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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

To

-As per list enclosed-**Subject: 2nd Meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP) – Minutes of Meeting**

Sir/ Madam,

The 2nd meeting of Northern Regional Power Committee (Transmission Planning) (NRPCTP) was held on 1st September, 2020 through Video Conferencing.

Minutes of meeting are available 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).

Yours faithfully,

(Goutam Roy) 14/11/20
Chief Engineer

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1.	Member Secretary, NRPC, 18-A ShajeedJeet 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. VidutBhawan, 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, Airport Building, 302, 1 st Floor, New Shakti Bhawan, Near Terminal 3 IGI Airport, New Delhi -37	18	General Manager (Planning), Delhi Transco Ltd, Shakti Sadan, Kotla Marg, New Delhi-110002
19.	General Manager (Planning), Chenab Valley Power Projects (P) Limited, Chenab Jal Shakti Bhawan, Rail Head Complex, Jammu				

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Minutes of 2nd Meeting of Northern Region Power Committee (Transmission Planning) (NRPCTP) held on 1.09.2020

List of participants is enclosed as **Annexure-I**.

Member (PS), CEA, the Chairman of RPC (TP) welcomed the participants and stated that as per the terms of reference of Region Power Committee (Transmission Planning), the meeting of NRPCTP was supposed to be conducted once in every quarter. The 1st meeting of NRPCTP was held on 24.01.2020; however the 2nd meeting could not be scheduled on time due to prevailing conditions of COVID-19. He then requested Chief Engineer (PSPA-I), CEA to take up the agenda item.

CE, PSPA-1 welcoming the members to the 2nd Meeting of Northern Region Power Committee (Transmission Planning) (NRPCTP) stated as mentioned by the Chairman the meeting is delayed from its schedule due the ongoing pandemic. We have been waiting for the pandemic to go, however, as the wait was becoming too long, as such, decision was taken to conduct the meeting through Video Conference. He apologised to the participants as it could be strenuous for sitting so long for the VC. He stated that to shorten the duration of the meeting we tried to reduce the agenda item, however, many participating organisation has send their agenda during the last two to three days and requested this office to include the same. He stated that as per the TOR the meeting is to be held after every three months' time so until it is almost urgent the agenda can be deferred for the next meeting. He requested the constituents to send their agenda items within one month from the last meeting, so that sufficient time could be given to members to study the agenda and to have fruitful discussions on it during the meeting. He, further emphasised, that as far as possible, issue need to be settled first with CEA, CTU and other organisation before coming to the NRPCTP meeting so that the RPC (TP) can deliberate on the same from a broader prospective. This would avoid longer unnecessary deliberations and disagreement. He then requested Director, PSPA-I (CEA) to take up the agenda for discussions.

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** Director, PSPA-1 stated that the minutes of the 1st meeting of (NRPCTP) were issued vide CEA letter dated 26.02.2020 and no comments have been received from the constituents and requested the members to confirm the minutes.
- 1.2** Members confirmed the minutes of 1st meeting of NRPCTP.

2.0 Creation of 400/220 kV, 2x315 MVA S/S at Akhnoor/Rajouri as ISTS

- 2.1** Director, PSPA-1 stated that the issue 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/Rajouri may be considered only after the utilization of 220 kV downstream from Samba, New Wanpoh and Amargarh are taken up for implementation by JKPDD. JKPDD had submitted a proposal during the 1st NRPCTP meeting for the establishment of 400/220 kV, 2x315 MVA S/s at Akhnoor/ Rajouri under ISTS. However, due to absent of any participants from J&K the issue could not be discussed. Now, JKPDD has again submitted the proposal and has requested for the following downstream transmission system for the implementation of 400/220 kV Akhnoor/Rajouri ISTS S/s:

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

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- 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

- 2.2** She further stated that as per the system studies carried out by CEA, it has been observed that the load flow study seems to be in order except the line from Akhnoor to Katra-II remains floating. She then requested Chief Engineer, Jammu to put some light into the matter.
- 2.3** CE, JKPDD stated that Rajouri is a border area and is at a distance of 150 km from Jammu, wherein 132 kV network is present. In that same corridor, there is resentment amongst people that a 400 kV line is passing in the vicinity and they are not getting quality power due to the interruptions on the 132 kV network because of long distance, plus the downstream network of capacity 320 MVA is having a loading of 500 MVA, feeding grids are getting overloaded and load shedding is being enforced. Therefore, in order to improve the system profile in that area, 400/220 kV Akhnoor/Rajouri S/s is proposed with the LILO of Amargarh – Samba 400 kV D/c line passing through the same corridor.
- 2.4** CE, PSPA-1 enquired about the distance of the proposed ISTS S/s from 220/132 kV Akhnoor-II(Jammu), Rajouri, Katra-II S/s. With this, JKPDD stated that for 400/200 kV ISTS, land is available at Siot (mid way between Akhnoor and Rajouri) which is at a distance of approx. 60 km from Akhnoor-II, 60 km from Rajouri and 40 km from Katra-II. Regarding the connectivity of Katra-II, JKPDD stated that instead of LILO of Salal-Kishenpur at Katra-II, 220kV D/c line from Nagrota-Katra-II may be considered. This would create a 220 kV ring around Jammu region, which will also serve the reliability purpose. The same proposal will be sent to CEA for approval under Intra-State works.
- 2.5** Chairperson, CEA enquired about the timeframe considered in the studies. In this regard, CEA stated that 2023-24 timeframe is considered. With this, Chairperson, CEA stated that longer timeframe could have been taken as the construction activities in J&K usually takes a lot a time.
- 2.6** COO, CTU agreed that revised studies needs to be done with the demand requirement along with the confirmation of 220 kV outlets from this substation. Further, he stated that usually there is mismatch in the timeframe of substation and transmission lines, therefore first the 200 kV outlets needs to be confirmed, then substation could be planned. Also, he suggested to plan 500 MVA transformers instead of 315 MVA at the proposed Akhnoor/Rajouri S/s.
- 2.7** Member Secretary, NRPC stated the downstream system is always delayed in case of J&K, particularly in Kashmir. Therefore, while confirming the ISTS Works, first the downstream system needs to matched with the timeframe of ISTS Transmission system, for proper absorption of power.
- 2.8** Chairperson, CEA suggested that revised studies could be done for J&K by CEA and CTU and accordingly, the proposal would be deliberated in the next NRPCTP meeting. Members agreed with the same.
- 3.0** **Transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs:**
- 3.1** Director, PSPA-1 stated that the transmission system for evacuation of power from Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEPs of CVPPL was discussed during 1st

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Northern Region Power Committee (Transmission Planning) held on 24.01.2020 & following system was agreed:

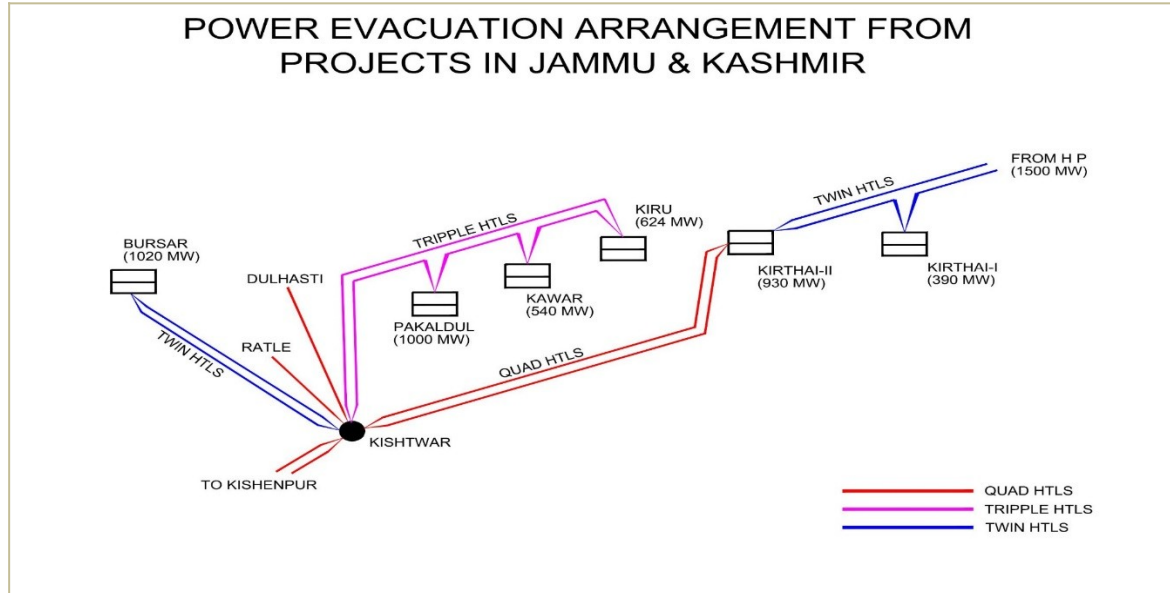
a) Connectivity Transmission system

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 has also 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:

1. Kishtwar switching station - Kishenpur400kV S/c (Quad) line (stringing of second circuit of Dulhasti–Kishenpur400kV from Kishtwar upto Kishenpur) along with bays at both ends - **Under ISTS**



c) Connectivity Transmission system for Kiru HEP:

CVPPL has also applied on 25.06.2020 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 with the following transmission system:

1. 400 kV D/c (Triple HTLS Conductor –Equivalent to about 2400MW-considering 10% overload) line from Kiru HEP – Pakaldul generation switchyard along with bays at both ends, forming one direct 400 kV ckt. from Kiru – Kishtwar PS(GIS) and other 400 kV ckt. LILOed at Kwar & Pakaldul HEP.

