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सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

Power System Planning & Appraisal-I Division

सेवा में/To

-As per list enclosed-**Subject: 2nd Meeting of Northern Region Power Committee (Transmission Planning)
(NRPCTP) - Agenda note**

Sir/ Madam,

The 2nd meeting of Northern Region Power Committee (Transmission Planning) (NRPCTP) is proposed to be held on 1st September, 2020 through Video Conferencing. The agenda note for the meeting has already been uploaded on CEA website: www.cea.nic.in (path to access: Home Page - Wing - Power System-PSPA-I-Standing Committee on Power System Planning- Northern Region).

Link for the meeting will be shared by a separate mail.

Kindly make it convenient to attend the meeting.

Yours faithfully,
Signature Not VerifiedDigitally signed by
MANJARI CHATURVEDI
Date: 2020.08.22 11:18:57
IST

(मंजरी चतुर्वेदी/ Manjari Chaturvedi)

निदेशक/ Director

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1.	Member Secretary, NRPC, 18-A Shajeed Jeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi - 110016	2.	Director (W &P), UPPTCL, Shakti Bhawan Extn,3rd floor, 14, Ashok Marg, Lucknow - 226 001	3.	Director, (Technical), THDCIL, Pragatipuram, Bypass Road, Rishikesh-249201
4.	Director (Technical), Punjab State Transmission Corporation Ltd. (PSTCL) Head Office The Mall Patiala - 147001	5.	Member (Power), BBMB, Sectot-19 B Madhya Marg, Chandigarh-1 60019	6.	CMD, NHPC, NHPC Office Complex, Sector-33, NHPC, Faridabad-121003
7.	Director (PP&D) RVPN, 3 rd Floor, Room no 330, Vidhyut Bhawan, Janpath, Jaipur-302005.	8.	Director (Technical), HVPNL, Shakti Bhawan, Sector- 6 Panchkula-134109	9.	Director (Technical), HPSEB Ltd. Vidut Bhawan, Shimla -171004
10.	Managing Director, HPPTCL, Barowalias, Khalini Shimla-171002 Fax-0177-2623415	11	Chief Engineer (Operation) Ministry of Power, UT Secretariat, Sector-9 D Chandigarh -161009	12	Development Commissioner (Power), Power Department, Grid Substation Complex, Janipur, Jammu,
13.	COO (CTU) POWERGRID, Saudamini, Plot no. 2, Sector -29, Gurgaon-122 001 (Fax-0124-2571809)	14	Director (System Operation), POSOCO B-9, Qutab Institutional Area, Katwaria Sarai New Delhi – 110010	15	MD, SECI, Prius Platinum, D-3, District Centre, Saket, New Delhi -17
16	CMD, NTPC, NTPC Bhawan, Core 7, Scope Complex-6, Lodhi Road. New Delhi	17	GM (GMR), Bajoli Holi Hydro Power Private Limited, Aiport Building, 302, 1 st Floor, New Shakti Bhawan, Near Terminal 3 IGI Airport, New Delhi -37	18	SVP, M/s Greenko Budhil HEP, 113/A, Sai Square Buiding, Road No. 36, Jubilee Hills, Hyderabad- 500033
19.	General Manager (Planning), Chenab Valley Power Projects (P) Limited, Chenab Jal Shakti Bhawan, Rail Head Complex, Jammu	20	General Manager (Planning), Delhi Transco Ltd, Shakti Sadan, Kotla Marg, New Delhi-110002		

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Agenda note for 2nd Meeting of Northern Region Power Committee (Transmission Planning) (NRPCTP):

- 1.0 Confirmation of the Minutes of the 1st meeting of Northern Region Power Committee (Transmission Planning) (NRPCTP) held on 24.01.2020**
- 1.1** The 1st meeting of Northern Region Power Committee (Transmission Planning) (NRPCTP) was held on 24.01.2020 and the minutes of the meeting were issued vide CEA letter no. File No.CEA-PS-11-21(19)/3/2019-PSPA-I Division dated 26.02.2020. No observation has been received on the minutes of meeting.
- 1.2** The minutes of 1st meeting of NRPCTP may please be confirmed.
- 2.0 Creation of 400/220 kV, 2x315 MVA S/S at Akhnoor/Rajouri as ISTS**
- 2.1** JKPDD had submitted a comprehensive transmission plan for Jammu Region which inter-alia included establishment of 400/220 kV, 2x315 MVA S/s at Akhnoor/ Rajouri as ISTS works. The issue of establishment of Akhnoor S/s was also deliberated in 37th meeting of Standing Committee on Power System Planning held on 20th Jan 2016, wherein, it was decided that proposal of new substation at Akhnoor may be considered only after the 220 kV downstream from Samba, New Wanpoh and Amargarh are taken up for implementation by JKPDD. JKPDD was advised to implement their downstream network expeditiously so as to optimally utilize the already created transmission elements.
- 2.2** JKPDD vide their letter dated 26.12.2019 has requested to take up 400/220kV Akhnoor S/s for implementation.
- 2.3** The agenda for the same was taken up in the 1st NRPCTP meeting held on 24.01.2020, but since no representative from JKPDD was present in the meeting, therefore, the agenda was deferred for the next meeting. Following transmission system has been proposed by JKPDD:
Works proposed under ISTS:
- i) Establishment of 2x315MVA, 400/220kV Akhnoor/ Rajouri S/s with 4nos. of 400kV line bays and 6nos. of 220kV line bays
 - ii) LILO of 400 kV D/c Amargarh (Kunzer)- Samba line at 400/220 kV Akhnoor/ Rajouri S/s
- Works proposed under Intra-State Transmission works:
- iii) 220 kV D/c line from 400/220 kV Akhnoor/ Rajouri to 220/132 kV Akhnoor-II
 - iv) 220 kV D/c line from 400/220 kV Akhnoor/ Rajouri to 220/132 kV Rajouri
 - v) 220 kV D/c line from 400/220 kV Akhnoor/ Rajouri to 220/132 kV Katra-II
- 2.4** System studies were done by CEA and the following has been observed:
- 1) With the LILO of 220 kV Salal-Kishenpur line at Katra-II and the interconnection of Katra-II -Akhnoor/Rajouri S/s, the power flow is from Katra-II to Akhnoor/Rajouri , due which in turn increases the loading on Salal -Katra-II line
 - 2) With switching off the LILO of 220 kV Salal-Kishenpur line at Katra-II, the line from Katra-II to Akhnoor/Rajouri is floating.
- Therefore, studies have been done without interconnection with Katra-II. The results of load flow are enclosed as Annexure -I.
- 2.5** Members may like to deliberate.
- 3.0 Transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs:**

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3.1 Transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL was discussed during 1st Northern Region Power Committee (Transmission Planning) held on 24/01/2020 & following system was agreed:

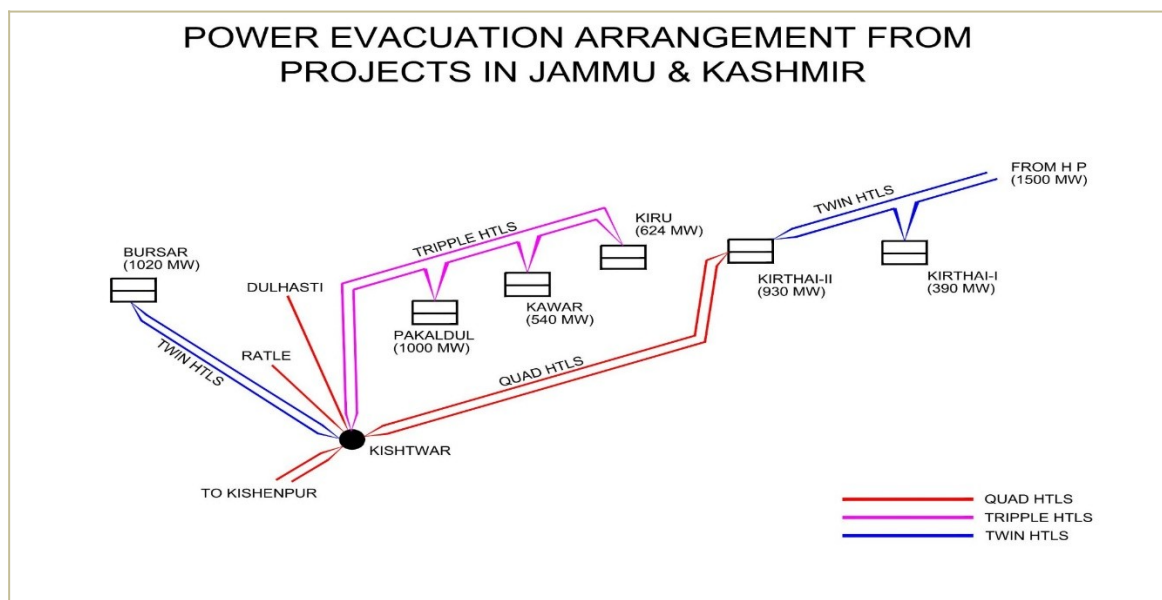
a) **Connectivity Transmission system**

1. Implementation of Kiru-Kwar- Pakaldul- Kishtwar 400 kV D/C Triple HTLS connectivity line to be implemented by M/s CVPPL. M/s CVPPL to phase the implementation of the connectivity line as per the implementation timelines of the three HEPs ie. Kiru, Kwar & Pakaldul.
2. One and a half breaker switching scheme at 400kV Generation switchyard- under the scope of M/s CVPPL
3. 2 GIS bays at each end of Kishtwar and Pakaldul- under the scope of M/s CVPPL
4. 420 kV, 125 MVAR Bus Reactor at Pakaldul HEP- under the scope of M/s CVPPL:
5. Establishment of 400 kV switching station at Kishtwar (GIS) by LILO one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) –under ISTS
6. 420 kV, 125 MVAR Bus Reactor at Kishtwar switching station- under ISTS

b) **LTA system for Pakaldul HEP:**

CVPPL had applied for LTA for transfer of 1000 MW from Pakaldul HEP to NR (target region). The application was discussed in 24th Meeting of Northern Region Constituents regarding Connectivity and LTA applications in NR held on 26.06.2019 wherein following transmission system for LTA was agreed:

- Kishenpur - Kishtwar switching station 400kV S/c (Quad) line (second circuit of Kishenpur – Dulhasti 400kV to be strung from Kishenpur upto Kishtwar) along with bays at both ends - **Under ISTS**



c) **Connectivity Transmission system for Kiru HEP:**

CVPPL on 25/06/2020 has applied for grant of Connectivity to Kiru HEP (624MW) w.e.f. 01.04.2024 and was discussed and agreed in 36th NR LTA/Connectivity meeting. During the meeting, CVPPL informed that the generation project is in advance stage of awarding the works and Land for the same has also been acquired. Accordingly CTU advised CVPPL to apply for LTA at the earliest so that transmission system for power transfer including Kishtwar switching station could be taken up for implementation,

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matching with the generation schedule and CVPPL was granted connectivity through the system as mentioned in the point (a) above.

3.2 The Transmission system to be implemented under ISTS has been discussed in the 3rd meeting of the "National Committee on Transmission" (NCT) held on 26th and 28th May, 2020 and has been agreed for taking up for implementation.

3.3 Members may like to note.

4.0 Implementation of 400/132kV transformer at Kishtwar Pooling Station:

4.1 JKPDD vide their email dated 13.8.2020 has requested to take up the implementation of 400/132kV transformer at 400kV pooling station at Kishtwar. JKPDD has intimated that they have existing 132kV line network at Kishtwar and 132kV RKKTL line from Ramban S/s is under construction. At present, they have three no 132/33kV GSS in vicinity i.e. 40MVA Kishtwar JKPDD, 20MVA Kishtwar(NHPC) and 70 MVA Khellani with further connectivity at sub- transmission level.

4.2 To provide reliable power to the area, JKPDD has requested for implementation of 315 MVA, 400/132kV transformer along with 132kV line bays at Kishtwar pooling station under ISTS.

4.3 Members may like to deliberate.

5.0 Transmission works to be implemented in Jammu and Kashmir Region under Intra-State transmission system

5.1 JKPDD has submitted the DPR for the transmission projects in Jammu region to CEA, which are required to be implemented during the 13th/14th plan. The same have been agreed technically in the 1st meeting of Northern Region Power Committee (Transmission Planning) held on 24.01.2020.

