. KN Singh	CGM	Power Grid
	Sh. YK Dixit	CGM	Power Grid
	Sh. Ashok Pal	CGM	Power Grid
	Sh. Rajesh Verma	SR DGM(CTU-PLG)	Power Grid
	Sh. Sunil Agrvawal	ED	
37.	**SJVN**		
	Sh. RK Bansal	Dir(E)	SJVNL
	Sh. Geeta Kapur	Dir(HR)	SJVNL
	Sh. Romesh Kapur	CGM	SJVNL
38.	**THDCIL**		
	Sh. Neeraj Verma	AGM	THDCIL
39.	**NRLDC**		
	Sh. SS Barpanda	ED	NRLDC
	Sh. Nitin Yadev	Manager	NRLDC(POSOCO)
	Sh. MK Agrawal	GM	NRLDC
40.	**NLDC**		
	Sh. N.Nallarasan	Sr.GM	POSOCO
41.	**APCPL**		
	Sh. CK Samarta	GM	APCPL
	Sh. Amit Hooda	Manager	APCPL
42.	**JHAJJAR POWER (CLP)**		
	Sh. Shashi Saini	Manager	CLP
	Divyadeep Gupta	Manager	CLP

S. No.	Name of Officer	Designation	Organisation
43.	**NPL**		
	Rajesh Kumar	Head-o/m	NPL
	Chaturanan Das	Mgr.Comm	NPL
44.	**NRPC**		
	Sh. Naresh Bhandari	MS	NRPC
	Sh. R P Pradhan	SE (C)	NRPC
	Sh. Ratnesh Kumar	EE (C)	NRPC
	Sh. Akshay Dubey	AEE (O)	NRPC
	Sh. Vikrant Singh Dhillon	AEE (C)	NRPC

Annexure-A.1.1

पावर ग्रिड कारपोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)
पावरग्रिड

केन्द्रीय कार्यालय: "सौदामिनी" प्लॉट सं. 2, सैक्टर–29, गुडगाँव–122 001, (हरियाणा) दूरभाष: 0124-2571700-719, फैक्स : 0124-2571762,
"Saudamini" Plot No. 2, Sector-29, Gurgaon-122 001, (Haryana) Tel. : 0124-2571700-719, Fax : 0124-2571762, Web.: www.powergridindia.com

CIN : L40101DL1989GOI038121

Ref. Number: C/CTU/N/00

Date: 06/06/2019

Shri Naresh Bhandari
Member Seceratary (NRPC)
Northern Regional Power Committee,
18-A, Qutab Institutional Area,
Shaheed Jeet Singh Marg,
Katwaria Sarai, New Delhi-110 016.

Sub.: Amendments in minutes of 44th meeting of Northern Regional Power Committee held on 19.03.2019- reg.

Sir,

We write with reference to the minutes of 44th meeting of Northern Regional Power Committee held on 19.03.2019 issued on 21.05.2019. In this regard, it is to mention that at point B. 36.2, it has been mentioned that *"On submitting the pre-charging study of above reactors, POWERGRID agreed to share the same"*. However, during the meeting representative of POWERGRID had informed following:

"The studies are available at CEA website along with agenda of 32nd SCM of NR. In case of any operational study, if required, the same can be carried out by NRLDC".

It is requested that a corrigendum to the minutes may please be issued covering the above modification of point B 36.2.

Thanking you,

Yours faithfully,

6/6/19

(Mukesh Khanna)
CGM (CTU-Planning)

पंजीकृत कार्यालय: बी–9, कुतब इंस्टीटयूशनल एरिया, कटवारिया सराय, नई दिल्ली–110016 दूरभाष: 011-26560112, 26560121, 26564812, 26564892, फैक्स: 011-26601081
Regd. Office: B-9, Qutab Institutional Area, Katwaria Sarai, New Delhi-110016 Tel.: 011-26560112, 26560121, 26564812, 26564892, Fax: 011-26601081, Web.: www.powergridindia.com

Annexure-A.1.2

पावर सिस्टम ऑपरेशन कारपोरेशन लिमिटेड
(भारत सरकार का उद्यम)
POWER SYSTEM OPERATION CORPORATION LIMITED
(A Govt. of India Enterprise)