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2. Switchyard Capacity must be able to handle about 2400MW power generated by the generation projects located in downstream of the Kiru HEP. GIS switchyard equipment and XLPE cables provided may be designed for carrying 4000 Amps current.
3. 400 kV, 125 MVAR Bus Reactor at Kiru generation switchyard.

She further stated that 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.

3.2 CE, CEA asked CTU to intimate the present status and the timeframe of the stringing of second circuit from Kishenpur to Kishtwar. On that CTU replied that the length of the line is approx. 130 km, which will take around 18-24 months considering the hilly region and would be done matching with the timeframe of the generation at Pakaldul, i.e February, 2024. CTU also stated that in the 1st meeting of NRPCTP, it was decided to finalise the location of Kishtwar S/s with the committee consisting of CEA, CTU, JKPDD and CVPPL, along with the confirmation of space. In this regard, CE, CEA stated that the same could not be planned due to COVID, however site visit will be planned soon.

3.3 Members noted the same.

3.4 CVPPL stated that as per the connectivity system CVPPL has to construct two number of bays at Kishtwar S/s for termination of their 400kV lines. However, as agreed in the earlier Standing Committee, the two circuits of the line is required should not be terminated in the same dia for reliability consideration and in the GIS S/s, the complete dia is to be implemented in the beginning itself. Therefore, CVPPL has to implement two complete dia with 6 circuit breaker bays out of which two bays are in their scope. CVPPL purposed that these 2 nos. of 400kV bays at the Kishtwar S/s may be implemented under ISTS and cost of two nos. of 400kV bays(CVPPL scope) shall be reimbursed by CVPPL.

3.5 *After deliberations, it was agreed that a separate meeting would be convened among CEA, CTU and CVPPL to discuss the issue of providing two numbers of 400kV bays at Kishtwar Switching Station.*

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

4.1 Director, PSPA-1 stated that JKPDD has requested to take up the implementation of 315 MVA, 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. of 132/33kV GSS in vicinity i.e. 40MVA Kishtwar JKPDD, 20 MVA Kishtwar (NHPC) and 70 MVA Khellani S/S with further connectivity at sub- transmission level. In order 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.

4.2 Chairperson, CEA suggested to plan 220 kV network instead of 132 kV considering the load growth. CE, JKPDD replied that there is no 220kV network in that area. At present, the local 132 kV load is being fed through the 132 kV line of NHPC. Two 50 MVA substations are proposed at Bhaderwah and Patan area under intra-state transmission works which will be sufficient for reliability purpose for the next 10-15 years. Considering that, the proposed 400/132 kV transformer along with along with 132kV line bays at Kishtwar pooling station under ISTS would be adequate.

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- 4.3** CTU stated that minimum two transformers would be required in order to meet n-1 criteria. Therefore, 2x200 MVA transformation capacity may be considered instead of 1x315 MVA.
- 4.4** CE, CEA enquired about the 132 kV network with the Kishtwar PS. In this regard, JKPDD replied total 4no. of 132 kV bays are required, two each for their 132/33 kV Khellani and local Kishtwar S/s. The same would be implemented matching with timeframe of Kishtwar ISTS.
- 4.5** CTU stated that this work has to be proposed in the strengthening scheme as when this project would be implemented under TBCB, for 400 kV LTTC will be generators and for 400/132 kV system, LTTC's will be Discoms. Therefore for the same bidding, two separate TSA would be signed. Also, regarding the timeframe of the scheme, JKPDD stated that the scheme may be implemented in matching timeframe of Kishtwar S/s.
- 4.6** *After deliberations, members agreed with the implementation of 2x200 MVA, 400/132 kV transformer at Kishtwar Pooling Station along with 4 no. of 132 kV line bays to be taken up as system strengthening scheme.*
- 5.0 Transmission works to be implemented in Jammu and Kashmir Region under Intra – State transmission system**
- 5.1** Director, PSPA-1 stated that 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. 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**. JKPDD has also submitted DPR for Kashmir region in January, 2020 to be implemented during 13th and 14th plan period. The same is under examination.
- 5.2** She further stated that following works proposed by JKPDD in the DPR's requires interconnection with the ISTS elements:

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)	Jatwal-Gladni Trans. Line is an ISTS line. Therefore work required to be taken up under ISTS

b) Kashmir Region

1	LILO of 220kV Wagoora - Kishenganga line at Khansahib (Beerwah)	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)	Alusteng- Leh 220kV S/c line is an ISTS line
3	220kV Kunzer - Gulmarg S/C line (15 km)	Amargarh (Kunzer) is an ISTS S/s, Out of 6 no.s of 220kV bays, 4 bays have been utilized for LILO of
4	220kV D/C line from 400/220kV Kunzar - 220/33kV Sheeri (40km)	Delina –Zeinkote at Amargarh (Kunzer), 2 nos. of bays are proposed to be utilized through Amargarh –Sheeri 220kV D/c line, space for additional 2 nos.
5	220kV Amargarh (Kunzar) - Lollipopa S/C line (4 kms)	of bays are required. Implementation of bays is proposed to be taken up by JKPDD.

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6	220kV New Wanpoh - Mattan D/C line (15km)	Out of 6 nos. of existing bays,4 nos. of 220kV bays are utilized at New Wanpoh with New Wanpoh – Alstren220kV 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 these 220kV bays.
7	New Wanpooh- Nillow 220kV D/c line (25km)	
8	220kV New Wanpoh - Qazigund S/C line on D/c towers (8km)	
9	LILo of 220kV D/C Delina - Kishanganga Line (PGCIL) at Wahipora (35km)	

- 5.3** CE, Jammu (JKPDD) stated that they are creating 160 MVA, 220/66 kV Chawdhi S/s under PMDP-15, through LILo of 220 kV Gladni-Hiranagar line. As per their proposal, 220 kV Samba-Gladni S/c line is feeding around 100 MVA to Gladni and it is proposed to feed another 160 MVA at Chawdhi S/s. Therefore, in order to avoid overloading on Gladni-Chawdhi line, 220 kV D/c Samba-Chawdhi line is proposed. Also, they will be proposing 220 kV Chawdhi- Nagrota – Katra line in order to form a 220 kV ring for Jammu region.
- 5.4** CTU stated that 945 MVA is the installed capacity at Samba S/s and accordingly only 630 MVA load can be permitted in order to meet n-1 criteria. Space is available at Samba, however too many feeders will cause the problem of overloading.
- 5.5** Further, regarding the second proposal of reconductoring 220 kV Jatwal-Gladni, CTU stated that at present 100 MW power is flowing through this line, therefore, shutdown period of 2 years required for reconductoring, will effect this power flow. COO, CTU agreed with the same and stated that a new transmission line may be proposed instead of thickening of existing Jatwal-Gladni line.
- 5.6** For Kashmir region, COO, CTU stated that New Wanpoh S/s was planned under ISTS in 2013-14 and till date the 220 kV outlets are not yet finalised. The timeframe of the 220 kV lines proposed is 2023-24. There will be a mismatch with the timeframe of the substation and transmission lines. Also, no space is available at New Wanpoh for any further expansion at 220 kV level.
- 5.7** CE, Kashmir informed that under construction 220kV connectivity lines at New Wanpoh S/s would be completed by November, 2020. Also, regarding the additional 2 bays proposed at New Wanpoh, he stated that they were not aware about the space constraints at New Wanpoh, otherwise, another alternative would have been proposed.
- 5.8** Chairperson, CEA suggested that the above proposal may be studied again by CEA, CTU and JKPDD with a timeframe of 2024-25 and accordingly maybe deliberated in the next NRPCTP meeting. Members agreed with the same.
- 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** Director, PSPA-1 stated that DTL has proposed up- gradation and Strengthening of Delhi Transmission system with the following schemes:
- a) Establishment of **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 substation has been envisaged. The land for establishment of substation is in possession of PGCIL to be handed over to DTL for construction of

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400/220/66kV GIS. The 400kV in-feed would be extension of 400kV bays of 765/400kV GIS.

- b) 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 NCRTEC 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.
- c) Creation of a new 765/400kV substation at Narela has been agreed under ISTS as part of transmission system for evacuation of power from SEZ in North Region (Phase-II – 8.1GW) in the 4th meeting of NRSCT held on 25.07.2019 and DTL may need to commission 400kV TikriKhurd instead of only 220/66kV with matching time. Therefore, DTL has proposed the Scheme of establishment of **400/220/66kV GIS 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 1500 MVA) at 220kV level in the plot (measuring 40,000Sqm), which is already in possession of DTL.

6.2 Chairperson, CEA enquired about the status of Gopalpur S/s. DTL replied that the Gopalpur S/s is at tendering stage and will be commissioned by 2023.

6.3 POSOCO stated that there is 400 kV bus splitting arrangement at 765/400 kV, 6000 MVA Jhatikara S/s, 3000MVA each towards Bamnoli and Mundka. Therefore, DTL needs to clarify on which side the 400/220 kV level is proposed by DTL. Further, whether the proposal of TikriKhurd was studied when Narela was agreed as a part of RE evacuation in the 4th NRSCT.

6.4 CEA stated that the proposal of 220/66 kV TikriKhurd was considered in the studies carried for the 765/400 kV Narela S/s agreed in 4th NRSCT. However, with proposed inter-connection of TikriKhurd with Narela, the fault level in the area increases significantly.