5.2 Apart from these works, JKPDD has also submitted some additional intra-state works to be included along with this DPR. The details of the additional transmission works proposed by PDD, Jammu is listed as **Annexure-II**.

5.3 JKPDD has also submitted DPR for Kashmir region in January, 2020 for the transmission works with 2639 MVA of new substations and 739 ckms of new transmission line to be implemented during 13th and 14th plan period. The same is under examination.

5.4 Some of the works proposed by JKPDD requires interconnection with the ISTS elements. The list of works are as follows:

a) Jammu Region

1	Laying of 220 kV D/c Jatwal-Chawdhi line (45 kms)	Two no. of bays are required at Samba(Jatwal) (to be implemented by JKPDD)
2	Thickening of S/C 220KV Jatwal-Gladni Trans. Line from ACSR Zebra to HTLS conductor(40 kms)- live work	Jatwal-Gladni Trans. Line is an ISTS line. Therefore work required to be taken up under ISTS

b) Kashmir Region

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S.No.	Transmission Line	Timeframe as per financial phasing	Substation Capacity Proposed/Anticipated Load	ISTS element involved
1	LILO of 220kV Wagoora - Kishenganga line at Khansahib (Beerwah)	Line: 2022-23 Khansahib S/s: 2022-23	Proposed at Khansahib: 50MVA,220/33 kV	Kishanganga - Wagoora 220kV D/C line is an ISTS line
2	LILO of one ckt of Alusteng- Leh 220kV S/c line on D/c towers at Gangangeer (Sonamarg) (5km)	Line: 2022-23 Gagangeer S/s: 2022-23	Proposed at Gagangeer: 50MVA,220/33 kV Anticipated Load: 40 MW	Alusteng- Leh 220kV S/c line is an ISTS line
3	220kV Kunzer - Gulmarg S/C line (15 km)	Line: 2026-27 Gulmarg S/s: 2024-25	Proposed at Gulmarg: 50MVA,220/33 kV	Amargarh (Kunzer) is an ISTS S/s, Out of 6 no.s of 220kV bays, 4 bays have been utilized for LILO of Delina –Zeinkote at
4	220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri (40km)	Line: 2022-23 Sheeri S/s: 2022-23	Proposed at Sheeri: 160MVA,220/3 kV 160MVA, 220/132kV	Amargarh (Kunzer), 2 nos. of bays are proposed to be utilized through Amargarh –Sheeri 220kV D/c line, space for additional 2 nos. of bays are required. Implementation of
5	220kV Amargarh (Kunzar) - Lollipopora S/C line (4 kms)	Line: 2025-26 Lollipora S/s: 2022-23	Proposed at Lollipopora: 2x50 MVA,220/33kV Anticipated Load: 65 MW	bays is proposed to be taken up by JKPDD.
6	220kV New Wanpoh - Mattan D/C line (15km)	Line: 2022-23 Mattan S/s: 2023-24	Proposed at Mattan: 160 MVA, 220/33kV 160MVA, 220/132kV	Out of 6 nos. of existing bays,4 nos. of 220kV bays are utilized at New Wanpoh with New
7	New Wanpoh- Nillow 220kV D/c line (25km)	Line: 2022-23 Nillow S/s: 2023-24	160 MW Anticipated Load at Nillow. Proposed at Nillow: 160MVA,220/3 kV 160 MVA,220/132kV	Wanpoh –Alstreng220kV D/c line and New Wanpoh- Mirbazar 220kV D/ c line, which are presently under construction. 2 nos. of 220kV bays are remaining unutilized. Therefore, additional 3 nos. of 220kV bays would be required at New Wanpoh. JKPDD has proposed to take up the implementation of
8	220kV New Wanpoh - Qazigund S/C line on D/c towers (8km)	Line: 2024-25 Qazigund S/s: 2025-26	Proposed at Qazigund: 50MVA, 220/33kV	these 220kV bays.

5.5 Members may like to deliberate.

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6.0 Establishment of 400kV substations (Jhatikara & TikriKhurd) and Interstate 220/66-33kV substation at Maharani Bagh under 13th Business Plan of DTL

6.1 Under the 13th Business Plan, DTL has proposed up- gradation and Strengthening of Delhi Transmission system with the establishment of

i) 400/220/66kV GIS substation at Jhatikara-1000 MVA (2 x 500 MVA) at 400/220kV level and 480 MVA (3 x 160 MVA) at 220/66kV level in the premises of existing 765/400kV PGCIL Jhatikra substation. The land for establishment of substation is in possession of PGCIL to be handed over to DTL for construction of 400/220/66kV GIS. The 400kV in-feed would be extension of 400kV bays of 765/400kV Jhatikara GIS.

ii) DTL has also proposed creation of 66kV & 33kV GIS along with extension of 220kV GIS at existing interstate **400/220kV GIS substation at Maharani Bagh**. The transformation capacity of proposed 220/66-33kV Maharani Bagh substation shall be 320MVA at 220/66kV level and 300 MVA at 220/33kV level. For the same, 220kV GIS bays shall be extended with the provision of 220kV bus-sectionalizer. 220/66kV transformation level has been considered on the request of upcoming project of NCRTC Rapid Rail network and 220/33kV, on the basis requirement of DISCOM (i.e. BRPL). The land for augmentation / establishment of substation at Maharani Bagh is already in possession of DTL.

iii) Creation of a new 765/400kV substation at Narela has been agreed in the 4th meeting of NRSCT held on 25.07.2019 under ISTS as part of transmission system for evacuation of power from SEZ in North Region (Phase-II – 8.1GW).DTL has proposed the Scheme of establishment of **400/220/66kV,1500 MVAGIS at TikriKhurd with 400kV in-feed from LILO of existing 400kV D/C Mandola – Bawana overhead transmission line (which is passing from inside the plot) and a provision of Narela-TikriKhurd 400kV D/C line**. having DTL would also need to commission 220/66kV TikriKhurd in matching timeframe. The plot (measuring 40,000Sqm), which is already in possession of DTL.

6.2 The above proposal of 400kV & 220kV transmission infrastructure will be established by DTL as a part of intra-state transmission system. Load Flow Studies carried by DTL are enclosed at **Annexure-III**.

6.3 Members may deliberate.

7.0 Transmission System requirement for additional 20GW REZ in Northern Region (Phase-III)

7.1 SECI has requested to plan the transmission system for additional 20 GW Solar SEZs envisaged in Rajasthan&proposed to be connected to the ISTS network at the location given in the following table:

Location	Capacity (in GW)			Total
	Phase-I (By July'22)	Phase-II (By Dec'22)	Phase-III (By April'23)	
Fatehgarh	6	5	-	11
Bhadla	4	-	4	8
Ramgarh	-		1	1

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Location	Capacity (in GW)			Total
	10	5	5	
				20

- 7.2 Considering the above generations, load flow studies have been carried out by CTU for a timeframe of 2024-25. Two alternative power evacuation arrangements have been proposed; **one through HVAC** and the **second through HVAC+ HVDC**. In both the alternatives the system has been tested for N-1 outage condition and seems to be in order. The HVDC solution is through VSC which in addition to providing the power evacuation solution would also provide reactive support as well as stability to the RE system.
- 7.3 The load flow studies have been carried out with the following assumptions:
1. CTU stated that the demand figures i.e. Total All-India Demand -244 GW (NR-77 GW, WR- 71 GW,ER- 27 GW,SR-63GW,NER-5 GW)have been taken from the 19th Electric Power Survey(2024-25).
 2. For evacuation of power in the Northern region, 100% Solar generation and 30% Wind Generation is considered (as generally in Rajasthan the same trend is noticed). At the same time, Wind generation is high in Western Region, so 70-80% Wind Generation is considered in WR. Solar generation in other regions is assumed 80-85%.
 3. 55-65% of minimum Technical Loading considered in Thermal Units and most of the Thermal Power Plants will be backed down.
 4. For Hydro Generations (mainly J&K and Himachal), 80% is considered in Peak Season and for Nuclear Plants, 65% is considered.
 5. Also, under n-1 contingency, the loading for 765 kV lines, rated at 4000 MVA, is assumed as 3500 MW (usually taken as 3000 MW). Reason being the huge capacity of around 37 GW ISTS system in Rajasthan with 100% generation needs to be evacuated properly.
 6. In the studies, all India transmission network up to 220kV level has been simulated. This includes, existing and well as under construction transmission network incl. high capacity transmission corridors and Green Energy Corridors.
 7. Transmission studies carried out for 2024 time frame. The study is restricted to only one scenario of Afternoon Peak. Joint study meeting to be convened with STUs for consensus on Load Generation Balance & updation of their network in 2024 time frame in simulation file.
- 7.4 Based on the above assumptions, 2 no. of alternatives have been identified one with HVAC system and other with Hybrid system (HVAC +HVDC):

Alternative-1: HVAC Transmission scheme:

1. Establishment of 10x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAR Bus Reactor with suitable sectionalization at 400kV & 220kV level
2. Establishment of 10x1500 MVA 765/400kV & 12x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAR Bus Reactor & 2x125 MVAR Reactor with suitable sectionalization at 400kV & 220kV level
3. Establishment of 2x500 MVA, 400/220 kV pooling station at Ramgarh (ISTS) along with 2x125 MVAR Bus Reactor
4. LILO of both circuits of 765 kV D/c line between Bhadla-2 and Fahegarh-2 at Bhadla-3
5. Fatehgarh-3- Fatehgarh-4 400 kV D/c(Quad) line (50 km)
6. Fatehgarh 4– Bhadla 3 400 kV 2XD/c line(Quad) (200 km/double ckt tower)

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7. Establishment of 765 kV switching station at suitable location near Phulera alongwith 2x330 MVAR,765 kV Bus Reactors.
8. Ramgarh (ISTS) – Bhadla-2 400kV D/c (Quad) line(180 km) alongwith 125 MVAR line reactor at Ramgarh (ISTS) end on each circuit
9. Bhadla 3 – Phulera 765 kV 2xD/c line (310 km double ckt tower) alongwith 240 MVAR Switchable line reactor for each circuit at each end of Bhadla 3 – Phulera 765 kV 2xD/c line
10. Phulera- Sikar-II 765 kV D/c(90 Km)
11. Sikar-II – Khetri 765 kV 2xD/c line (90 Km/double ckt tower)
12. Establishment of 3x1500 MVA 765/400kV substation at suitable location near Fatehabad alongwith 2x330 MVAR,765kV Bus Reactors & 2x125 MVAR Bus Reactors
13. LILO of Bikaner-Moga 765 kV D/c at Fatehabad (110km/per double circuit)
14. LILO of Moga-Hissar 400kV D/c at Fatehabad(18km/ per double circuit)
15. Fatehabad-Jind 400kV D/c(Quad) line(90km)
16. Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAR, 765kV Bus Reactors & 2x125MVAR, 400kV Bus Reactors
17. LILO of both circuits of Jaipur-Gwalior 765 kV D/c at Dausa
18. LILO of both circuits of Agra – Jaipur 400kV D/c at Dausa
19. Augmentation of 1x1500 MVA, 765/400kV ICT at Bhiwani(PG)* (Jind section)Substation
20. Augmentation of 1x1500 MVA ICT, 765/400kV ICT at Jhatikara* (Bamnauli section) Substation
21. Augmentation of 1x1500 MVA ICT, 765/400kV ICT at Fatehgarh-II* Substation
22. Establishment of 4x1500 MVA 765/400kV & 6x500 MVA 400/220 kV pooling station at Fatehgarh-3(In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II) alongwith 2x330 MVAR,765kV & 2x125 MVAR, 400kV Bus Reactors alongwith suitable sectionalization at 400kV & 220kV level
23. Establishment of 2x1500 MVA 765/400kV substation at suitable location near Mathura alongwith 2x330 MVAR Bus Reactor & 2x125 MVAR Reactor
24. Phulera – Mathura 765 kV D/c line (280 km) alongwith 1x240 MVAR Switchable line reactor for each circuit at each end of Phulera – Mathura 765 kV D/c line
25. Mathura – Mathura (UPPTCL) 400 kV D/c (quad) interconnection(10 KM)
26. Establishment of 765 kV switching station at suitable location near Hardoi alongwith 2x330 MVAR 765 kV Bus Reactor
27. Mathura – Hardoi 765 kV D/c line (300 km) alongwith 1x330 MVAR Switchable line reactor for each circuit at each end of Mathura – Hardoi 765 kV D/c line
28. LILO of Lucknow-Bareilly 765 kV S/c at Hardoi (25km)
29. Establishment of 765 kV switching station substation at suitable location near Beawar alongwith 2x330 MVAR 765 kV Bus Reactor
30. Fatehgarh-3– Beawar 765 kV D/c (350 km) alongwith 240 MVAR Switchable line reactor for each circuit at each end of Mathura – Hardoi 765 kV D/c line
31. LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar(45 km/per double circuit)
32. Beawar – Dausa 765 kV D/c line (240 km) alongwith 240 MVAR Switchable line reactor for each circuit at each end