उत्तरी क्षेत्रीय भार प्रेषण केन्द्र / NORTHERN REGIONAL LOAD DESPATCH CENTRE
कार्यालय : 18-ए, शहीद जीत सिंह सनसनवाल मार्ग, कटवारिया सराय, नई दिल्ली- 110016
OFFICE : 18-A, Shaheed Jeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi- 110016
CIN : U40105DL2009GOI188682, Website : www.nrldc.org, www.nrldc.in, Tel.: 011- 26519406, 26523869, Fax : 011- 26852747

संदर्भ संख्या :NRLDC\TS-02\ ६ ७१

दिनांक: 06 जून 2019

सेवा में,

सदस्य सचिव, एन॰आर॰पी॰सी॰, 18 ए, SJSS मार्ग, कटवारिया सराय, नई दिल्ली -110016

विषय: Minutes of 41st TCC and 44th NRPC meeting

महोदय,

In reference to the Minutes of 41st TCC and 44th NRPC meeting issued on 21-May-19, the following modifications are proposed:

Agenda item	Point in minutes	Modification
B.16.2	Representative of POSOCO highlighted the importance of AGC and stated that 50 paise markup was decided for RRAS which was also implemented for AGC pilot project which might be reviewed.	The importance of all three frequency responses i.e. primary, secondary and Tertiary responses has been stated in various CERC orders and also practiced worldwide. POSOCO representatives were of the view that to maintain frequency at 50Hz, all responses are required. The following salient points were emphasized about the three responses: • Primary response: Larger corpus of generation; For immediate arrest of frequency variation; no load set point change • Secondary Response: Load set point change; To bring back frequency to its reference value. • Tertiary Response: Manual intervention; To restore secondary reserves. Members appreciated the need of all three responses in the grid. Representative of POSOCO highlighted the importance of AGC and stated that 50 paise markup was decided for RRAS which was also implemented for AGC pilot project.
B.40.1	NRLDC representative stated that three FRC based events occurred during Jun-Sep'18.	NRLDC representative stated that three FRC based events occurred during Oct'18-Jan'19.
B.41.3	She highlighted that capacity building program will be free of cost for all SLDCs. She also requested all the constituents to participate in capacity building program to be scheduled in 2019 with full strength and enthusiasm.	She highlighted that capacity building programs conducted by POSOCO have 5 slots reserved for SLDC nominees and will be free of cost for all SLDCs. She also requested all the constituents to participate in capacity building program to be scheduled in 2019 with full strength and enthusiasm.

It is requested to kindly incorporate the above modifications in MoM.

धन्यवाद,

भवदीय

एस एस बड़पंडा 6/6/19
(एस एस बड़पंडा)
कार्यपालक निदेशक

प्रतिलिपि विनम्र सूचनार्थ:

- मुख्य महाप्रबंधक, राष्ट्रीय भार प्रेषण केंद्र, बी9-, कुतुब इन्स्टीट्यूशनल एरिया, नई दिल्ली -110016

Annexure-B.1

Minutes of Meeting held on 03.06.19/04.06.19 among CEA, POWERGRID & PSTCL at Patiala regarding Short circuit level at Moga S/s & Injection of power through Bikaner - Moga 765kV D/c line.

List of participants is enclosed at **Annexure-I**

In-line with decision taken in 3rd NRSCT meeting held on 24.05.19(MOM awaited) regarding Transmission system for Rajasthan Solar Energy Zone (8.9 GW), a meeting was held on 03.06.19 & 04.06.19 at PSTCL office, Patiala& Chandigarh to further deliberate on high short circuit level at Moga S/s (400kV &220kV level) and overloading of 220kV level network in Western Punjab due to increased injection of power at 765/400 kV Moga S/s through Bikaner - Moga 765kV D/c line.

Chief Engineer (TS), PSTCL welcomed the participants and requested them to deliberate on the study scenario cases carried out by them regarding injection of power at 765/400kV Moga S/s in Punjab. It was deliberated that in order to resolve issues regarding high short circuit levels of Moga(PG) 400kV bus, a bus split arrangement is required. Based on the feasibility, various alternatives were discussed and the following optionwas found to be technically suitable:

400kV Bus Section-1

- 400kV Kishenpur D/c feeders
- 400kV Hisar D/c feeders
- 2 nos. 765/400kV transformers
- 1 No. 80 MVAR or 125 MVAR Reactor based on feasibility

400kV Bus Section-2

- 400kV Jalandhar D/c feeders
- 400kV Bhiwani feeder
- 400kV Fatehabad feeder
- 400kV Nakodar feeder
- 400kV Talwandi Sabo/Malkana Feeder
- 4 nos. 400/220kV transformers
- 1 No. 80 MVAR or 125 MVAR Reactor based on feasibility

With the above bus split arrangement, fault level of Bus section-1 & 2 is observed to be reduced to within the limits of 40 kA.