6.5 CTU stated that DTL has also proposed augmentation of 2x315 MVA transformers at Maharani Bagh. At present, the loading of transformers at Maharani Bagh is 1200 MVA, against the installed capacity of 1630 MVA, which indicates that n-1 criteria hardly met. As per the studies carried out by DTL, total ICT loading indicated is 750 MVA whereas actually it is around 1200 MW. Also, no space is available for additional transformers at Maharani Bagh, therefore alternate arrangement needs to be considered.

For Jhatikara, CTU informed that there is no space available that could be handed over to DTL. Also there was no such previous communication or commitment done by PGCIL regarding the handing over the land. Further, the proposal of Jhatikara is not clear as to how the 400kV level will be created.

DTL stated that loading at Maharani Bagh would reduce after the 220kV feeders from Tuglakabad to RK Puram and Masjid Moth would get connected. Therefore, the proposal of creation of 66kV & 33kV GIS along with extension of 220kV GIS at existing interstate 400/220kV GIS substation at Maharani Bagh may be considered.

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6.6 Chairperson suggested that the proposal of Jhatikara and Maharni Bagh needs to be studied again by CEA, CTU and DTL.

6.7 After deliberations, following was agreed:

(i) *Establishment of 400/220/66kV GIS at TikriKhurd with 400kV in-feed from LILO of existing 400kV D/C Mandola –Bawana overhead transmission line.*

(ii) *Proposal of 400/220/66kV GIS substation at Jhatikara, extension of 220kV GIS at existing interstate 400/220kV GIS substation at Maharani Bagh with 320MVA at 220/66kV level and 300 MVA at 220/33kV level and interconnection of Narela to TikriKhurd through 400kV D/C line would be studied again by CEA, CTU and DTL and accordingly would be deliberated in the next NRPCTP meeting.*

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

7.1 Director, PSPA-1 stated that 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
	10	5	5	20

7.2 Considering the above generations, the load flow studies have been carried out for a timeframe of 2024-25 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 timeframe. The study is restricted to only one scenario of Afternoon Peak. Joint study meeting to be convened with STUs for consensus

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on Load Generation Balance & updation of their network in 2024 time frame in simulation file.

7.3 Based on the above assumptions, 2 no. of alternatives have been identified one with HVAC system and other with Hybrid system (HVAC +HVDC). In both the alternatives the system has been tested for N-1 outage condition and seems to be in order.

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)
7. Establishment of 765 kV switching station at suitable location near Phulera along with 2x330 MVAR, 765 kV Bus Reactors.
8. Ramgarh (ISTS) – Bhadla-2 400kV D/c (Quad) line(180 km) along with 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) along with 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 along with 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) along with 2x330 MVAR,765kV & 2x125 MVAR, 400kV Bus Reactors along with suitable sectionalization at 400kV & 220kV level
23. Establishment of 2x1500 MVA 765/400kV substation at suitable location near Mathura along with 2x330 MVAR Bus Reactor & 2x125 MVAR Reactor
24. Phulera – Mathura 765 kV D/c line (280 km) along with 1x240 MVAR Switchable line reactor for each circuit at each end of Phulera – Mathura 765 kV D/c line

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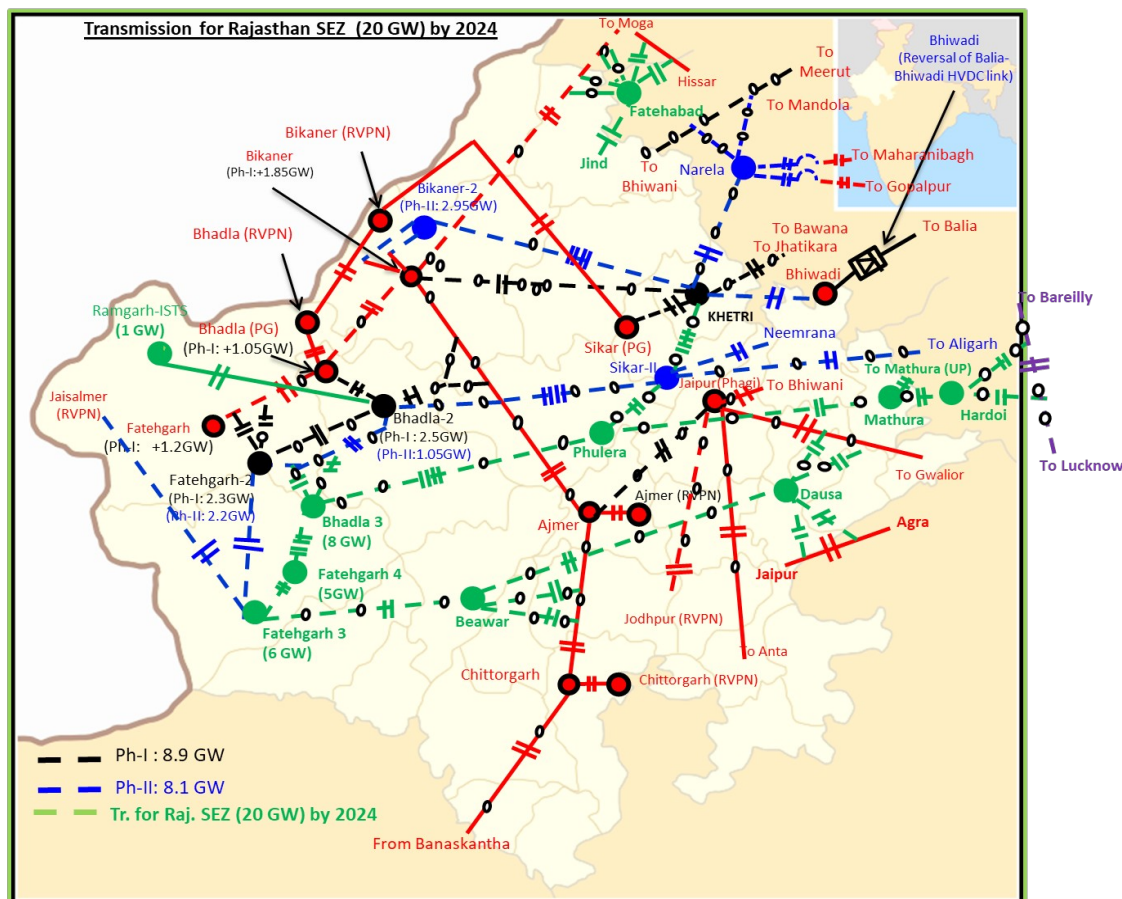
25. Mathura – Mathura (UPPTCL) 400 kV D/c (quad) interconnection(10 KM)
26. Establishment of 765 kV switching station at suitable location near Hardoi along with 2x330 MVAR 765 kV Bus Reactor
27. Mathura – Hardoi 765 kV D/c line (300 km) along with 1x330 MVAR Switchable line reactor for each circuit 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 along with 2x330 MVAR 765 kV Bus Reactor
30. Fatehgarh-3– Beawar 765 kV D/c (350 km) along with 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) along with 240 MVAR Switchable line reactor for each circuit at each end

Note I:

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.

*Availability of Space is to be verified

Estimated Cost – about Rs. 15,700 Cr.



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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

Alternative-2-Hybrid Transmission scheme of HVAC & HVDC

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)
7. Establishment of 765 kV switching station at suitable location near Phulera along with 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) along with 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) along with 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 along with 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)
16. Fatehabad-Jind 400kV D/c(Quad) line(90km)
17. Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 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 along with 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

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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) along with 2x330 MVar (765kV) Bus Reactor \pm 400kV HVDC line (Quad Lapwing - 2 Loops) between Fatehgarh-III & Lucknow-1000 km
27. Fatehgarh-III - Fatehgarh(VSC) 400kV 2xD/c Lucknow(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