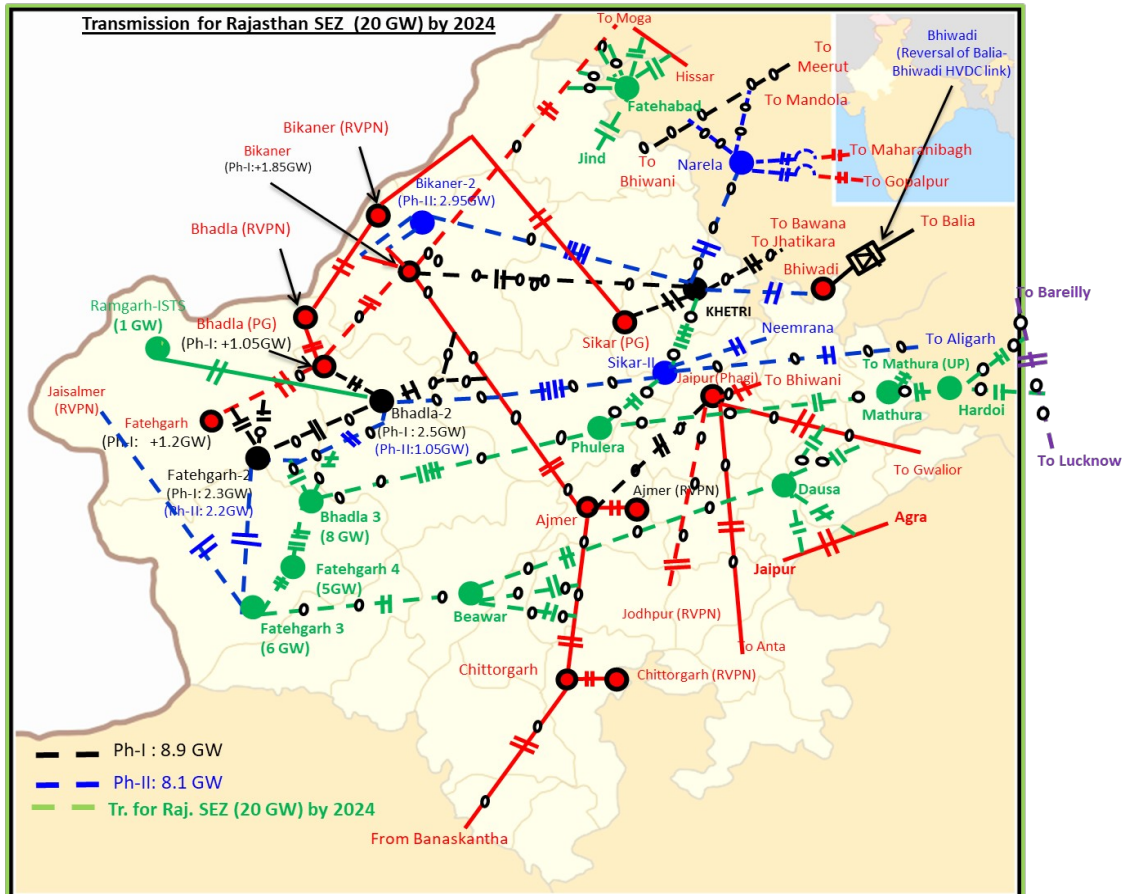
Note I:

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- 400kV/220kV bays for termination of developer feeders are not considered under the present scope. It was assumed that bays to be implemented by applicant. However, future space provision to be considered under the present scope.
- Reactive power support (both leading & lagging) from Solar Generation has been considered up to 0.98 pf.

*Availability of Space is to be verified

Estimated Cost – about Rs. 15,700 Cr.



Note-II: It may be noted that during 32nd meeting of NR for Connectivity & LTA Applications, M/s Adani Green Energy Four Limited was granted Stage-II Connectivity through 400 kV S/c line to Ramgarh-II PS from Dec '2022. Applicant requested to take up the implementation of 400 kV bay at Ramgarh-II under ISTS

Since development of generation projects is anticipated in various pockets of Rajasthan in three phases, the proposed corresponding Transmission system in three phases viz. PHASE-III A, PHASE-III B & PHASE-III C is given below:

PHASE-III A (FATEHGARH-6GW, BHADLA-4GW)

- Establishment of 4x1500 MVA 765/400kV & 7x500 MVA 400/220 kV pooling station at Bhadla-3 alongwith 2x330 MVAR Bus Reactor & 2x125 MVAR Reactor with suitable sectionalisation at 400kV & 220kV level
- LILo of both circuits of 765 kV D/c line between Bhadla-2 and Fahegarh-2 at Bhadla-3

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- iii) Establishment of 765 kV switching station at suitable location near Phulera alongwith 2x330 MVAR,765kV Bus Reactors.
- iv) Bhadla 3 – Phulera 765 kV 1st D/c line (310 km double ckt tower) alongwith 240 MVA Switchable line reactor for each circuit at each end of Bhadla 3 – Phulera 765 kV D/c line
- v) Phulera- Sikar-II 765 kV D/c(90 Km)
- vi) Sikar-II – Khetri 765 kV D/c line (90 km)
- vii) Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa alongwith 2x330 MVAR, 765kV Bus Reactors & 2x125 MVAR, 400kV Bus Reactors
- viii) LILO of both circuits of Jaipur-Gwalior 765 kV D/c at Dausa
- ix) LILO of both circuits of Agra – Jaipur 400kV D/c at Dausa
- x) Augmentation of 1x1500 MVA, 765/400kV ICT at Bhiwani(PG)* (Jind section) Substation
- xi) Augmentation of 1x1500 MVA ICT, 765/400kV ICT at Jhatikara* (Bamnauli section) Substation
- xii) Augmentation of 1x1500 MVA ICT, 765/400kV ICT at Fatehgarh-II* Substation
- xiii) Establishment of 4x1500 MVA 765/400kV & 6x500 MVA 400/220 kV pooling station at Fatehgarh-3(In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II) alongwith 2x330 MVAR,765kV & 2x125 MVAR, 400kV Bus Reactors alongwith suitable sectionalization at 400kV & 220kV level
- xiv) Establishment of 2x1500 MVA 765/400kV substation at suitable location near Mathura alongwith 2x330 MVAR Bus Reactor & 2x125 MVAR Reactor
- xv) Phulera – Mathura 765 kV D/c line (280 km) alongwith 1x240 MVA Switchable line reactor for each circuit at each end of Phulera – Mathura 765 kV D/c line
- xvi) Mathura – Mathura (UPPTCL) 400 kV D/c (quad) interconnection(10 KM)
- xvii) Establishment of 765 kV switching station at suitable location near Hardoi alongwith 2x330 MVAR 765 kV Bus Reactor
- xviii) Mathura – Hardoi 765 kV D/c line (300 km) alongwith 1x330 MVA Switchable line reactor for each circuit at each end of Mathura – Hardoi 765 kV D/c line
- xix) LILO of Lucknow-Bareilly 765 kV S/c at Hardoi (25km)
- xx) Establishment of 765 kV switching station substation at suitable location near Beawar alongwith 2x330 MVAR 765 kV Bus Reactor
- xxi) Fatehgarh-3– Beawar 765 kV D/c (350 km) alongwith 240 MVA Switchable line reactor for each circuit at each end of Mathura – Hardoi 765 kV D/c line
- xxii) LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar(45 km/per double circuit)
- xxiii) Beawar – Dausa 765 kV D/c line (240 km) alongwith 240 MVA Switchable line reactor for each circuit at each end

PHASE-III B (FATEHGARH-5GW)

- i) Augmentation with 2x1500 MVA(5th& 6th) 765/400kV ICT at Bhadla-3
- ii) Establishment of 10x500 MVA 400/220 kV pooling station at Fatehgarh-4 alongwith 2x125 MVAR Bus Reactor with suitable sectionalisation at 400kV & 220kV level
- iii) Fatehgarh-3- Fatehgarh-4 400 kV D/c(Quad) line (50 km)
- iv) Fatehgarh 4– Bhadla 3 400 kV 2XD/c line(Quad) (200 km/double ckt tower)
- v) Bhadla 3 – Phulera 765 kV D/c(2nd) line (310 km) alongwith 240 MVA Switchable line reactor for each circuit at each end of Bhadla 3 – Phulera 765 kV D/c line

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- vi) Establishment of 3x1500 MVA 765/400kV substation at suitable location near Fatehabad alongwith 2x330 MVAR,765kV Bus Reactors & 2x125 MVAR Bus Reactors
- vii) LILO of Bikaner-Moga 765 kV D/c at Fatehbad(110km/per double circuit)
- viii) LILO of Moga-Hissar 400kV D/c at Fatehabad(18km/ per double circuit)
- ix) Fatehabad-Jind 400kV D/c(Quad) line(90km)

PHASE-III C (BHADLA-4GW, RAMGARH-1GW)

- i) Augmentation with 4x1500 MVA(7th to 10th) 765/400kV & 5x500 MVA 400/220 kV ICT at Bhadla-3
- ii) Establishment of 2x500 MVA, 400/220 kV pooling station at Ramgarh (ISTS) alongwith 2x125 MVAR Bus Reactor
- iii) Ramgarh (ISTS) – Bhadla-2 400kV D/c (Quad) line(180 km) alongwith 125 MVAR line reactor at Ramgarh (ISTS) end on each circuit
- iv) Sikar-II – Khetri 765 kV D/c(2nd) line (90 Km)

Results of the system studies carried out with the proposed scheme for PHASE-III A, PHASE-III B & PHASE-III C is enclosed at **Exhibit-I(A), Exhibit-I(B) and Exhibit-I(C)** respectively along with Load Generation Balance of Northern Region.

Alternative-2-Hybrid Transmission scheme of HVAC & HVDC

1. Establishment of 10x500 MVA 400/220 kV pooling station at Fatehgarh-4 alongwith 2x125 MVAR Bus Reactor with suitable sectionalization at 400kV & 220kV level.
2. Establishment of 10x1500 MVA 765/400kV & 12x500 MVA 400/220 kV pooling station at Bhadla-3 alongwith 2x330 MVAR Bus Reactor & 2x125 MVAR Reactor with suitable sectionalization at 400kV & 220kV level.
3. Establishment of 2x500 MVA, 400/220 kV pooling station at Ramgarh (ISTS) alongwith 2x125 MVAR Bus Reactor.
4. LILO of both circuits of 765 kV D/c line between Bhadla-2 and Fahegarh-2 at Bhadla-3
5. Fatehgarh-3- Fatehgarh-4 400 kV D/c(Quad) line (50 km)
6. Fatehgarh 4– Bhadla 3 400 kV 2XD/c line(Quad) (200 km/double ckt tower)
7. Establishment of 765 kV switching station at suitable location near Phulera alongwith 2x330 MVAR,765 kV Bus Reactors.
8. Pulera – Dausa 765kV D/c(120 Km)
9. Ramgarh (ISTS) – Bhadla-2 400kV D/c (Quad) line(180 km) alongwith 125 MVAR line reactor at Ramgarh (ISTS) end on each circuit
10. Bhadla 3 – Phulera 765 kV 2xD/c line (310 km per double ckt tower) alongwith 240 MVAR Switchable line reactor for each circuit at each end of Bhadla 3 – Phulera 765 kV 2xD/c line
11. Phulera- Sikar-II 765 kV D/c(90 Km)
12. Sikar-II – Khetri 765 kV 2xD/c line (90km/double ckt tower)
13. Establishment of 3x1500 MVA 765/400kV substation at suitable location near Fatehabad alongwith 2x330 MVAR,765kV Bus Reactors & 2x125 MVAR Bus Reactors
14. LILO of Bikaner-Moga765 kV D/c at Fatehbad(110km/per double circuit)
15. LILO of Moga-Hissar 400kV D/c at Fatehabad(18km/per double circuit)