With the bus splitting proposed issue of high short circuit level at Moga is resolved and also the loading problem in Punjab flow is resolved.

With above arrangementthere are no ISTS touch points to Punjab through Moga 765/400kV ICT (Bus section-1). However on Bus section-2, one circuit each of

Hisar/Bhiwani and Fatehbad is connected which takes care of some ISTS flows at Moga Bus. The flows have been checked at all ISTS stations and Punjab stations and the same remains N-1 compliant at all levels after adding the proposed system of Punjab which is as under at 2022 peak of 14800 MW.

Additional ICT at Balachak = 500 MVA

Additional ICT each at Makhu, Muktsar and Rajpura = 500 MVA each

Upgradation of ICT at Nakodar from 315 MVA to 500 MVA = 185 MVA

New 400 kV substation at Dhanansu by LILO of Jalandhar – Kurukshetra line – 2 X 315 = 630 MVA

New 400 kV substation at Ropar by LILO of KolDam – Ludhiana line – 2 X 500 MVA = 1000 MVA

PSTCL further stated that additional ICT of 500 MVA each at Dhanansu and Ropar in line with closure of GGSTP Ropar shall be plannedto keep them N-1 compliant on closure of GGSTP Ropar. Further, any additional ICT if necessary shall be planned as per the real-time flows.

POWERGRID informed that with given space constraints at 765/400kV Moga substation, they would need to relocate the bays for bus section-1 for which existing buildings shall have to be relocated for space creation. Further, other options for interconnection of feeders of bus section-1 to 400kV main Bus (bus section-2) through GIS bus duct shall also be explored. Based on the suitability & feasibility of above option, above proposed bus split arrangement at 400kV Moga S/s shall be carried out separately as part of system strengthening.

It was in principal agreed that the above splitting of busbar will be done by reengineering as part of ISTS system at Moga and this scheme of splitting the busbar at Moga shall become part of the Bikaner-Moga line scheme as supplementary strengthening scheme and shall remain associatedwith the transmission scheme of Bikaner–Moga line.Technically both the above schemes are required to be completed in similar time frame. Powergrid informed that Bikaner–Moga line is in advance stage of implementation and considering the same it was agreed in principal that in case of completion of Bikaner-Moga line, before completion of bus splitting the way forward shall be as discussed below:

The implementation of Bikaner-Moga 765 kV D/C line considering the power flow from RE generation in Rajasthan who have been granted LTA (3.38 GW approx.) was deliberated and it was observed that with bus splitting there are no issues of any quantum of flow in this line. However, without bus splitting the quantum of injection into 400 kV system through 765/400 kV ICTs needs to be studied in detail. The preliminary studies reveals that in case of this loading exceeding 2000 MW (threshold) the Punjab system gets overloaded and the operational measures will

have to be taken. Punjab deliberated that before finalizing this issue, the operational measures to be taken needs to be agreed upon as Punjab shall not be liable to any load shedding due to the same. Powergrid deliberated that to finalize the operational measures, they need to consult their seniors and POSOCO and the issue shall be further deliberated during meeting scheduled on 13/14th June already fixed at CEA Delhi.

It was observed that some additional 400kV outlets from Moga 400kV bus section-1 or shifting of some circuits from Moga 400kV bus section-2 to Moga bus section-1 needs to be done. Shifting of some elements like Moga - Nakodar 400kV S/c line from bus section-2 to bus section-1 was studied and found not feasible as it results into overloading of Moga-Nakodar line, loading of ICTs at Moga and also at Nakodar. Further, LILO of Talwandi Sabo- Nakodar 400kV S/c line at Moga was studied but the field reports as gathered by PSTCL revealed that there is no possibility of connecting this LILO due to ROW issues.

It was also observed that with above bus split arrangement, loading levels on 765/400kV transformers at Moga reduces. Accordingly, need of 3rd 1x1500 MVA, 765/400kV transformer was reviewed. It emerged in the studies that with proposed Moga bus split arrangement, 3rd 1x1500 MVA, 765/400kV transformer at Moga may not be requiredas a part of the present scheme of Transmission system of Rajasthan Solar Energy Zones (8.9 GW).