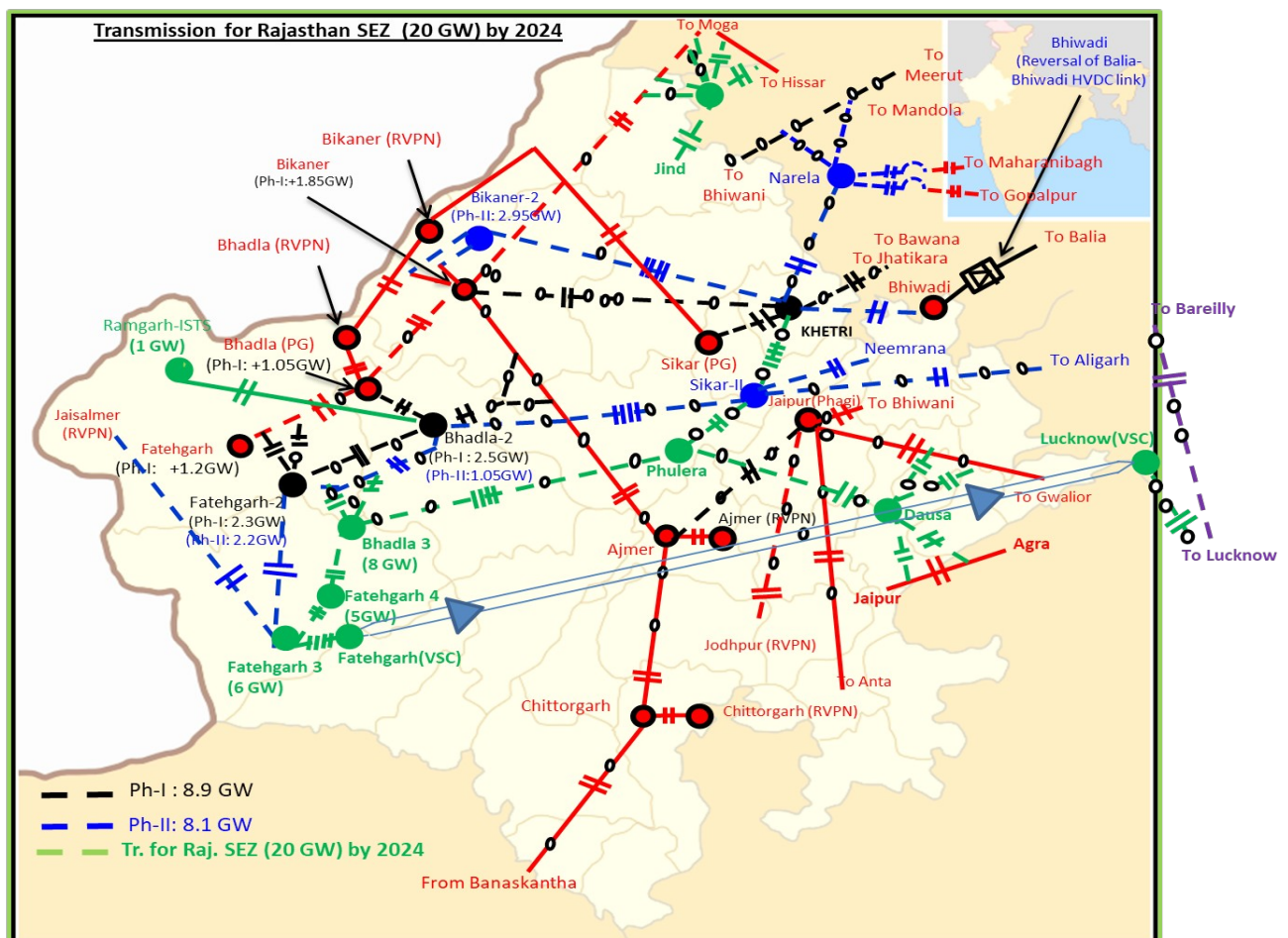
Note:

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 –III**.

- 7.4** Director, PSPA-1 further stated that 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. She then requested the constituents to give their comments.
- 7.5** CE, PSTCL stated that as per the study file given by CTU, their thermal generation has been reduced to 20%. 660 MW of thermal units have been backed down to 198 MW and 700 MW units to 210 MW. Punjab generation for 2024-25 has been considered as 2124 MW only. He further opined that the proposal for evacuation of bundled power needs to be considered, instead of focussing only on solar generation.
- 7.6** HVPNL agreed with PSTCL stating that their thermal units have also been backed down to 30%, whereas in the assumptions, 55-65% is mentioned. Also, 2800 MW of nuclear power plant agreed in the 1st NRPCTP at Gorkhpur (Fatehabad) has not been considered in the studies.
- 7.7** RVPNL stated that because of the bulky transmission network planned in case of HVAC alternative; more than 50% of land would be wasted due to RoW, GSS, crossings, etc. Further, no study has been done on voltage, fault level and reactive power stability. Already, 90% fault level is experienced at Bhadla and Phagi. First, this issue needs to be resolved. He also stated that the HVDC alternative is designed only for 5 GW, which is very less considering the huge RE potential at Rajasthan. He opined that a pooling station could be planned in Fatehgarh area instead of proposing 4 GSS at Fatehgarh area. Power from the Pooling station could then be transferred through HVDC system only. Also, 2-3 alternatives of HVDC needs to be studied instead of comparing HVAC with HVDC, as HVAC would always have an advantage considering its lower cost. And, provision of storage should also have been considered.
- 7.8** UPPTCL stated that as the HVDC system is getting terminated at Lucknow, the commercial implications at UP would be very high. Further, they have already shared their comments on the study file regarding the loading at Mathura and Hardoi as per the HVAC alternative. At present, their 220 kV system is getting overloaded and n-1 criteria is not met at certain places, therefore new S/s at Mathura could be planned.
- 7.9** SECI informed that the locations of generation were identified based on the feedback of developers looking into the availability of land for generation and proper access to these areas. Further, these locations have the potential of both solar and wind generation. Accordingly, 20 GW generation has been planned. Approximately, 75% would be solar and around 25% system would be hybrid (solar+wind). Regarding the storage, SECI further stated that hybrid system with batteries is under consideration but would take time of around 2 years to materialize, looking into the higher cost of battery at present.
- 7.10** PSTCL stated that first the exact potential of solar and hybrid generation needs to be considered. And accordingly, CTU should plan the transmission system in such a manner that in case of outage of this generation, the entire system and the grid remains stable.
- 7.11** CTU informed that the studies are carried out for peak power scenario. For load-generation balance, 9 generation scenarios are carried out and were uploaded on the website on

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8.07.2020 and no comments were received. The thermal generations in the States are considered as per load LGBR for different cases and merit order has also been considered. The demand is supposed to be met from solar power. With the increased penetration of RE generations, the thermal generations are required to be backed down. Constituents should have sent their comments regarding the over-loading, over-voltage, fault analysis etc so that the same could have been integrated in the studies. The studies could be done again incorporating all the comments.

Regarding both the alternatives proposed, CTU further stated that the cost of HVDC cost is 22,950 Cr. whereas, HVAC cost is 15,700 Cr. There is a difference of almost 7000 Cr., plus the implementation time in HVDC is high. Also, regarding RVPN opinion of evacuation of power with 2-3 proposal of HVDC lines, the total cost would be around 50,000 Cr. If the purpose for evacuation is solved reliably by an alternative costing 15000 Cr., then there is no point in going for higher cost alternative. Further, Regarding the query raised by HVPN for non- consideration of Nuclear Power plant, it was clarified that the studies has been done for 2023-24 timeframe, however the schedule of Nuclear Plant is that of 2026-27.

7.12 Director (SO), POSOCO stated that while planning the transmission system for such large scale RE generation, necessary emphasis needs to be given to reliability, resiliency and economic aspects. He further stated that with such high concentration of RE in small pockets, it becomes necessary to simulate the behaviour of the system in case of any delayed clearance of fault (stuck breaker condition at one end) as there might be possibility of losing a large quantum of generation under such conditions. Also, constituents have to accept the fact that thermal generation has to be reduced in near future.

He stated that in order to assess the adequacy and reliability of the proposed system, it is important that at least 16 scenarios (4 points on load curve for each season) on all India case be simulated and studied. The load-generation balance for all these 16 scenarios shall first be finalized and any regional study shall be carried out on this finalized LGB by CTU as well as STUs. Though LGB for nine scenarios has been prepared by CTU for 2021-22 timeframe, similar exercise may also be carried out for 2023-24 case.

On the HVDC vs HVAC alternative, Director (SO), POSOCO further stated that during planning of transmission system for Ph-I &II RE in Rajasthan, the VSC based HVDC was proposed to be terminated at Modipuram. Now, the HVDC is proposed to be terminated at Lucknow which has resulted in increase in length of HVDC by around 500 KM. The optimal location for HVDC shall be decided on the basis of change in direction of network flows i.e. the ideal location will be the one from where the direction of flow changes from north to east. Further, it is also necessary to study the percentage utilization of HVDC under different scenarios to freeze the location of HVDC.

He further informed that in order to address various issues associated with RE high penetration in the grid such as decline in inertia and short circuit levels, high voltages during night hours etc., the feedback of exploring the possibility of installing Synchronous Condensers was given by POSOCO in previous Standing Committee Meetings. Same may be studied in view of significant RE generation envisaged in Rajasthan in this proposal for Phase-III. And detailed comments on the study files shall be shared by NLDC with CEA and CTU.

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7.13 CE, CEA stated that works are being carried out for the preparation of All-India study file. Further, the provision of synchronous condensers would also be looked into.

7.14 After deliberations, it was decided that all the constituents would send their comments/solution within 20 days and accordingly the same would be incorporated in the studies and would be deliberated in the next NRPCTP meeting. It was also intimated that no new comments on the study would be entertained during the meeting so the States need to furnish their within stipulated timeframe as indicated.

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

8.1 CEA stated that 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. THDC vide letter dated 17.12.2019 has 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. A meeting was held in CEA on 19.02.2020, wherein, 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.

CEA further stated that bays required at Aligarh (to be implemented by THDC) will terminate in opposite diameter; therefore total 4 bays will be required.

8.2 UPPTCL stated that at present the 2 no. of 400 kV bays at Khurja (from the LILO of Aligarh-Shamli) are sufficient to draw their quantum of power. However, provision for 2 no. of spare bays may be kept.

8.3 On enquiry about the LILO length and issue of overloading in case of n-1 contingency, UPPTCL replied that the LILO length is 20 km, Aligarh-Khurja is 60km and Khurja-Shamli around 120 km. Further, with 60% share (792 MW), one circuit of 400kV Aligarh-Shamli D/c line will be adequate enough for power evacuation.

8.4 CE, CEA requested THDC to share their views. THDC stated that the project is in advance stage. Powergrid has been awarded the 400 kV line from Khurja to Aligarh S/s for implementation. The same would be completed within 2 years. The 1st unit would be commissioned by Sep, 2023. However, due to COVID, it may get delayed to Dec, 2023.

8.5 CTU informed that THDC has not yet applied for LTA. He then enquired THDC about the status of PPA with stakeholders. THDC stated that PPA has been signed, however they have not applied for LTA as their project is expected in 2023. CTU replied that it would be better

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if THDC could apply for LTA so that in case of strengthening requirement, they could plan the system timely.

8.6 POSOCO enquired about the variable charges component of tariff of THDCIL's Khurja. THDC replied that is Rs 1.39 Rs./Unit.