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16. Fatehabad-Jind 400kV D/c(Quad) line(90km)
17. Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa alongwith 2x330 MVAR Bus Reactor & 2x125 MVAR Reactor
18. LILO of both circuits of Jaipur-Gwalior 765 kV D/c at Dausa
19. LILO of both circuits of Agra – Jaipur 400kV D/c at Dausa
20. Augmentation of 1x1500 MVA, 765/400kV ICT at Bhiwani(PG)* (Jind section) Substation
21. Augmentation of 1x1500 MVA ICT, 765/400kV ICT at Jhatikara* Substation
22. Augmentation of 1x1500 MVA ICT, 765/400kV ICT at Fatehgarh-II* Substation
23. Establishment of 6x500 MVA 400/220 kV pooling station at Fatehgarh-3 alongwith 2x330 MVAR Bus Reactor & 2x125 MVAR Reactor with suitable sectionalization at 400kV & 220kV level
24. 5000MW, \pm 500kV Fatehgarh-IV VSC HVDC terminal station at suitable location near Fategarh
25. 5000MW, \pm 500kV Lucknow-III VSC HVDC terminal station at suitable location near Lucknow
26. Establishment of 5x1500MVA 765/400 kV ICT at Pooling station Lucknow (VSC) alongwith 2x330 MVA (765kV) Bus Reactor \pm 400kV HVDC line (Quad Lapwing - 2 Loops) between Fatehgarh-III & Lucknow-1000 km
27. Fatehgarh-III - Fatehgarh(VSC) 400kV 2xD/cLucknow(PG)-Lucknow(VSC) 765kV D/c
28. Lucknow(PG-765kV) - Lucknow(PG-400kV)*
29. Augmentation of 1x1500 MVA ICT*, 765/400kV ICT at Lucknow 765kV Substation

Note:

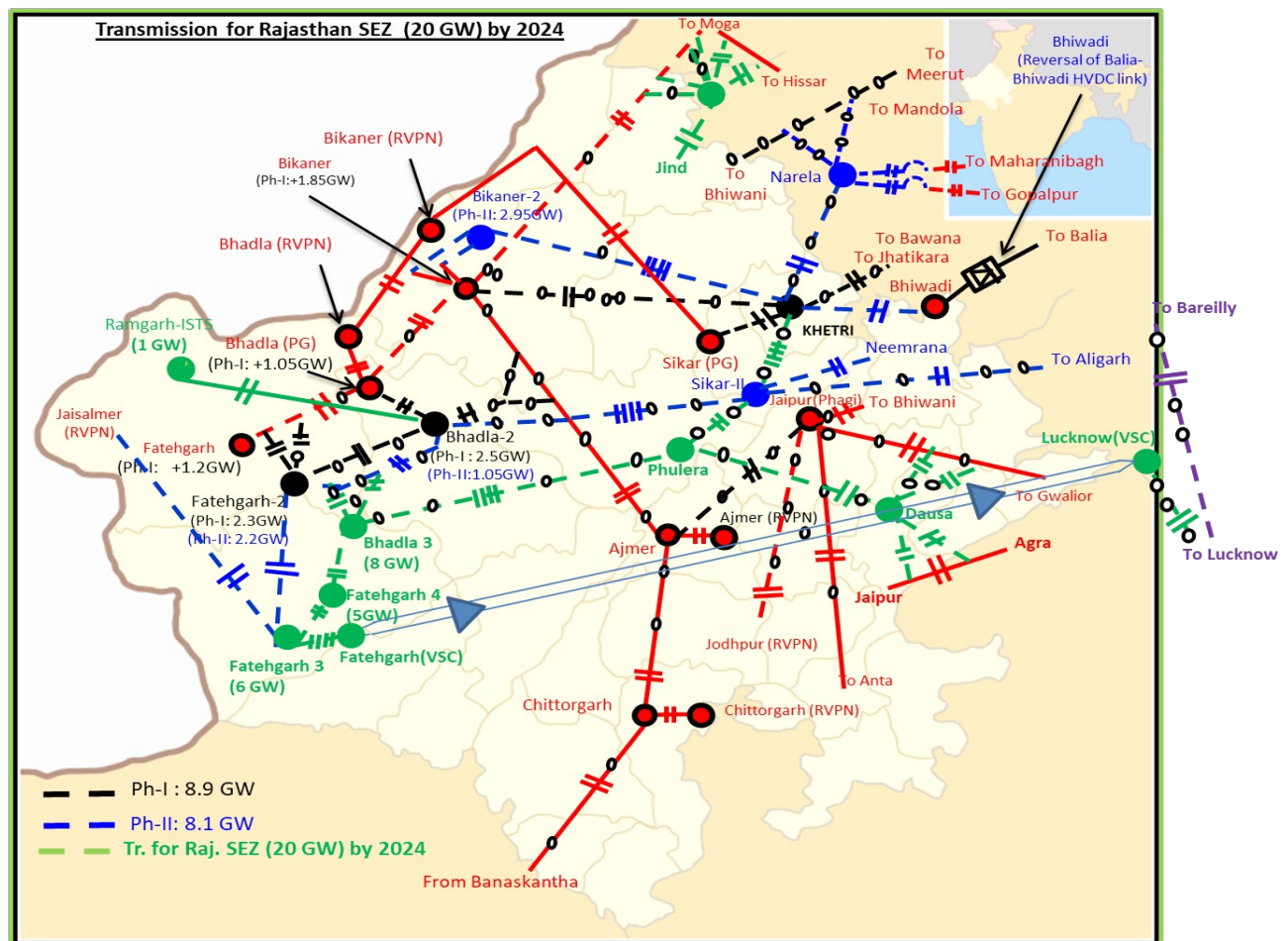
1. 400kV/220kV bays for termination of developer feeders are not considered under the present scope. It was assumed that bays to be implemented by applicant. However, future space provision to be considered under the present scope
2. Reactive power support (both leading & lagging) from Solar Generation has been considered up to 0.98 pf.
3. At some locations, violation of N-1 criteria is observed for 400/220kV ICTs at STU substations. STUs may review the underlying network for 2024 timeframe & confirm the same

*Availability of Space is to be verified

Estimated Cost – about Rs.22,950 Cr.

- **Schematic**

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The study results are enclosed as **Annexure –IV**.

7.5 The above studies have been circulated to all NR State constituents by CTU vide their email dated 8.07.2020 for their comments. However, no comments have been received.

7.6 Members may like to deliberate.

8.0 Transmission system for evacuation of power from Khurja STPP (2x660 MW) of THDCIL

8.1 Transmission system for evacuation of power from the proposed Khurja STPP (2x660 MW) of THDC was discussed in 40th NR Standing Committee meeting held on 22.06.2018, wherein THDC informed that UP has share of 60% of the total power from the project and remaining 40% power is for the other states of Northern Region. During the meeting, all the beneficiaries except UP opined that ISTS network should be planned for drawl of their allocated power from Khurja STPP and following was agreed:

- THDC to apply for connectivity and LTA (for quantum of allocated power to other States except UP) to CTU
- CEA / CTU to carry out the studies to plan the evacuation system for Khurja STPP.
- The connectivity lines (along with the bays) to the nearest ISTS point (to be decided after studies) may need to be implemented by THDC as per the regulations.
- UPPTCL to draw their share of power from Khurja STPP switchyard bus bar.

8.2 For further deliberations, a meeting was held in CEA on 19.02.2020 (minutes enclosed as **Annexure-V**), wherein CTU had informed that THDC vide letter dated 17.12.2019 has

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applied for Connectivity of Khurja thermal power plant (2x660 MW) of 528 MW (which is equivalent to allocated power in other states in Northern Region except UP) and THDC has requested the connectivity with the grid at 765/400 kV Aligarh substation of POWERGRID.

8.3 UPPTCL stated that they have signed the PPA for 60% of the power from Khurja STPP (2x660 MW). UPPTCL further stated that they have proposed to draw their share of power from Khurja STPP switchyard bus bar at both 220 kV and 400 kV levels. Also, they have proposed LILO of one circuit of the under-construction Aligarh - Shamli 400kV D/C at Khurja STPP for evacuation of their share of power.

8.4 However, THDC informed that 6 nos. of 400 kV bays and 1x125 MVAR, 400 kV bus reactor at generation switchyard has been proposed for evacuation of power and works are already been awarded and as such, there is no provision of 220 kV level at generation switchyard. THDC added that, as financial closure of the project has been achieved so there is no possibility of creation of 220kV level at generation switchyard at this stage.

8.5 CEA agreed that at this stage, no change can be done at Khurja STPP switchyard. CEA added that UPPTCL would require to draw their share of power at 400 kV level and UPPTCL may explore the possibility utilizing 4 nos. of 400kV line bays for drawing power from Khurja switchyard. UPPTCL agreed for the same and stated that they would study suitable locations for drawing power from Khurja STPP reliably.

8.6 After further deliberations, following was agreed:

- i. CTU to provide connectivity for 528 MW of Khurja STPP (2x660 MW) at Aligarh 765/400 kV substation. The 400 kV Khurja STPP – Aligarh lines along with 2 nos. of 400 kV bays at both ends to be constructed by generation developer i.e. THDCIL.
- ii. UPPTCL may establish LILO of one circuit of Aligarh – Shamli 400 kV D/C line at Khurja STPP as intra-state work for evacuation UP share power from Khurja STPP (2x660 MW).
- iii. UPPTCL to explore the possibility of drawing additional 400kV lines (2 nos.) from Khurja switchyard.

8.7 Members may like to deliberate.

9.0 Up-gradation of Tehri Pooling Station–Meerut 765kV 2xS/c lines (operated at 400 kV) at its rated voltage

9.1 Transmission system under Tehri PSP (1000 MW) includes 4x800 MVA, 765/400 kV ICTs and Tehri/Koteshwar Pooling station, charging of Tehri-Meerut at 765 kV 2xS/c line along with modification of series capacitors for operation at 765 kV level, 240MVAR on each circuit of above line at Meerut end & 240MVAR bus reactor at Tehri/Koteshwar Pooling Station. However, during the 39th SCM of NR, the issue of oscillations at Tehri complex (1400 MW existing) under n-1 contingency condition was discussed and it was agreed to de-link the up gradation of Tehri - Meerut 765 kV 2 x S/C lines (presently operated at 400 kV) along with reactive compensation with the commissioning of Tehri PSP generation project.

Subsequently, in 1st meeting of NRPCTP held on 24.01.2020, for evacuation of 1400MW power from Tehri generation complex, following was agreed:

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- i. 3x800 MVA ICTs & charging of Tehri-Meerut line at 765 kV may be covered as part of system strengthening
- ii. Charging of 4th 800 MVA ICT along with other associated elements to be matched with Tehri PSP

9.2 The above decisions were subject to consent from THDC. Accordingly, a meeting was held among CEA, CTU and THDC on 28.07.2020 through VC (copy of the minutes enclosed at **Annexure-VI**), wherein THDC informed that they have no objection in this regard, however, their generation project has been delayed and is likely to be commissioned by June 2022. On this, it was also informed that charging of Tehri-Meerut line at 765 kV level and three ICTs have been completed. It was further informed that LTA granted to THDC would be operationalized with the charging of following transmission elements which are expected by Dec'20:

- 4th 800MVA ICT at Tehri PS
- 3rd 1500MVA ICT at Meerut
- Tehri PSP – Tehri PS 400kV S/c line

9.3 Upon operationalization, THDC will have to pay the transmission charges of above elements till commissioning of generation project. After deliberations, following was agreed:

- 3x800 MVA ICTs at Tehri Pooling & charging of Tehri-Meerut line at 765 kV along with upgradation of series capacitors, 240MVA Line reactors at Meerut end and 240MVA Bus reactor at Koteshwar PS to be considered with the strengthening scheme.
- 18km line from Tehri PSP to the Pooling station, the 4th ICT at Tehri Pooling station and the 3rd ICT at Meerut to be considered associated with Tehri PSP
- THDC to expedite the commissioning of the Tehri PSP

9.4 Members may note.

10.0 Evacuation system for Singrauli STPP Stage III (2x800 MW)

10.1 The evacuation system for Singrauli Stage III (2x800 MW) was discussed in the 1st meeting of NRPCTP held on 24.01.2020 (extracts of the minutes enclosed at **Annexure-VII**), wherein it was decided that the short circuit level in Singrauli will again be studied by CEA and CTU and accordingly, would be discussed in the next NRPCTP meeting.