CEA indicated that keeping in view charging of Kishenpur - Moga 400kV D/c line at 765kV level, future space for at least 2 nos. of 765kV diameters at Moga s/s may be explored by POWERGRID.Further, with charging of Kishenpur - Moga at 765kV level the 400kV bays vacated could be used for taking additional 400kV outlet from Moga bus section-1 and in that time frame implementation of Moga 3rd ICT could be taken up if required. However PSTCL stated that before planning any such link, the Punjab shall be supplied with all the study material with flows and acceptance of Punjab shall be a prerequisite, which was agreedin principal.

Further, as referred in the 3rd NR SCT meeting, matter regarding agenda from PSTCL for creation of new 400/220kV substation at Ropar & Dhanansu was also discussed. As per the studies, following transmission system was agreed for implementation by PSTCL:

400/220kV Ropar S/s in the premises of existing 220kV Guru Gobind Singh Thermal Power(GGSSTP)

1. Establishment of 2x500 MVA, 400/220kV S/s at Ropar
2. LILO of both circuits of 400kV Koldam–Ludhiana(PG) 400kV D/c line at Ropar
3. 220kV interconnection (2xD/C–twin moose) of Ropar and existing 220kV Ropar bus
4. 1x125 MVAR,420kV Bus Reactor at Ropar

400/220kV S/s at Dhansanu

1. Establishment of 2x315 MVA, 400/220kVAIS S/s at Dhansanu
2. LILO of one circuit of Jallandhar–Kurukshetra 400kV (direct) line at Dhansanu
3. 1x125 MVAR, 420kV Bus Reactor at Dhananu.

The entire study and the viewpoint as emerged above was presented to the management of PSTCL and PSPCL on 04.06.19 at PSPCL guest house,Sector-10, Chandigarh and the above viewpoint was agreed upon in principal. The management was of considered opinion that the entire scheme of green corridor and the scheme of transmission system for solar system in Rajasthan should have no financial burden on Punjab as the same is being implemented as per Govt. of India guidelines.

CEA stated that the scheme has been technically agreed in the NRSCT except for provision of 3rd ICT at Moga. Punjab has raised some technical issues. The issues have been deliberated and technical solution has been found in terms of bus splitting. The commercial aspects of the scheme need to be raised at appropriate forum.

Powergrid representative agreed to the above technical deliberations in principal subject to final approval of their management.

PSTCL

Sh. Sanjeev Gupta, CE/TS

Sh. Paramjeet Singh, SE/Planning

Sh. Kamal Krishan, ASE/Planning

CEA

Sh. Awdhesh Kr. Yadav, Director (PSP&A-I)

Ms. Manjari Chaturvedi, Director (PSP&A-I)

CTU/POWERGRID

Sh. Rajesh Verma, Sr. DGM(CTU-Plg)
Sh. Kashish Bhambhani, DGM(Smart Grid)
Sh. Sandeep Kumawat, Chief Manager(Smart Grid)
Sh. V M S Prakash Yerubandi, Manager(CTU-Plg)
Sh. K Deepak, Dy. Mgr(Engg.-S/s)

—x—

Annexure-I

List of participants

PSTCL

Sh. Sanjeev Gupta, Chief Engineer (TS)

Sh. Paramjeet Singh, Supdt. Engineer(Planning)

Sh. Kamal Krishan, ASE/Planning

CEA

Sh. Awdhesh Kr. Yadav, Director(PSP&A-I)

Ms. Manjari Chaturvedi, Director(PSP&A-I)

CTU/POWERGRID

Sh. Rajesh Verma, Sr. DGM(CTU-Plg)

Sh. Kashish Bhambhani, DGM(Smart Grid)

Sh. Sandeep Kumawat, Chief Manager(Smart Grid)

Sh. V M S Prakash Yerubandi, Manager(CTU-Plg)

Sh. K Deepak, Dy. Mgr(Engg.-S/s)

Additional Participants on 4.6.19:

1. CMD PSTCL
2. CMD, PSPCL
3. Director/Distribution, PSPCL
4. Director/Technical, PSTCL
5. CE/PPR, PSPCL
6. CE/P&M, PSTCL
7. CE/SLDC, PSTCL
8. Dy. CE/PR, PSPCL
9. Dy. CE/SLDC (Op), PSTCL