8.7 After 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 the 400 kV termination bays at Khurja and at Aligarh S/s, (to be constructed by generation developer i.e. THDCL.*

(ii) *UPPTCL to 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).*

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

9.1 CEA stated that the 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 Meeting of SCPSPNR, 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:

- (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 CEA further stated that the above decisions were to be intimated to THDC. Accordingly, a meeting was held among CEA, CTU and THDC on 28.07.2020 through VC, 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
- Tehri PSP – Tehri PS 400kV S/c line

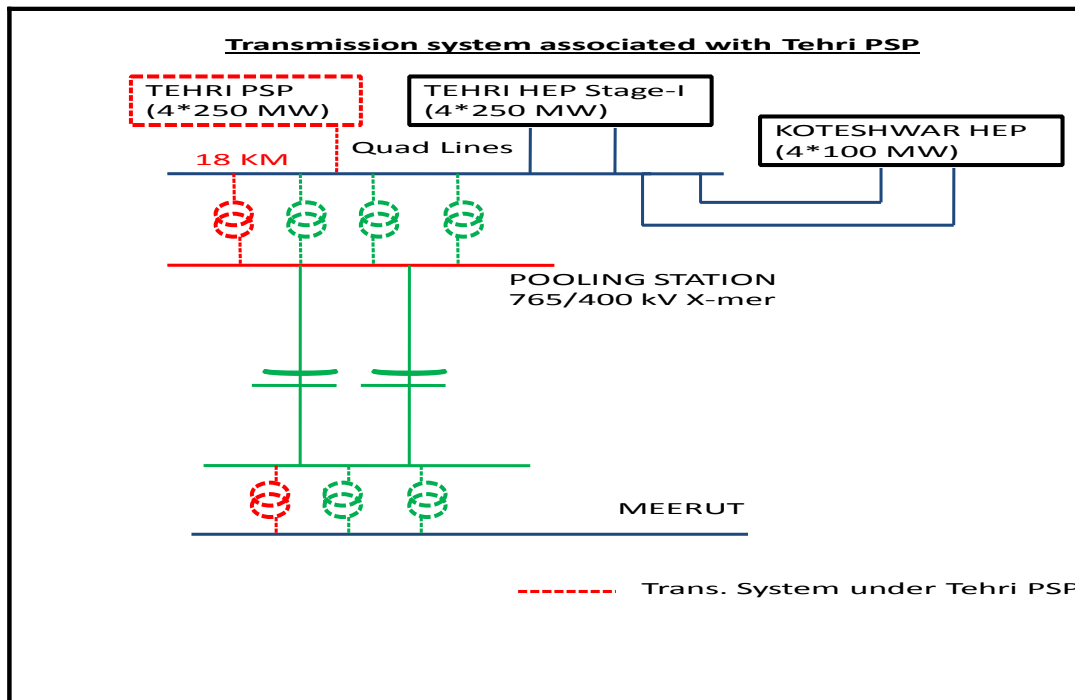
Upon operationalization, THDC will have to pay the transmission charges of above elements till commissioning of generation project. After deliberations, following was agreed:

- 3x800 MVA ICTs at Tehri Pooling & charging of Tehri-Meerut line at 765 kV along with upgradation of series capacitors, 240MVAR Line reactors at Meerut end and 240MVAR Bus reactor at Koteshwar PS to be considered with the strengthening scheme.

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- 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

9.3 CTU stated that with 1400 MW installed capacity and considering 10% overload at Tehri complex, three 800 MVA ICTs would be sufficient for meeting the n-1 criteria; therefore they have proposed the charging of 3x800 MVA ICTs along with system strengthening scheme and 4th 800MVA ICT at Tehri PS, 3rd ICT at Meerut and Tehri PSP – Tehri PS 400kV S/c line would be associated with the Tehri PSP.



- 9.4** Regarding the progress of Tehri PSP, THDC informed that there is delay in the civil works due to the contractor issue in Tehri PSP, however, EM works have been started as per the original schedule, GSU have been installed for all 4 units and GIS works have been completed. Due to COVID, works may further get delayed to Dec, 2022.
- 9.5** CE, CEA further stated that with expected Dec, 2022 timeframe, transmission charges have to be paid for 2 years, i.e. from Dec, 2020 to Dec, 2022. THDC stated that the existing Tehri HEP faces evacuation problem and is forced to be backed down by NRLDC whenever one of the lines goes out.
- 9.6** POSOCO stated that earlier when the system was at 400 kV, whenever there was a problem in FSC, restrictions were imposed as 1400 MW (plus overload) could not be evacuated on a single 400 kV circuit due to oscillations, therefore a shutdown was required. He further stated that now at 765 kV there would be no constraint as the loading of the line is increased. He then enquired about the requirement of FSC's with the coming of Tehri PSP and after the upgradation of Meerut – Koteswar D/C at 765 kV level.
- 9.7** Regarding FSC, CTU stated that the total installed capacity will be 2400 MW at Tehri Complex, after the commissioning of Tehri PSP. There is a possibility that oscillations might occur in the complex, therefore FSC's would be required at 765 kV level also.

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CTU further informed that as per the latest updates, the commissioning of the 4th ICT and the 18 km 400 kV S/c line from Tehri PSP to Tehri PS would be done by the end of October, 2020 and LTA will be effective from 1st November, 2020. Tariff for the same would be applicable as per the CERC regulations.

9.8 CE, CEA suggested THDC to resolve the issue with the contractor at the generation site at the earliest and expedite the charging of units at Tehri PSP, in order to reduce the burden of the transmission charges.

9.9 After deliberations, following was agreed:

(i) *3x800 MVA ICTs at Tehri Pooling Station & charging of Tehri-Meerut line at 765 kV along with upgradation of series reactors, 240MVar Line reactors at Meerut end and 240MVar Bus reactor at Koteshwar PS to be considered with the strengthening scheme.*

(ii) *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 and after commissioning of these transmission elements, THDC will have to pay the transmission charges as per CERC regulations till the commissioning of their generation.*

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

10.1 Director, PSPA-1 stated that the evacuation system for Singrauli Stage III (2x800 MW) was discussed in the 1st meeting of NRPCTP held on 24.01.2020, 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. 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
10	SINGRAULI 400.00	41672.3	26421.3
11	VINDH-IV,V 400.00	38803.8	38795.3

10.2 She further stated that as per the studies carried out by CEA, 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.

10.3 On enquiry about the progress of Anpara D –Unnao 765kV, UPPTCL informed that due to COVID, the commissioning of the line is delayed from June, 2020 to Nov, 2020.

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10.4 CTU enquired POSOCO whether the Singrauli- Anpara 400 kV S/c line would be kept open on trial basis or permanently. In this regard, POSOCO stated that the line could be permanently open after commissioning of Anpara D –Unnao 765kV line.

10.5 Members noted the same.

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 CEA stated that 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 NRSCT 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 include 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 Subsequently, 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 CEA further stated that 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

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.

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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 PSTCL enquired about the addition in the scheme cost. CE, CEA replied that cost has come down as line length is reduced. PSTCL further stated that it should be ensured that there would be no additional cost implications with the change in the scheme.

11.6 CTU stated that as per earlier location, when GIB area was not taken into account, the line length from Ramgarh II-Fatehgarh was 150km and Ramgarh-II- Jaisalmer was 60 km, total length being 210 km. Now, with the change in location, line length from Fatehgarh III-Fatehgarh is around 45 km and Fatehgarh III - Jaisalmer is around 50 km, total length now being 100 km. This will reduce the line length to about 110 km and considering the HTLS line cost of Rs 2 Cr/km, there will be a complete saving of around 200 Crore.

11.7 Director (SO), POSOCO enquired whether change in location from Ramgarh-II to Fatehgarh-III would result in increase in length of dedicated line by developers. CEA stated that they have currently received applications from Adani and Azure power for connectivity in Ramgarh area. Adani power has decided to develop their generation plant in Ramgarh area only, for which separate system would be developed as SECI has also intimated potential of IGW in that area. The other applicant i.e. Azure power agreed to shift their generation plant from Ramgarh to Fatehgarh-III where solar insolation is high.

11.8 Members noted the same.

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

12.1 Director (PSPA-I), CEA stated that 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.

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.	ReoliDugli 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	--

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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.

12.2 She further stated that 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 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. CTU agreed that in order to finalize the transmission system, the generators should apply for Connectivity & LTA.