10.2 In this regard, load flow studies were done again by CEA, wherein 3-Ph Fault (A) Levels in Singrauli Anpara Complex With or Without Singrauli 400kV – Anpara 400kV S/c line were carried out with following observation:

S. No.	Bus Name	3 Ph Fault (A)	
		With Line	Without Line
1	SINGRAULI III 400.00	36342.8	36335.0
2	VINDHYACHAL V 400.00	30149.0	30142.9
3	ANPARA 400.00	51656.6	39272.9
4	ANPARA C 400.00	50465.7	38702.1
5	ANPARA D 400.00	45742.4	36121.2
6	OBRA 400.00	24404.5	23191.8
7	ANPARA C 765.00	23840.3	21762.0
8	RIHAND-GEN 400.00	29047.5	24030.9
9	RIHAND III 400.00	40798.9	40789.6

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10	SINGRAULI 400.00	41672.3	26421.3
11	VINDH-IV,V 400.00	38803.8	38795.3

10.3 It is noticed that with the opening of Singrauli- Anpara 400 kV S/c line, the 3-Phase fault level reduces significantly, therefore, the line can be kept normally open (could be closed in emergency conditions) after commissioning of Anpara D –Unnao 765kV line in order to restrict high short circuit level in Singrauli-Anpara complex.

10.4 Members may note.

11.0 Change in location in the earlier agreed transmission schemes: Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A

11.1 The transmission scheme “Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A” was agreed in the 5th meeting of NRST held on 13.09.2019 and was discussed in the 6th meeting of NCT. The scheme is to be implemented through TBCB route with M/s RECTPCL as BPC appointed by MoP vide Gazette notification dated 24.02.2020. The transmission scheme is currently under bidding. The scope of works under this scheme inter alia includes Establishment of Ramgarh-2 PS along with Ramgarh2 PS – Fatehgarh-2 PS 400kV D/c line (150 km) and Ramgarh-2 PS – Jaisalmer-2 (RVPN) 400 kV D/c line (60 km). However, with the proposed location of Ramgarh-2 PS, these transmission lines from this substation would have to pass through GIB Arc (habitat of Great Indian Bustard bird). In order to avoid GIB zone, Ramgarh-2 PS – Fatehgarh-2 PS 400kV D/c line have to circumvent the GIB area resulting in increase of line length to more than 450 km.

11.2 Three meetings were held on 08.04.2020, 20.04.2020 and 01.05.2020 in which discussions were held regarding shifting of Ramgarh-2 PS to appropriate new location. In the meeting held on 01.05.2020, the following was agreed:

- i. The new location for establishment of Ramgarh-2 PS under the transmission scheme ‘Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II - Part A’ agreed as: Fatehgarh-3 (Ramgarh-2 PS): Village Neemba, Tehsil Fatehgarh, District Jaisalmer (26°20'08"N and 71°04'48"E)
- ii. Since the substation is now shifted in Fatehgarh area, there should be futuristic land provision for evacuation of around 8-9 GW RE power instead of 1.9 GW as planned in Ramgarh-2 PS.

11.3 The pooling station which was planned in Ramgarh/Kuchheri potential SEZ is now been agreed to be shifted to Jaisalmer potential SEZ to avoid the GIB area. In the meeting held on 01.05.2019, it has also been agreed that adequate provision of space for 765kV level at Ramgarh-II (Fatehgarh-III) PS may be kept for future expansion. Subsequently, in the meeting held on 15.05.2020 amongst CEA and CTU, the future space requirement of Ramgarh-II (Fatehgarh-III) 400/220kV PS has also been revised/finalized. The modified scope of work under the transmission scheme ‘Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II - Part A’ is given below:

- a) Establishment of 400/220 kV, 4x500 MVA at Ramgarh-II (Fatehgarh-III) PS with 420kV (2x125 MVAR) bus reactor

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Future provisions: Space for

765/400kV ICTs along with bays: 8 nos.

765kV line bay alongwith switchable line reactor: 8 nos.

765kV Bus Reactor along with bays: 3 nos.

400/220 kV ICTs along with bays: 8 nos.

400 kV line bays along with switchable line reactor: 10 nos.

400kV Bus Reactor along with bays: 2 nos.

400kV Sectionalization bay: 2 nos.

220 kV line bays: 15 nos.

220kV sectionalization bay: 2 nos.

b) Ramgarh-II (Fatehgarh-III) PS – Fatehgarh-II PS 400kV D/c line (Twin HTLS*)

c) Ramgarh-II (Fatehgarh-III) PS – Jaisalmer-II (RVPN) 400kV D/c line (Twin HTLS*)

11.4 Looking at the high potential of Fatehgarh area, it was agreed to shift the Ramgarh-2 PS in the Fatehgarh area with the same connectivity.

11.5 Members may note.

12.0 Power Evacuation for various HEPs in the Chenab and Satluj Basin of Himachal Pradesh

12.1 MoP vide letter dated 14.07.2020 has requested CEA to plan the necessary transmission system for the evacuation of upcoming hydro projects of around 3000 MW capacity in the Chenab Basin of Himachal Pradesh. Also, SJVN vide their letter dated 23.06.2020 and 26.06.2020 has requested for the revision in the transmission system corresponding to the various hydro projects allotted to them by the Govt. of HP. Accordingly, a meeting was held on 17.07.2020 through VC with SJVN, NTPC and NHPC, the developers of these hydro projects for discussing the same.

12.2 The details of the upcoming hydro projects as described by the developers are as follows:

S. No.	Name of Hydro Electric Project	Tentative Installed Capacity	Tentative Commissioning Date
I	SJVN		
1.	Reoli Dugli HEP	458 MW	15.12.2029
2.	Purthi HEP	224 MW	15.03.2030
3.	Bardang HEP	168 MW	15.03.2030
II	NTPC		
1.	Seli	400 MW	
2.	Miyar	120 MW	
III	NHPC		
1.	Dugar HEP	449 MW	2029-30
IV	HIMURJA		
	33 Small Hydro Projects	113 MW	--

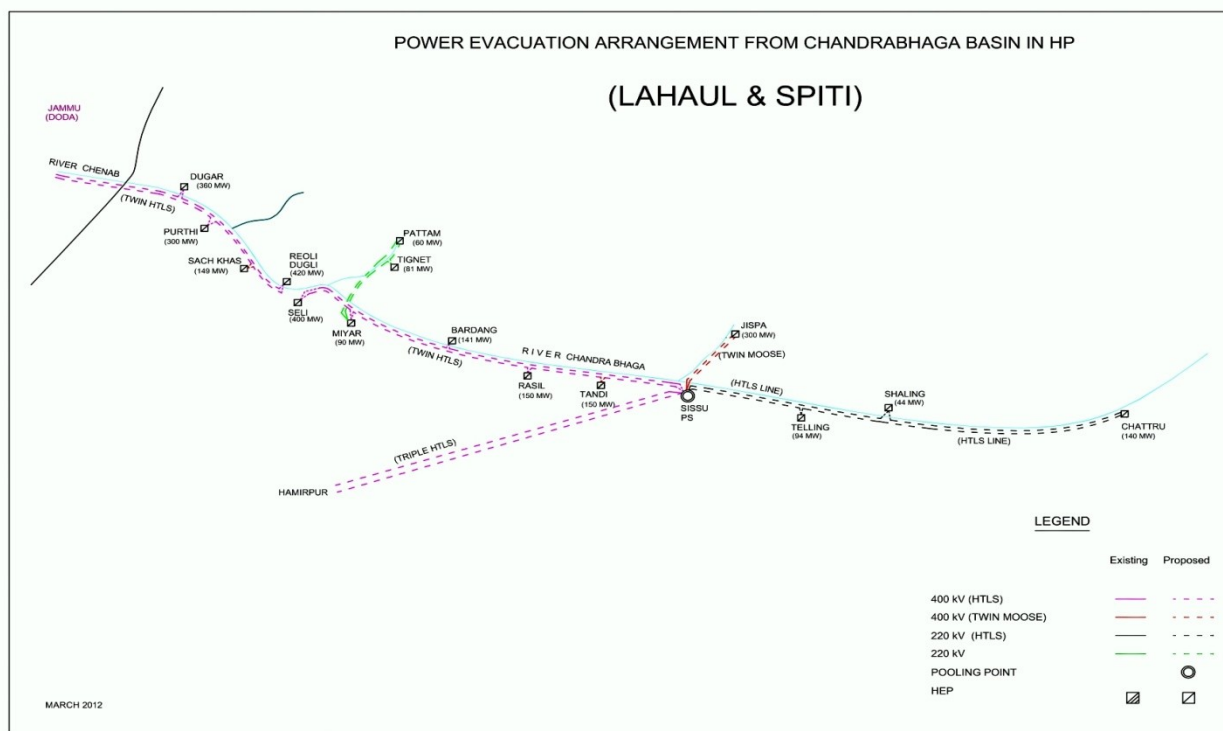
SJVN also informed that apart from the projects in Chenab Basin, Govt. of HP has also allotted Jhangi Thopan Powari HEP to SJVNL in the Satluj Basin of Himachal Pradesh. The tentative installed capacity of this project is 790 MW with 2028-29 as the tentative commissioning period.

12.3 During the meeting, MD, HPSEB informed that due to the lack of grid connectivity in the Chenab Basin, the huge capacity of hydro power coming in the area will be facing evacuation constraints. Also, as DGs won't be able to support the power for the

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construction activities of these projects, therefore some infrastructure for the transmission system needs to be planned in the initial phase. Further, he requested CPSUs that as the projects have been allotted by the Govt. of HP, so they should approach CTU and complete all the formalities like connectivity/LTA in order to firm up the evacuation system as the construction of the transmission lines may take longer time due to the difficult terrain in the region.

- 12.4** CEA stated that the power evacuation arrangement for the above mentioned hydro projects in Chenab Basin was planned earlier (map given below). Also, HPPTCL has recently proposed another alternative for power evacuation route through Sach Khas. The same proposal could be looked into according to the timeframe of the upcoming hydro projects.



- 12.5** CTU added that Kishtwar S/s in J&K was earlier planned for evacuation of around 1500 MW power from Dugar, Purthi, Sach Khas and Reoli Dugli HEP in HP along with Kirthai –I and Kirthai –II in J&K. Remaining projects of the Chenab Basin were planned to be evacuated through Hamirpur. In order to finalize the transmission system, CTU requested the generators to apply for Connectivity & LTA.

- 12.6** Director, HPPTCL informed that the survey for determining the route of SachKhas is currently being carried out. The details of the same will be intimated and accordingly the transmission system could be planned in that area.

- 12.7** After deliberations, it was agreed that the CPSUs would apply for connectivity for providing assurance with respect to the timeframe of the generation and looking into the details of Route Survey, the transmission system could be planned in consultation with HP.

- 12.8** Members maynote.

13.0 Evacuation arrangement of Tidong-I HEP in Distt Kinnaur (HP)

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- 13.1** The issue of evacuation of power from Tidong -I HEP was deliberated while discussing the power evacuation arrangements from the HEPs in Satluj Basin & Chandrabhaga Basin in Himachal Pradesh in the 30th meeting of Standing Committee on Power System Planning held on 19.10.2011, wherein following was agreed:

“Since, Tidong-I (100 MW) is due for commissioning in December, 2014 and Jangi Pooling station may not come up by that time, Tidong-I power shall be temporarily evacuated by LILO of one circuit of 220 kV D/C Kashang- Bhaba line at Tidong-I HEP. These works shall be carried out by HPPTCL. Later on when Jangi P.S. is commissioned, Tidong-I - Jangi line shall be constructed and also Kashang – Jangi 220 kV D/c line with single HTLS conductor shall be established. These works are proposed to be carried out by HPPTCL.”

- 13.2** In a meeting held in CEA on 13.03.2020 to discuss the Revision of Master Plan for the state of Himachal Pradesh, the evacuation arrangement of Tidong-I HEP (150 MW) was also discussed. It was intimated that expected commissioning date for Tidong-I (150 MW) is by 2021 and Kashang II –IV are by 2024/2025. Based on the deliberation in the above meeting and considering the site condition and the urgent need for Tidong-I to evacuate its power, the following system was agreed for evacuation of power from Tidong (150 MW) and Kashang HEPs Stage I to IV(243 MW) :

- i) Re-conductoring of the 220 kV Kashang to Wangtoo section of the Kashang-Bhaba 220 kV line with HTLS conductor.
- ii) One circuit of the Kashang –Wangtoo line to be LILOed at Tidong HEP Switchyard with HTLS conductor.