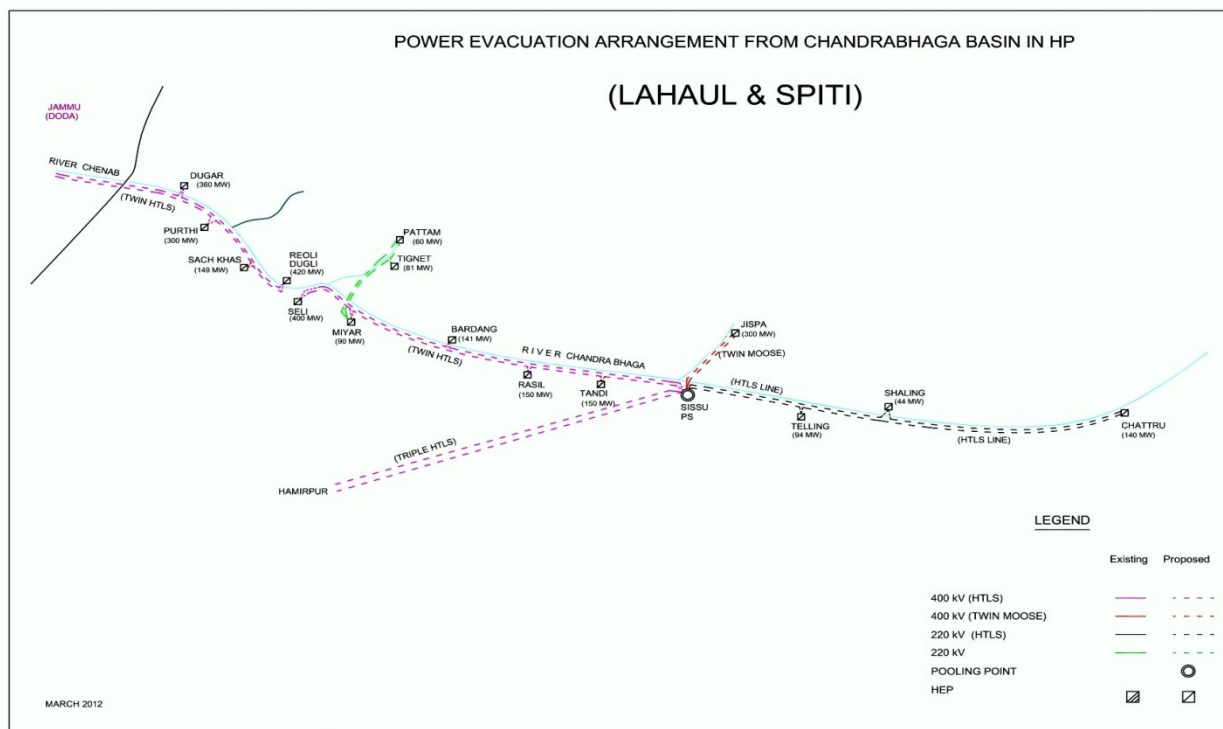
12.3 CE, CEA stated that the power evacuation arrangement for the above mentioned hydro projects in Chenab Basin was planned earlier (map given below). Two routes were analysed, one through Chenab Basin and the other through Manali. Manali route might be difficult looking into the growing tourism in the area. Further, HPPTCL has proposed another alternative route by carrying out the survey for power evacuation through SachKhas. From SachKhas, power could be allowed to flow towards Jalandhar. The same proposal would be looked into in consultation with CTU and HP.

He further stated that SJVN and NHPC have requested CEA to provide the evacuation system for their projects in order to prepare the DPR. In this regard, CEA has prima facie indicated that a 400/220kV Pooling station would be constructed somewhere between Dugar and Purthi. Power from the projects in the Chenab basin would be pooled at this 400/220kV substation and then would be taken to the nearest ISTS point. The project developer has to make a provision for either LILO of the nearest ISTS 400 kV line or construct a dedicated 400 kV D/C line from their HEP to the 400/220kV pooling station. He then requested CTU to comment on the matter.

12.4 CTU stated that as per the survey done in 2010-11, it was indicated that it is a difficult terrain to construct line. However, the timeframe of the HEPs was not finalized at that time. Now as the timeframe is expected around 2029-30, therefore a survey could be planned again with a team comprising of CEA, CTU, HP, Site Personnel to identify the availability of land for Pooling station and the routing of lines. He further stated that for the purpose of DPR and connectivity application, only 2 no. of 400 kV bays (at Pooling station), one bus reactor and around 30km of 400 kV connectivity line could be considered as a part of each project till the system is finalized.

12.5 ED, NHPC enquired as to what to be included in the DPR with respect to the transmission system in the scope of NHPC. In this regard, CE, CEA stated that system will be finalized after undergoing survey. However, as stated by CTU, provision of 4 no. of 400 kV bays(2 nos. each at Pooling station and HEP switchyard), one bus reactor and approx. 30km of 400 kV D/c line could be included in the DPR.

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12.6 SJVN informed that for Reoli Dugli HEP and Purthi HEP, they have applied for connectivity to CTU in the month of August. They further enquired that Bardang HEP is near to Tandi/Sissur, so whether the 30km line would also be considered in this case or some change is recommended. In this regard, CE, CEA replied that considering long length of the Chandra Bhaga basin there could a need for another Pooling station, however, the same could be discussed separately with CEA and CTU.

12.7 HPPTCL stated that the detailed analysis for the survey for the alternate route from SachKhas was sent to CEA in the month of August. CE, CEA stated that the same has been seen and need to be discussed in a separate meeting.

12.8 NTPC enquired what line length should be considered for Seli (400 MW) and Miyar (120 MW) HEP. CTU replied to club the projects and consider 40 km line length, common for both the HEPs.

12.9 POSOCO suggested that CTU should specify the terminal equipment rating for all the projects in order to avoid any kind of limitation at later stage. CTU stated that the same could be finalized only after the survey for implementing the Pooling Station would be carried out.

12.10 *After deliberations, it was decided that a joint survey to be carried out with a team comprising of CEA, CTU, HP to identify the land for Pooling station and the routing of lines. As per the survey report, it would be decided whether the project developer has to make a LILO of the nearest ISTS 400 kV line or construct a dedicated 400 kV D/C line from their HEP to the 400/220kV pooling station*

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

13.1 Director, PSPA-1 stated that 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:

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“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 Further, a meeting was held in CEA on 13.03.2020 to discuss the Revision of Master Plan for the state of Himachal Pradesh, wherein the evacuation arrangement of Tidong-I HEP (150 MW) was also discussed. It was intimated that the capacity of Tidong-I has been enhanced from 100 MW to 150 MW with 2021 as the expected commissioning date 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 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 She further stated that 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:

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- (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 condition.
- (3) In the event of any power evacuation constraint during any line outage, adequate backdown 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 On enquiry by CTU regarding the timeframe of Kashang-II and III, HPPTCL informed that these projects are expected in 2024-25.

13.6 Members noted the same.

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 Director, PSPA-1 stated that 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 She further stated that as per the present 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 as per their scope space for only 4 nos. of line bays were to be provided. However, as per the land procured by them the space for 6nos. of bays could be made available at the Khetri switchyard but they would provide only 4 nos. of bay free of cost, which is within their scope. For the 2 additional bays they would provide the land on chargeable basis. Further, since the future space provision for switchable line reactors at Khetri S/s was not kept, therefore space for 4 nos. of switchable line reactor is not available. Therefore, a meeting was

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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.

- 14.3** In the meeting, POWERGRID Khetri Transmission System Limited informed that installation of switchable Line reactors for Bikaner-II – Khetri 400kV 2xD/c requires procurement of contiguous land by the developer of the line. It was 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. During the meeting, it transpired that as per the survey of the line, the line length is approximately 285 km so considering that, fixed line reactors could be considered at Khetri S/s, as this would avoid the requirement for acquisition of additional land. POWERGRID Khetri Transmission System Limited also informed that as per their assessment fixed line reactors can be installed in the available space at Khetri S/s.
- 14.4** Accordingly, it was agreed that in place of 1x80MVAr switchable Line reactor on each circuit at Khetri end of Bikaner-II – Khetri 400 kV 2xD/c Line, 1x80MVAr fixed line reactors would be installed 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.
- 14.5** Members noted the same.
- 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** CTU stated that 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 500 MW at a single ISTS pooling station and sought connectivity at 400 kV level. 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 bay at generation switchyard. 400 kV Bay at Fatehgarh-III PS is proposed under the scope of ISTS.

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15.2 CTU further stated that as given in 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”, therefore 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.

15.3 RVPN enquired about the status of earlier proposed 220 kV bays and transformation capacity at the above mentioned locations. CTU replied that all the 220 kV bays have been allotted and transformation capacity has been utilized. The Stage-II connectivity applications for these have already been received.

15.4 RVPN stated that earlier developers were seeking for 220 kV, then why 400kV connectivity has been proposed. CTU replied that as per SECI manufacturing tenders, RE generators have allocated bulk capacities of around 500 MW which may further enhance their capacity to 1000 MW. Therefore generators have requested for connectivity at 400 kV level under ISTS. This connectivity at 400 kV level is in addition to the bays allotted at 220 kV level.

15.5 RVPN stated that as discussed in the TCC meetings, space provision has been kept in Sikar-II for 8 nos. 220kV line bays and 4 nos. 400/220kV transformers. RVPN further opined that there is no space requirement as the commercial implications would be imposed on RVPN. CTU stated that there is no harm in keeping space provision as the same would be beneficial for Rajasthan for future expansion. RVPN stated that there would be no requirement in future as per STU, therefore space provision should not be kept. CTU agreed with RVPN and stated that the provision of 8 nos. 220kV line bays and 4 nos. 400/220kV transformers at Sikar-II would be deleted from the scope.

15.6 Members agreed with the proposal of 5 nos. of 400 kV bays (Bhadla II- 3 nos., Fatehgarh-II- 1 no. & Fatehgarh-III-1 no.) for implementation under ISTS with time frame indicated above.

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

16.1 CEA stated that the 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 included 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 and the provision for 2 nos. of bays at Aligarh S/s would be deleted from the scope.

16.2 Members noted the same.

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 CEA stated that the 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

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Fatehgarh-II & Bhadla-II S/s, schedule of 220kV bays at these S/s was kept unchanged i.e. Dec'21.

17.2 CEA further informed that as per LTA/Connectivity meeting of NR held on 31.08.2020, CTU has given the update that PFC & REC has intimated that because of the delay in the completion of bidding process, the schemes are further delayed and the completion schedule of the schemes would be from June, 2022 onwards. Detailed phasing is attached at **Annexure-IV**.