The above arrangement for evacuation of power from Tidong-I would be a temporary arrangement till the commissioning of Jangi P.S. After commissioning of Jhangi PS, Tidong –I would be connected to Jhangi PS through 220 kV D/C line.

- 13.3** Subsequently, STATKRAFT (developer of Tidong –I HEP) vide its letter dated 12.6.2020 has informed the following:

- i) Change of conductor from ACSR Zebra to HTLS will help only when the whole line is changed as mentioned above. Since HPPTCL plan to change the conductor is not known (most probably two year before commissioning of Kashang) only change of conductor by Tidong-I will not serve any purpose. Since Tidong -I project is going to get commissioned by 2021, and the ACSR Zebra conductor is already at site and has no replacement value, the same shall be used now and Tidong-I will also do the reconductoring along with HPPTCL.
- ii) The present arrangement is purely temporary in nature and when the Kashang will come to full capacity, Tidong will have to be connected to Jangi PS. It means even if Tidong and HPPTCL change their part of conductor, N-1 requirement cannot be fulfilled due lack of redundancy at Wangtoo PS. When Tidong I and HPPTCL will change the conductor of their part this should be considered as permanent solution.
- iii) During all the discussion with HPPTCL, M/s Tidong -I has proposed to change only one circuit of Tidong to LILO point with HTLS conductor and that would be

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sufficient to evacuate power of Kashang I, II, III (195 MW) and Tidong-I (150 MW), which was not reflected in the minutes of meeting.

13.4 Considering the submission made by M/s Tidong, and subsequent discussion with HPPTCL & CTU, following changes in the evacuation arrangement from Tidong –I (150 MW) were intimated to M/s Tidong –I:

- (1) Tidong I may execute the LILO of one circuit of the Kashang –Wangtoo line at Tidong HEP with ACSR Zebra conductor.
- (2) HPPTCL to carry out reconductoring of Kashang -Wangtoo line and Kashang-Bogtu-Wangtoo line matching with the timeframe of Kashang II, III, IV. Tidong developers should also reconductor, the LILO portion of the Kashang –Wangtoo line at Tidong HEP, matching with the Kashang II, III, IV time frame, so that there is no power evacuation constraint from Kashang HEP under N-1 contingency condition.
- (3) In the event of any power evacuation constraint during any line outage, generation back down should be carried out by the Tidong HEP in consultation with the SLDC.
- (4) In case of outage of transformer as Wangtoo, the loss of generation if any shall be borne by Kashang and Tidong-I in proportion to their generation.
- (5) On the commissioning of Jhangi Pooling station, Tidong –I HEP would also be connected to Jhangi Pooling Station.

13.5 Members maynote.

14.0 Issue regarding 1x80MVAR switchable Line reactor on each circuit at Khetri end of Bikaner-II – Khetri 400 kV 2xD/c Line:

14.1 Ministry of Power vide Gazette Notification dated January 27, 2020 appointed PFC Consulting Limited (PFCCL) as Bid Process Coordinator (BPC) for development of “Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II Part-F” through Tariff Based Competitive Bidding Process. The scope of the transmission scheme includes the following;

- i) Establishment of 400/220 kV, 6x500 MVA Pooling Station at Bikaner –II PS with suitable bus sectionalisation at 400 kV and 220 kV level and with 420kV (2x125 MVAR) bus reactor
- ii) Bikaner-II PS – Khetri 400 kV 2xD/c line (Twin HTLS* on M/c Tower)
- iii) 1x80MVAR switchable Line reactor on each circuit at Khetri end of Bikaner-II – Khetri 400 kV 2xD/c Line
- iv) 4 no. of 400 kV line bays at Khetri for Bikaner –II PS – Khetri 400kV 2xD/c line
- v) Khetri- Bhiwadi 400 kV D/c line (Twin HTLS)
- vi) 2 no. of 400 kV line bays at Khetri for Khetri - Bhiwadi 400kV D/c line
- vii) 2 no of 400 kV(GIS) line bays at Bhiwadi for Khetri- Bhiwadi 400 kV D/c line
- viii) STATCOM at Bikaner–II S/s

14.2 As per the scope of the scheme, the developer of the Khetri S/s has to provide space for 6 nos. of 400kV bays and space for 4 nos. of switchable line reactors. The developer of Khetri S/s i.e. Khetri Transmission Limited (owned by PGCIL) intimated that the space for 6nos. of bays are available at the Khetri switchyard. However, since the future space

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provision for switchable line reactors at Khetri S/s was not kept, therefore space for 4 nos. of switchable line reactors are not available.

- 14.3** A meeting was held on 09.07.2020 and 05.08.2020 through VC with officials from PFCCL, CTU, CEA and M/s KTL to discuss the above issue, wherein POWERGRID Khetri Transmission System Limited informed that installation of switchable Line reactors for Bikaner-II – Khetri 400kV 2xD/c requires procurement of about 3200 Sq.m. Of contiguous land by the developer of the line. BPC opined that procurement of contiguous land and obtaining clearances from statutory authorities may unnecessarily delay the project and it would be difficult to meet tight timelines.
- 14.4** Considering the length of the line approximately about 280 km as indicated by PFCCL based on the information received through survey, it was decided that fixed line reactors may be considered at Khetri S/s instead of switchable line reactor and if the same can be accommodated in the available space then acquisition of additional land can be avoided. POWERGRID Khetri Transmission System Limited informed that as per their assessment with fixed line reactors the reactors can be accommodated within the available space at Khetri S/s.
- 14.5** Based on the discussions, it was agreed that the 1x80MVA switchable Line reactor on each circuit at Khetri end of Bikaner-II – Khetri 400 kV 2xD/c Line may be taken as fixed line reactors under the scheme “Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II Part-F” and accordingly necessary changes may be done in the bidding document.
- 14.6** Members may note.
- 15.0 Grant of 400kV bays to RE generators at Bhadla-II PS, Fatehgarh-II, & Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS.**
- 15.1** While planning of Transmission system for SEZ in Rajasthan under Phase-I & II, it was envisaged that RE generation projects would get connected to ISTS at 220 kV level. However, SECI has come out with manufacturing linked tenders with bulk capacities of RE generation projects. RE generators who have won bids under SECI manufacturing linked tender, have applied for RE generation capacities for up to 1000 MW at a single ISTS pooling station and sought connectivity at 400 kV level.
- 15.2** Accordingly, after deliberations in NR LTA & Connectivity meetings, it was agreed that these RE generators may be granted Stage-II Connectivity at 400 kV level instead of 220 kV level for optimum utilization of bays. The details are as below:

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Sl. No	Applicant	Date of Application	Stage-II Connectivity Sought (MW)/date	Connectivity Point	Dedicated Tr. system
1.	NTPC Ltd.	08/11/2019 + 26/02/2020	250 + 300 (01/09/2021)	Bhadla-II PS	NTPC Ltd. 300 MW Power plant – Common PS of NTPC’s 250MW& 300 MW Solar Project located at Kolayat through 220 kV S/c line and Common PS – Bhadla-II PS through 400 kV S/c line (already granted for 250 MW plant)(suitable to carry 900 MW under nominal voltage) – to be implemented by applicant along with bay at generation switchyard & Common PS. (400 kV Bay already granted for 250 MW plant at Bhadla-II PS is proposed under the scope of ISTS)
2.	Azure Power India Private Limited	18/12/19	500 (07/04/2022)	Bhadla-II PS	Azure Power India Pvt. Ltd. Power Plant (For appl. No. 1200002401 & 1200002403 being combined together)- Bhadla-II P.S 400 kV S/c line (suitable to carry 1000 MW under nominal voltage) – to be implemented by applicant along with bay at generation switchyard. 400 kV Bay at Bhadla-II PS is proposed under the scope of ISTS.
3.	Adani Green Energy Four Limited	08/01/20	500/ 31/01/2022	Bhadla-II PS	Adani Green Energy Four Ltd. Power Plant- Bhadla-II P.S 400 kV S/c line (suitable to carry minimum capacity of 900 MW under nominal voltage) – to be implemented by applicant along with bay at generation switchyard. 400 kV Bay at Bhadla-II PS is proposed under the scope of ISTS.
4.	Azure Power India Private Limited	18/12/19	500 (07/04/2024)	Fatehgarh-II PS	Azure Power India Pvt. Ltd. Power Plant- Fatehgarh-II P.S 400 kV S/c line (suitable to carry minimum capacity of 1000 MW under nominal voltage) – to be implemented by applicant along with bay at generation switchyard. 400 kV Bay at Fatehgarh-II PS is proposed under the scope of ISTS.
5.	Azure Power India Private Limited	18/12/19	500 (31/10/2025)	Fatehgarh-III PS (erstwhile Ramgarh-II)	Azure Power India Pvt. Ltd. Power Plant- Fatehgarh-III (erstwhile Ramgarh-II) 400 kV S/c line (suitable to carry 900 MW under nominal voltage) – to be implemented by applicant along with

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Sl. No	Applicant	Date of Application	Stage-II Connectivity Sought (MW)/date	Connectivity Point	Dedicated Tr. system
					bay at generation switchyard. 400 kV Bay at Fatehgarh-III PS is proposed under the scope of ISTS.

15.3 In view of the above and also as given in with RE detailed Procedure “For the connectivity system, the dedicated transmission line including line bays at generation pooling station shall be under the scope of the applicant and the terminal bays at the ISTS sub-station shall be under the scope of transmission licensee owning the ISTS sub-station subject to compliance of relevant provision of tariff policy”, it is proposed that the above 5 nos. of 400 kV bays (Bhadla II- 3 nos., Fatehgarh-II- 1 no. & Fatehgarh-III-1 no.) may be taken up for implementation under ISTS with time frame indicated above.

15.4 Members may like to deliberate.

16.0 2 nos. of 765kV GIS line bays Modules at Aligarh S/s

16.1 Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II was agreed in the 5th meeting of Northern Region Standing Committee on Transmission (NRSCT) held on 13.09.2019. The scheme also includes Sikar-II – Aligarh 765kV D/c line along with 765kV line bays & line reactors at each end. However, it is to inform that 2 nos. of 765kV GIS line bay modules are already available at Aligarh S/s. Accordingly, it is proposed that above GIS line bay modules available at Aligarh S/s may be utilized for termination of Sikar-II – Aligarh 765kV D/c line may at Aligarh S/s.

16.2 Members may note.

17.0 Phasing of Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II

17.1 Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II was agreed in the 5th meeting of Northern Region Standing Committee on Transmission (NRSCT) held on 13.09.2019 with completion schedule as Dec’21. Subsequently, Time frame of above mentioned scheme was discussed in a meeting held among CEA, MNRE, CTU & SECI on 22.05.2020 wherein it was decided to revise the completion schedule of the subject scheme as Mar’22/June’22, however, based on schedule of Stage-II Connectivity at Fatehgarh-II & Bhadla-II S/s, schedule of 220kV bays at these S/s was kept unchanged i.e. Dec’21. Detailed phasing is attached at **Annexure-VIII**.

17.2 Members may note.

18.0 Spare Reactor at Narela

18.1 Provision of spares and future space for Transmission system for Solar Energy Zones (8.1GW) under Phase-II was agreed in 1st NRPC (TP) meeting held on 24.01.2020. In the minutes of 1st meeting of NRPC (TP), it was mentioned that 1x110 MVAR spare reactor at Khetri end would be used as spare for Khetri – Narela 765 kV D/c line. However, it may be noted that no line reactor is envisaged for this line at Khetri end and spare reactor is

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required at Narela end for which no provision has been made. Accordingly, 1x110MVAR spare reactor at Khetri may be read as 1x110MVAR spare reactor at Narela (GIS) end. The same is summarized below:

As per 1 st NRPCTP meeting	Revision
1x110 MVAR spare reactor at Khetri to be used as spare for Khetri – Narela 765 kV D/c line	1x110 MVAR spare reactor at <u>Narela(GIS)</u> to be used as spare for Khetri – Narela (GIS) 765 kV D/c line

18.2 Members may note.

19.0 Additional 80 MVAR, 765kV Spare Reactor at Bhadla-II S/s

19.1 Fatehgarh II – Bhadla II 765kV D/C(2nd) line along with 2x240 MVAR switchable line Reactors at both ends were envisaged without additional spare reactor under Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II. During 1stNRPC (TP) meeting held on 24.01.2020, it was agreed that 1x80 MVAR spare reactor (Identified under Rajasthan SEZ Ph-I) each at Fatehgarh-II and Bhadla-II to be used as spare for Fatehgarh-II – Bhadla-II 765kV D/c line (2nd).

19.2 However, based on the Electrical layout of 765kV Bhadla-II S/S, it is to mention that 80 MVAR spare Reactor proposed under Rajasthan SEZ, Phase-I is on the opposite side of switchyard w.r.t. the bays being proposed for termination of Bhadla II – Fatehgarh II 765kV D/c(2nd) line at Bhadla-2 S/S. Further, in order to utilize the same 80 MVAR spare Reactor under present scope, the 765kV and 145kV Auxiliary Buses needs to be extended from one side of switchyard to the other side (approx. 750 meters) involving crossings under the 765kV lines inside the substation. In order to avoid such complex layout constraints, it is proposed to have the separate spare unit of 1x80 MVAR line Reactor at Bhadla-II. Spare reactor shall also be utilized for 240 MVAR line reactors on each circuit of Bhadla-II – Sikar-II 765kV 2xD/c line at Bhadla-II end.

19.3 Members may discuss.

20.0 Additional 1x500 MVA, 400/220kV ICT (8th) at Bhadla Pooling Station

20.1 Presently, for evacuation of 3380MW power from Solar Generation Projects/Solar Parks near Bhadla, 7 nos. of 500 MVA ICTs are being implemented at Bhadla Pooling Station. Subsequently, 150MW LTA to Tata Power has also been granted in 14th Connectivity / LTA meeting of NR held on 17/08/2018. Thus total LTA from Bhadla including evacuation of power from solar generation projects/solar parks along with this LTA shall become 3530 MW against already planned transformation capacity of 3500 MW.

20.2 Further, as per Transmission Planning Criteria, the “N-1” criteria may not be applied to the immediate connectivity of wind/solar farms with the ISTS/Intra-STS grid i.e. the line connecting the farm to the grid and the step-up transformers at the grid station. Therefore, to evacuate power from solar parks / generators, for which LTA has been granted, it is proposed to augment the transformation capacity of Bhadla Pooling Station by 1x500 MVA ICT.

20.3 Members may approve.

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21.0 Connectivity & LTA Status for Rajasthan SEZ Phase-I & II

21.1 Transmission System for Rajasthan SEZ Phase-I (8.9GW) & Phase-II (8.1GW) has been agreed in 3rd NRSCT meeting and 5th NRSCT meeting held on 24.05.2019 & 13.09.2019 respectively. The details of Connectivity/LTA received/granted/agreed for grant at various pooling stations is as below:

Sr. No.	Pooling Station	Potential (GW)		Stage-II Connectivity (GW)		LTA (GW)	
		Phase-I	Phase-II	Received	Granted/Agreed for grant	Received	Granted/Agreed for grant
1	Bhadla	1.05	-	1.25	1.25	1.2	1.2
2	Bhadla-II	2.5	1.05	6.14	5.74	1.415	1.415
3	Fatehgarh	1.2	-	1.2	1.2	1.2	1.2
4	Fatehgarh-II	2.3	2.2	5.485	5.485	3.12	3.12
5	Fatehgarh-III (erstwhile Ramgarh-II)	-	1.9	5.28*	2.38	0.98	0.98
6	Bikaner	1.85	-	2.94	2.4	2.1	2.1
7	Bikaner-II	-	2.95	0.225	-	0.225	-
	Total	8.9	8.1	22.52	18.455	10.24	10.015

**It is to be noted that against the RE potential of 1.9 GW envisaged at Fatehgarh-III PS, we have received Stage-II Connectivity applications for 5.28 GW.*

21.2 In addition to above, earlier 2.33GW LTA at Bhadla and 1 GW LTA at Fatehgarh has also been granted. Details of Connectivity/LTA agreed/granted during 31st – 36th Connectivity and LTA meeting of NR Constituents held from Jan'20 to Jul'20 is given at **Annexure-IX**. Further, during aforesaid period the list of MTOA applications received & granted involving Northern Region is attached at **Annexure-X**.

21.3 Members may note.

22.0 Time frame of 1 no. of 220kV bays at Shahjahanpur (PG) under ISTS

22.1 In 1st NRPCTP meeting held on 24.01.2020, based on UPPTCL request, for LILO of Sitapur – Shahjahanpur 220 kV SC line at Shahjahanpur POWERGRID 400 kV substation, 1 no. of 220kV bay under ISTS was agreed. It was also agreed to implement the above bay in matching timeframe of LILO of Sitapur (UPPTCL) – Shahjahanpur (UPPTCL) 220 kV S/c line at Shahjahanpur (PG). However, timeframe for above bay is yet to be informed by UPPTCL.

22.2 UPPTCL may inform the timeframe for implementation of above 220kV bay.

23.0 LILO of both circuits of Fatehgarh (TBCB) – Bhadla (PG) 765kV D/c line (to be operated at 400kV) at Fatehgarh-II – Conductor for LILO in Portion

23.1 Transmission System for Solar Energy Zones in Rajasthan (8.9GW) under Phase-I was agreed in 3rd NRSCT held on 24.05.2019. Presently, the scheme is under implementation. The scheme also includes LILO of both circuits of Fatehgarh (TBCB) – Bhadla (PG) 765kV D/c line (to be operated at 400kV) at Fatehgarh-II so as to establish Fatehgarh (TBCB) – Fatehgarh-II 400kV D/c line (765kV D/c line to be operated at 400kV) and Fatehgarh-II – Bhadla (PG) 765kV D/c line. Further, charging of Fatehgarh-II – Bhadla (PG) section at 765kV (after LILO) has also been agreed.

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23.2 As the line i.e. Fatehgarh (TBCB) – Fatehgarh-II 400kV D/c line is to be charged at 400kV and future up gradation of this line at 765kV level has not been envisage. Accordingly, to optimize the cost, HTLS conductor having ampacity of 1574 Amps is being considered for LOOP IN portion of the subject line.

23.3 Members may note.

24.0 Transmission works intimated by HVPNL

24.1 HVPNL vide their letter no Ch-60 HSS 391 dated 30.06.2020 has intimated various 220 kV Intra-State transmission schemes involving reconfiguration/inter-connection with 400 kV ISTS elements.

24.2 HVPNL has awarded/in process to award the following intra-state transmission schemes which are connected with ISTS system and needs to be approved from NRPCTP. Details of the schemes are:

(1) Creation of 2x160 MVA, 220/66 kV GIS substation in the yard of existing 66 kV AIS Sector 15-II, Gurgaon (along with space for providing 1 No. 220 kV T/F bay and 2 No. 220 kV line bays in future to be kept in 220kV GIS building) with following connectivity:

- LILO of 220 kV circuit no. 04 from 400 kV Substation Sector 72, Gurugram (PGCIL) to 220 kV Substation Sector 72, Gurugram (HVPNL) at 220 kV Substation Sector 15-II, Gurugram.

(2) Augmentation of existing 3 No. 220 kV S/C lines between 400 kV Sector-72 Gurugram (PGCIL) & 220 kV substation Sector-72 Gurgaon (HVPNL) from single moose ACSR to single HTLS conductor having current carrying capacity equivalent to twin moose ACSR conductor.

(3) LILO of one circuit of 220 kV Nuna Majra- Daultabad D/C line with twin moose conductor at 400 kV substation Bahadurgarh (PGCIL)

(4) LILO of one circuit of 220 kV D/C A-4 to A-5 line at NTPC Faridabad

(5) Replacement of existing 0.4 sq inch conductor of 220 kV D/C PGCIL Khanpur-Kaithal line with HTLS conductor of equivalent size of zebra conductor.

(6) Augmentation of 0.4 sq inch ACSR conductor of 220 kV D/C Khatkar-Mund line with conductor having current carrying capacity of 1200 A

24.3 HVPNL also intends to create 220 kV substation Harfali instead of 220 kV Prithla which was approved in 39th SCM. Details of Harfali infrastructure (which is to be approved) and Prithala (which is to be cancelled) are tabulated as under:

S.No.	Name of the transmission scheme	SCM/NRSCT meeting reference
1.	Creation of 220 kV AIS substation Harfali with installed capacity of 2x100 MVA, 220/66 kV + 2x12.5/16 MVA, 66/11 kV T/Fs to be fed from 400 kV ISTS Prithla in the FY 2023-24 along with creation of the following 220 kV bays:	39th SCM Item No. 8.0 2 no. 220 kV bays were allocated for 400 kV Prithla to 220 kV Prithla

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S.No.	Name of the transmission scheme	SCM/NRSCT meeting reference
	<p>i. 2 no. 220 kV bays for 2x100 MVA, 220/66 kV T/Fs.</p> <p>ii. 2 no. 220 kV line bays for accommodating line i.e. Creation of 220 kV D/C line from 400 kV ISTS substation Prithla to 220 kV substation Harfali with 0.5 sq” ACSR Moose conductor on overhead arrangement with LILO of one circuit at 220 kV substation Meerpur Kurali with 0.5 sq” ACSR Moose conductor on overhead arrangement.</p> <p>iii. 2 no. 220 kV line bays for accommodating line i.e. LILO of one circuit of 220 kV D/C Samaypur-Palwal overhead line at 220 kV substation Harfali with 0.4sq” ACSR conductor.</p> <p>iv. 1 no. 220 kV Bus Coupler bay.</p> <p>v. The space may be kept for future bay for installation of 1 no. 220/66 kV T/F & for creation of 4 nos. 220 kV line bays.</p> <p>vi. The space may be kept for future bays for installation 1 no. I/C for 220/66 kV T/Fs.</p> <p>The connectivity of the 220 kV AIS substation Harfali at 220 kV level is given as under:</p> <p>i. Creation of 220 kV D/C overhead line on M/C & D/C towers from 400 kV ISTS substation Prithla to 220 kV substation Harfali (approx. line length=15kms) with 0.5 sq” ACSR Moose conductor on overhead arrangement with LILO of one circuit at 220 kV substation Meerpur Kurali on M/C & D/C towers with 0.5 sq” ACSR Moose conductor on overhead arrangement in FY 2023-24 (approx. line length=40km).</p> <p>ii. Creation of LILO of one circuit of 220 kV D/C Samaypur-Palwal line at 220 kV substation Harfali with 0.4 sq” ACSR conductor on overhead arrangement in FY 2023-24 (approx. line length=1km).</p>	D/C line and same may be allocated to present scheme.
3.	<p>Cancellation of the following in-principle works approved by HVPNL :-</p> <p>i. Creation of new 220 kV AIS/GIS Substation at Prithla depending upon the availability of land in Prithla area by 220 kV D/C line with HTLS conductor having capacity equivalent to twin moose from 400kV Substation Prithla with 2x160 MVA , 220/66kV transformer with a provision of 1x160 MVA , 220/66kV transformer in future.</p> <p>ii. Allocation of two no. 220 kV bays at 400kV</p>	<p>39th SCM Item No. 8.0 Approved in 39th SCM, now may be cancelled.</p>

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S.No.	Name of the transmission scheme	SCM/NRSCT meeting reference
	<p>Substation Prithla to terminate 220 kV D/C line between 400kV ISTS, Prithla & 220 kV Substation Prithla.</p> <p>iii. Allocation of two no. 220 kV bays at 220 kV Substation Prithla to terminate 220 kV D/C line between 220 kV Prithla and 220 kV Meerpur kurali.</p> <p>Cancellation of the following in-principle works approved by HVPNL:-</p> <p>i. Creation of 220 kV D/C Prithla – Meerpur Kurali line with 0.5 sq. inch ACSR conductor (pprox.. aerial distance 35 km as per Google map) in FY2019-20 matching with the commissioning of 400 kV ISTS Substation, Prithla.</p> <p>ii. Allocation of two no 220 kV bays at 220 kV Meerpur Kurali to terminate 220 kV D/C Prithla – Meerpur Kurali line.</p>	

24.4 The following 220 kV transmission schemes have already been apprised in the agenda item “*Down Stream network by State utilities from ISTS Station*” in various SCM/NRSCT/NRPCTP, and are placed for specific approval of the NRPC(TP) in order to avoid future complications w.r.t. obtaining charging code from NRLDC.:

S.No.	Name of the transmission scheme	SCM/NRSCT meeting reference
1.	Creation of LILO of both circuits of 220 kV D/C Badshahpur - Sector 77 Gurugram at 400 kV Sohna Road, Gurugram	40th SCM Item no. 36.1 and 36.2
2.	Creation of LILO of both circuits of 220 kV Sector 69-Roj Ka Meo D/C line at 400 kV Sohna Road, Gurugram	1st NRSCT Item no. 14.2 and 14.3
3.	Augmentation of balance conductor of 220 kV D/C Badshahpur- Sohna Road line after the LILO work placed at Sr. No. 1 above from 0.4 sq inch ACSR conductor to 0.4 sq inch AL-59 conductor	2nd NRSCT Item no. 12.2 and 12.3
4.	Creation of 220 kV D/C line from 800 kV substation PGCIL Bhadson to 220 kV substation Salempur	3rd NRSCT Item No. 33
5.	Creation of 220 kV D/C line from 765 kV substation PGCIL Bhiwani to 220 kV substation Isharwal (HVPNL)	1st NRPC(TP) Item No. 26.0
6.	Creation of 220 kV D/C line from 765 kV substation PGCIL Bhiwani to 220 kV substation Bhiwani (HVPNL)	
7.	Creation of LILO of both circuits of 220 kV Narwana-Mundh D/C line at 400 kV substation Khatkar, Jind (PGCIL)	
8.	Creation of LILO of both circuits of 220 kV Pali-	

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S.No.	Name of the transmission scheme	SCM/NRSCT meeting reference
	Sector 56 Gurugram D/C line at 400 kV substation Kadarapur	
9.	Creation of LILO of both circuits of 220 kV Pali-Sector 65 Gurugram D/C line at 400 kV substation Kadarapur	
10.	Creation of 220 kV D/C line from 400 kV substation PGCIL Panchgaon to 220 kV HVPNL Panchgaon (2x160 MVA, 220/66 kV + 1x100 MVA, 220/33 kV)	31st SCM Item No. 18 The downline system of 400 kV Panchgaon (PGCIL) was submitted to CEA vide HVPNL office letter memo no. Ch-23/HSS-152/Vol-XV dated 20.3.2013
11.	Creation of 2x160 MVA, 220/132 kV + 2x100 MVA, 220/33 kV GIS substation at HSIIDC, Rai (Sonepat). 220 kV GIS bays: i. 4 No. 220 kV bays for 2x160 MVA, 220/132 kV+2x100 MVA, 220/33 kV transformers. ii. 1 No. 220 kV bays for 220 kV bus coupler iii. 4 No. 220 kV line bays for D/C line each from Deepalpur and Jajji iv. Space for 2 No. 220 kV line bays in future. The connectivity of the 220 kV GIS substation, HSIIDC, Rai (Sonepat) at 220 kV level is given as under: i. Creation of 220 kV D/C line (0.5 sq inch ACSR) from 400 kV substation Jajji (PGCIL) to 220 kV substation HSIIDC, Rai (Sonepat)	39th SCM Item No. 7.0 It has been stated that 2 No. of bays at Jajji (PG) would be utilized for connectivity of HSIIDC Rai S/s. HVPNL has awarded the work for creation of HSIIDC Rai.
	ii. Creation of 220 kV D/C line (0.5 sq inch ACSR conductor) on multi circuit towers from 400 kV substation Deepalpur to 220 kV substation HSIIDC Rai enroute 220 kV substation RGENC.	31st SCM Item No. 18 The downline system of 400 kV Deepalpur was submitted to CEA vide HVPNL office letter memo no. Ch-23/HSS-152/Vol-XV dated 20.3.2013

24.5 Members may like to note.

25.0 Down Stream network by State utilities from ISTS Station:

25.1 Augmentation of transformation capacity in various existing substations as well as addition of new substations along with line bays for downstream network are under implementation at various locations in Northern Region. For utilization of these transformation capacities, implementation of downstream 220kV system needs to be commissioned. Monitoring of downstream network is also being carried out in monthly OCC meetings.

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S. No.	Substation	Downstream network bays	Commissioning status of S/s / Transformer	Planned 220kV system and Implementation Status
1	400/220kV, 3x315 MVA Samba	2 nos. bays utilized under ISTS. Balance 4 nos to be utilized	Commissioned (1 st & 2 nd – Mar'13 3 rd – Oct'16) Bays – Mar'13	<ul style="list-style-type: none"> • LILO of 220 kV Bishnha – Hiranagar D/c line. • 220kV D/c Samba (PG) – Samba (JKPDD) approved in 1st NRSCT. PDD, J&K to update.
2	400/220kV, 2x315 MVA New Wanpoh	6 Nos. of 220 kV bays to be utilized	Commissioned in Jul'14. Bays – Jul'14	<ul style="list-style-type: none"> • 220 kV New Wanpoh - Mirbazar D/c line. Target completion – March, 2019. • 220 kV Alusteng - New Wanpoh Line. PDD, J&K to update.
3	400/220kV, 2x500 MVA Kurukshetra (GIS)	4 nos. of 220 kV bays to be utilized	Commissioned in Mar'17	<ul style="list-style-type: none"> • 220kV D/c Bhadson (Kurukshetra) – Salempur with HTLS conductor equivalent to twin moose. P.O. issued on 15.10.18. Contract agreement signed on 30.11.18. Target completion - 30.04.2020. HVPNL to update.
4	400/220kV, 2x315 MVA Dehradun	Out of 6 bays, only two bays used. Balance 4 bays to be utilised.	Commissioned in Jan'17	<ul style="list-style-type: none"> • 220 kV Dehradun-Jhajra line. Target completion: Nov, 2021 PTCUL to update.
5	Shahjahanpur, 2x315 MVA 400/220 kV	Partially utilized. Balance 4 Nos. of 220 kV bays to be utilized.	Commissioned in Jun/Sep'14	<ul style="list-style-type: none"> • 220 kV D/C Shahjahanpur (PG) - Azimpur D/C line. Target completion - Dec, 2020. • 220 kV D/C Shahjahanpur (PG) - Gola line. Target completion - Dec, 2020. UPPTCL to update.
6	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. Target completion - Dec, 2020. 4 bays – Dec'13, 2 bays – Mar'14, 2 bays – Mar'19	<ul style="list-style-type: none"> • 220 kV D/C Hamirpur-Dehan line. HPSEBL to update.
7	Kaithal 400/220 kV 1x 315 MVA Sub-station	July 2017 (Shifting of transformer from Ballabgarh)	Commissioned	<ul style="list-style-type: none"> • 220 kV Kaithal(PG)- Neemwala D/c line. Target completion - 25.02.2020. HVPNL to update.
8	Sikar 400/220kV, 1x 315 MVA S/s	2 Nos. of 220 kV bays	Commissioned	Retendering to be done in Dec'19 RRVNL to update.
9	Bhiwani 400/220kV S/s	6 nos. of 220kV bays	Commissioned	<ul style="list-style-type: none"> • 220 kV D/C line from 765 kV S/stn. PGCIL Bhiwani to 220 kV S/stn. HVPNL Bhiwani • 220 kV Bhiwani (PG) - Isherwal (HVPNL) D/c line. PO issued on 09.07.2019.

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S. No.	Substation	Downstream network bays	Commissioning status of S/s / Transformer	Planned 220kV system and Implementation Status
				<ul style="list-style-type: none"> Contractual completion is on 08.11.2020. HVPNL to update.
10	Jind 400/220kV S/s	6 nos. of 220kV bays	Commissioned	<ul style="list-style-type: none"> LILO of both circuits of 220kV Narwana – Mund D/c line at Jind (PG). PO issued on 09.07.2019. Contractual completion is on 08.11.2020. HVPNL to update.
11	400/220kV Tughlakabad GIS(4x 500)	10 no of 220kV bays	Commissioned	<ul style="list-style-type: none"> RK Puram – Tughlakabad (UG Cable) 220kV D/c line. Scheme will be revised Target completion – March 2023. Okhla – Tughlakabad 220kV D/c line. Mehrauli – Tughlakabad 220kV D/c line. BTPS – Tughlakabad 220kV D/c line. Commissioned. Masjid Mor – Tughlakabad 220kV D/c line. Target completion – Dec., 2021 DTL to update.
12	400/220kV Kala Amb (TBCB) (7x105) GIS	6 nos. of 220kV bays	Commissioned (Jul'17)	<p>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 – Dec 2021</p> HPSEBL to update.
13	400/220kV Kadarpur Sub-station (TBCB) (2x500)	8 nos. of 220kV bays	Commissioned on 11.12.19, as informed by TBCB licensee	<ul style="list-style-type: none"> LILO of both circuits of 220 KV Pali - Sector 56 D/C line at Kadarpur along with augmentation of existing conductor from 220 KV Sector-56 to LILO point with 0.4 sq inch AL-59 conductor. NIT re-floated on 03.09.2019. Likely date of award- 15.02.2020. LILO of both circuits of 220KV Sector 65 - Pali D/C line at Kadarpur along with augmentation of balance 0.4 sq. inch ACSR conductor of 220 kV Kadarpur - Sector 65 D/C line with 0.4sq inch AL-59 conductor HVPNL to update.

Establishment of new 400/220kV substations in Northern Region:

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Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity by States
1	400/220kV Dwarka-I GIS (8 nos. of 220kV bays)	4x 500	Oct'20	DTL to update.
2	220/66kV Chandigarh GIS (8 nos. of 66kV bays)	2x 160	Dec'20	<ul style="list-style-type: none"> • Construction of 2 nos of 66 kV lines is in progress and is targeted to be completed by 31st March, 2020. • Work of 4 nos. of 66 kV lines for evacuation of power from 220 kV Hallomajra S/s is in estimation/tendering stage. • 2 nos. of 66 kV bays will be utilized for future expansion/feeding of new 66 kV S/s Chandigarh to update.
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. bays would be used by the lines being constructed by PTCUL.	2x315	Dec'20	<ul style="list-style-type: none"> • 220kV Almora-Jauljibi line. • 220kV Brammah-Jauljibi line PTCUL to update.

25.2 Members may kindly update and expedite the downstream network.

26.0 Status of signing of LTA/TA agreements for the generation projects in Uttarakhand

26.1 A meeting was held at CERC in Dec'19 on issues involved in Uttarakhand Integrated Transmission Project (UITP) wherein all the generators mentioned below weredirected to sign the Tripartite Transmission Agreements & LTA agreements for Connectivity and LTA agreements immediately:

Status of signing of Tripartite LTA agreement for UITP projects as on 10/08/2020

Sl. No.	Applicant	LTA Quantum	Status of Tripartite LTA agreement	Status of Tripartite Transmission Agreement
1	L&T Uttaranchal Hydropower Ltd. (Singoli Bhatwari HEP) – 99 MW	99 MW	Signed by CTU, L&T & PTCUL	PTCUL stated that there is no need to sign TA
2	NTPC Ltd. (Tapovan Vishnugad HEP) – 520 MW	513.76 MW	Draft Format for LTA agreement was agreed by PTCUL. The same was forwarded to all the NR beneficiaries. NTPC is coordinating with	PTCUL stated that there is no need to sign TA

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3	SJVN Ltd (Naitwar Mori HEP)	60 MW	Signed by CTU, SJVNL & PTCUL	SJVNL is ready to sign, however, PTCUL stated that there is no need to sign TA.
4	THDC Ltd. (Vishnugad Pipalkoti HEP) –	444 MW	LTA not applied	Not Signed by Applicant and PTCUL
5	SJVN Ltd. (Devsari HEP) –	252 MW	LTA not applied	Not Signed by Applicant and PTCUL
6	Lanco Mandakini Hydro Energy Pvt. Ltd. (Phata Byung	66.88 MW	Project under NCLT	Project under NCLT

27.0 Presentation by RVPN for Power Flow Control Devices:

27.1 The proposal for the Transmission System regarding Uprating, Upgrading and Strengthening of Intra-State Transmission Schemes for Renewable Energy Evacuation in Western Rajasthan implemented by RVPN was agreed in the 1st meeting of NRPCTP held on 24.01.2020. One of the schemes includes the implementation of Power Flow Control Devices. Therefore, RVPN was requested to share the requisite details about this new technology in the next NRPCTP meeting.

27.2 RVPN may share the presentation with the members.

28.0 Any other issue with permission of the chair.