17.3 CTU further informed that implementation of the schemes would be done in phase manner in order to match the timeframe with the generators.

17.4 Members noted the same.

18.0 Spare Reactor at Narela

18.1 Director, PSPA-1 stated that the 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 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 1st 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 noted the same.

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

19.1 Director, PSPA-1 stated that 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-II765kV D/c line (2nd).

However, based on the Electrical layout of 765kV Bhadla-II S/S, Powergrid had informed 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 Reactor for line Reactors 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.

19.2 CTU suggested that this provision of 1x80 MVAR, 765kV Spare Reactor at Bhadla-II S/s could be taken up for implementation as strengthening scheme.

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19.3 *Members agreed with the implementation of additional 1x80 MVAR, 765kV Spare Reactor at Bhadla-II S/s as strengthening scheme.*

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

20.1 CEA stated that at present, 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. Therefore, additional 1x500 MVA ICT is proposed at Bhadla PS.

20.2 CTU stated that 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. Also, this ICT may be taken up as strengthening scheme and further LTA may not be granted at Bhadla, in order to meet the criteria of n-1 contingency.

20.3 SECI stated that in case one of the transformers goes out, entire generation will face issues. Therefore, n-1 contingency has to be taken care of at RE pooling station. The same needs to be revised in the Transmission Planning Criteria also.

20.4 Director (SO), POSOCO also stated that the existing planning criteria was revised long back in January 2013 and pooling of RE generation to the extent of 3-4 GW at one location was not anticipated at that time. Therefore, N-1 compliance of 400/220 kV ICTs at RE pooling station (immediate connectivity) is not mandated in the existing Transmission Planning Criteria. Now, with the target of integrating 175 GW RE by 2021-22, the N-1 criteria at RE pooling stations needs to be reviewed as, currently, any outage may result in loss of significant generation and can adversely impact the grid security.

20.5 MS, NRPC stated that instead of proposing strengthening at one particular S/s, there could be a proposal for augmentation of transformers at all the RE pooling stations in order to meet n-1 criteria. In this regard, POSOCO suggested augmentation at the substations with capacity more than 1000 MW.

20.6 Chairperson CEA also agreed that the criteria need to be reviewed and stated that the committee constituted for the review of the transmission planning criteria would look into the same.

20.7 *After deliberations, it was agreed for the implementation of additional 1x500 MVA, 400/220kV ICT (8th) at Bhadla Pooling Station as strengthening scheme for meeting the n-1 criteria.*

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

21.1 Director, PSPA-I stated that the 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)
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		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.

21.3 CTU informed that as per the latest updates, the total Stage-II connectivity has been granted for 24.14 GW, and LTA applications granted for 13.34 GW. Some more applicants were granted the St-II connectivity and LTA in the 37th meeting held on 29.8.2020. Details of Connectivity/LTA agreed/granted during 31st – 37th Connectivity and LTA meeting of NR Constituents held from Jan'20 to Aug'20, along with the details of LTA/Connectivity granted in other regions with beneficiaries as NR is given at **Annexure-V**. Further, during aforesaid period the list of MTOA applications received & granted involving Northern Region is attached at **Annexure-VI**.

21.4 Members noted the same.

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

22.1 Director, PSPA-1 stated that in the 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). She then requested UPPTCL to inform the timeframe for implementation of above 220kV bay.

22.2 UPPTCL informed that the timeframe of 1 no. of 220kV bays at Shahjahanpur (PG) under ISTS is May, 2021.

22.3 CTU stated that the scheme will be taken up in NCT and also needs Ministry approval. Therefore, it may get delayed. UPPTCL stated that the requirement of their area will be in May, 2021; therefore the same may be expedite.

22.4 Members noted the same.

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

23.1 CTU stated that the 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 -I– Bhadla (PG) 765kV D/c line (to be operated at 400kV) at Fatehgarh-II so as to establish Fatehgarh -I – Fatehgarh-II 400kV D/c line (765kV D/c line to be operated at 400kV) and Fatehgarh-II –

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Bhadla (PG) 765kV D/c line. Further, charging of Fatehgarh-II – Bhadla (PG) section at 765kV (after LILO) has also been agreed.

23.2 He further stated that as the line i.e. Fatehgarh -I – Fatehgarh-II 400kV D/c line is to be charged at 400kV and future upgradation 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 at the terminating end of 400 kV level(for the last 2-3 km).

23.3 Members noted the same.

24.0 Transmission works proposed by HVPNL

24.1 Director, PSPA-1 stated that HVPNL vide their letter no Ch-60 HSS 391 dated 30.06.2020 has proposed various 220 kV Intra-State transmission schemes involving reconfiguration/inter-connection with 400 kV ISTS elements. **HVPNL has awarded/in process to award 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

24.2 She further stated that 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: <ol style="list-style-type: none"> i. 2 no. 220 kV bays for 2x100 MVA, 220/66 kV T/Fs. ii. 2 no. 220 kV line bays for accommodating line i.e. Creation of 220 kV D/C line from 400 kV ISTS 	39th SCM Item No. 8.0 2 no. 220 kV bays were allocated for 400 kV Prithla to 220 kV Prithla D/C line and same may be allocated to present scheme.

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S.No.	Name of the transmission scheme	SCM/NRSCT meeting reference
	<p>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 MeerpurKurali 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 MeerpurKurali 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>	
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 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</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 220 kV Prithla and 220 kV Meerpurkurali.</p> <p>Cancellation of the following in-principle works approved by HVPNL:-</p> <p>i. Creation of 220 kV D/C Prithla – MeerpurKurali 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 MeerpurKurali to terminate 220 kV D/C Prithla – MeerpurKurali line.</p>	

24.3 She stated that 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. The same is enclosed at **Annexure –VII**.

24.4 Members noted the same.

25.0 Down Stream network by State utilities from ISTS Station:

25.1 CTU stated that 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. STUs were requested to furnish the updates of the downstream system planned/under construction associated with the listed ISTS substation. Accordingly, the data provided by STU’s in this regard is enclosed as **Annexure -VIII**.

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

26.1 CTU stated that a meeting was held at CERC in Dec’19 on issues involved in Uttarakhand Integrated Transmission Project (UITP) wherein all the generators mentioned below were directed 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. (SingoliBhatwari HEP) – 99 MW	99 MW	Signed by CTU, L&T & PTCUL	PTCUL stated that there is no need to sign TA

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2	NTPC Ltd. (TapovanVishnuga d 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
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

26.2 CTU further stated that as per the above table, beneficiaries need to sign the LTA.

26.3 Members noted the same.

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 The information shared by Sterlite Power on Power Flow Control Device is enclosed at **Annexure- IX**.

Additional Agenda Items:

28.0 Agenda Points proposed by UPPTCL:

28.1 Director, PSPA-1 stated that the downstream Network of Gorakhpur (400 kV) PG s/s with creation of 220/132/33 kV Maharajganj and Anandnagar S/s has been deliberated and concurred in the 40th meeting of SCSPNR held on 22.06.2018. However, considering final land locations of these UPPTCL s/s and associated line length of 100 km, modifications proposed in the downstream network are as follows:

S.No	Approved in 4 th NRSCT dated 25.07.2019	Modifications proposed
1	Gorakhpur (PG)- Maharajganj 220 kV D/C line (Twin Moose) -40 km	Gorakhpur (PG)- Maharajganj 220 kV D/C line (Zebra) -70 km
2	Maharajganj- Anandnagar 220 kV D/c line-30 km	LILO of one circuit of Gorakhpur (PG)- Maharajganj 220 kV D/C line at Anandnagar- 30 km

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28.2 UPPTCL informed that the studies for the same have been done and no overloading has been observed.

28.3 UPPTCL further stated that in view of anticipated load in Unnao district and to meet n-1 criteria, they have proposed augmentation at 400 kV Unnao S/s from 3x315 MVA to 2x315+1x500 MVA. The present loading is 700 MW at Unnao S/s.

28.4 CTU stated that with the augmentation of 1x500 MVA transformer, n-1 criteria will not be fulfilled. Therefore, it is suggested to implement 2x500 MVA transformer at 400 kV Unnao S/s.

28.5 After deliberations, following was agreed:

- (i) *The modified downstream network of Gorakhpur S/S (400 kV) :*
- Gorakhpur (PG)- Maharajganj 220 kV D/C line (Zebra) -70 km*
 - LILO of one circuit of Gorakhpur (PG)- Maharajganj 220 kV D/C line at Anandnagar- 30 km*
- (ii) *Augmentation at 400 kV Unnao S/s from 3x315 MVA to 1x315+2x500 MVA.*

29.0 Transmission System for upcoming hydro generators in Yamuna Basin

29.1 PTCUL stated that power from proposed generators of Yamuna basin was earlier planned to be evacuated through 220 kV D/C Mori-Khodri line. However, as per MoM of 39th meeting of standing committee dated 29th& 30th May 2017, the evacuation system was changed to 220 kV Mori-Dehradun line. Further, Connectivity was granted to Naitwar Mori HEP of SJVNL in October, 2017 and was agreed in the 2nd meeting of Northern Region Standing Committee on Transmission held on 13/11/2018 through the following transmission system:

- Naitwar Mori HEP - # Location of Mori 220/132 kV (PTCUL) S/s 220 kV D/C line (to be implemented by applicant along with 220 kV bays at generating end).
- #Location of Mori 220/132 kV (PTCUL)-Dehradun 220 kV D/C line (to be implemented by PTCUL as ISTS Licensee).
- # Mori 220/132 kV S/s is not required in the time frame of connectivity of Naitwar Mori HEP.

29.2 In the same meeting of 2nd NRSCT, PTCUL was also requested to submit a report to CEA regarding the status of upcoming hydro generation projects in Yamuna basin and based on the report of PTCUL regarding Yamuna Basin hydro generation projects, decision regarding the capacity of Mori-Dehradun 220 kV D/c line would be taken. In this regard, PTCUL vide its letter dated 20.07.2020 has forwarded the status of generators in Yamuna Basin with following details:

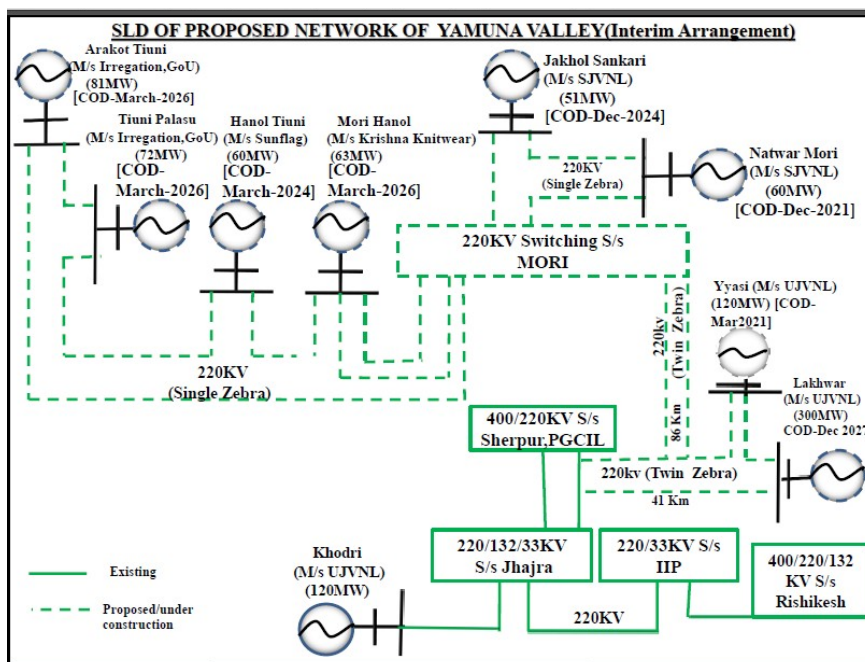
S.No	Name of Project/Developer	Capacity	Expected Target	Construction Status
1	Naitwar Mori (SJVNL)	60 MW	Dec-2021	Started
2	HanolTiuni (M/s Sunflag)	60 MW	March-2024	Not Started
3	JakholSankari (SJVNL)	51 MW	Dec-2024	Not Started
4	ArakotTiuni (Irrigation Deptt.GOU)	81 MW	March-2026	Not Started
5	TiuniPlasu (Irrigation Deptt.GOU)	72 MW	March-2026	Not Started
6	Mori Hanol (M/s Krishna knitwear)	63 MW	March-2026	Not Started
Total	387 MW			

29.3 PTCUL further stated that considering the total capacity of potential generation of 387 MW and as per above MoM of 2nd NRSCT, PTCUL has planned a 220 kV Mori-Dehradun line as

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ISTS, with Twin Zebra configuration. PTCUL has also informed that the LTA for construction of above line has been signed with SJVNL on dated 31.01.2020 and Implementation Agreement on dated 16.03.2020.

For transmission system for evacuation of power from 60 MW Naitwar Mori HEP of M/s SJVN Ltd, PTCUL has also proposed construction of 220 kV Mori-Dehradun line interconnection with under construction 220 kV D/C Vyasi-Dehradun line (being constructed as Intrastate Transmission Network of PTCUL) through LILO arrangement near Vyasi as an interim arrangement (Phase-I) as per Single Line Diagram (SLD) enclosed below. This will reduce the line length of proposed 220 kV Twin Zebra Mori-Dehradun line from 116 km to 86 km. approximately. Further, the construction of remaining portion of approximately 30 km. of 220 kV Twin Zebra Mori-Dehradun line (Phase-II) can be taken up as and when required considering the commissioning schedule of remaining 5 nos. Generators in Mori & nearby area and the capacity of under construction 220 kV D/C Vyasi-Dehradun line.



29.4 PTCUL has also informed that 220 kV twin Zebra D/C Lakhwar-Vyasi-Dehradun line has been designed as per the capacity of proposed UJVNL generators Lakhwar HEP (300 MW) and Vyasi HEP (120 MW) as Intra State Transmission Scheme. Out of the two proposed generators Lakhwar (300MW) and Vyasi 120(MW), only Vyasi HEP is under construction and is scheduled for commissioning in year 2021. Construction of Lakhwar HEP has not started yet. PTCUL is constructing 220kV Vyasi Dehradun line on Double circuit in twin Zebra scheduled for commissioning in March 2021. This scheme is already discussed in 3rd Standing Committee Meeting on Transmission Planning dated 24/05/2019. Presently 220 kV D/C Vyasi-Dehradun line is under construction. The expected CoD of Vyasi HEP is March, 2021 and of Lakhwar HEP is Dec, 2027.

29.5 Considering the above, following system for evacuation in Yamuna basin (Including SJVN HEP) may be considered-

- i. Capacity of Proposed 220 kV Mori-Dehradun line on double circuit in Twin Zebra Conductor configuration considering the approx. 387 MW power from Proposed/Under Construction Hydro Generators of Yamuna basin as mentioned above.
- ii. In first phase, Construction of proposed 220 kV D/C twin zebra line from Mori upto the interconnection point (near Vyasi) of 220 kV D/C Vyasi-Dehradun line (being constructed

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as Intrastate Transmission Network of PTCUL) as an interim arrangement (Phase-I, approx. line length 86 km.). This will expedite the evacuation of Power from SJVN HEP. In Phase-II construction of 220 kV D/C twin zebra line from interconnection point near Vyasi to Dehradun (approx. line length in Phase-II 30 km) shall be taken up later on as per system requirement.

- iii. Accordingly, Tripartite LTA Agreement signed between PTCUL, CTU & SJVNL and Implementation Agreement signed between PTCUL & M/s SJVNL will be amended for incorporating the above arrangement of implementation of 220 kV Mori-Dehradun line in phases(Phase-I&II) for evacuation of power from 60MW Naitwar Mori HEP and operationalisation of LTA through the interim arrangement for recovery of tariff.

29.6 CTU stated that there would be regulatory issues as Natwar Mori is an ISGS project and the same will be connected to Intra-State system via 220 kV D/C Vyasi-Dehradun line. Further, for Vyasi project is also getting directly connected to Dehradun S/s, which is an ISTS S/s, therefore ISTS charges would also be applicable.

29.7 PTCUL stated that in order to avoid extra 30 km. of 220 kV Twin Zebra Mori-Dehradun line and till the time the other projects in the Yamuna Basin (as mentioned in the above table) would be commissioned, Natwar Mori may be granted connectivity through Intra-State system. Further, he informed that SJVN has also agreed with this proposal of PTCUL.

29.8 CTU stated that the system can be agreed technically; however the regulatory issues and the commercial implications to the beneficiaries may be discussed separately.

29.9 MS, NRPC stated that as per new regulations, there would be cost implications to the beneficiaries; therefore there is a possibility that beneficiaries may object later. However, system can be agreed technically just to match the timeframe of generator with existing transmission system in order to provide evacuation system for Natwar Mori.

29.10 CEA stated that CERC vide its order dated 31.1.2013 has declared the UITP scheme as deemed ISTS to be implemented by PTCUL. Now, PTCUL has proposed some change in the ISTS works under UITP scheme as approved by CERC, so they need to approach to CERC or otherwise they may implement the scheme under Intra-State transmission scheme.

29.11 After deliberations, it was decided that the above proposal of PTCUL can be agreed technically for evacuation of power from Natwar- Mori HEP as intrastate scheme. However, for treating it as part of deemed ISTS the regulatory issues need to be clarified from CERC before proceeding for construction of the line. Further, the commercial implications can be discussed separately with CEA, CTU and PTCUL.

30.0 Any other issue with permission of the chair.

30.1 PSTCL:

30.1.1 PSTCL requested to include their proposal of unjustified bilateral charges levied by PGCIL for non-utilization of 2 no. of 220 kV line bays at Jalandhar S/s was not included in the agenda and requested to include the same in the agenda of next meeting of NRPCTP.

30.1.2 Members agreed.

30.2 UPPTCL:

30.2.1 UPPTCL stated that that in the 3rd NRSCT held on 25.09.2019, evacuation of 1x660 MW

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Harduaganj TPS was discussed. In the minutes issued for the same, due to typographical error 3x315 MVA ICT was mentioned instead of 2x315 MVA. The same may be modified.

30.2.2 Members noted the same.

30.3 HVPNL:

30.3.1 HVPNL requested to circulate the agenda of the meeting at least 15 days before the meeting so that they get sufficient time to prepare their comments and take approval from their management and no additional agenda should be entertained after that.

30.3.2 CE, CEA acknowledged the views of HVPNL and stated that this time the agenda was circulated 15 days prior to the meeting; however, in future efforts would be made to circulate the agenda at least one month before the meeting. He requested the members that in an endeavour to send the agenda 1 month before the meeting all the agenda should be available at least 2 months before the meeting. So the members are requested to send the agenda within 1 months' time after the MoM is circulated. No agenda/additional agenda would be accepted within 2 months period before the ensuing meeting. He also requested the committee to keep limited agenda for the meeting so that all the agenda items could be deliberated properly.

Meeting ended with thanks to the chair.

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