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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 &amp; Appraisal - I Division

-As per list enclosed-

विषय: उत्तरी क्षेत्र की विद्युत प्रणाली योजना पर स्थायी समिति की 40 वीं बैठक  
के कार्यवृत्त

**Sub: 40<sup>th</sup> Meeting of Standing Committee on Power System Planning of  
Northern Region-Minutes of Meeting**

Sir/ Madam,

40<sup>th</sup> meeting of the Standing Committee on Power System Planning of Northern Region was held on 22<sup>nd</sup> June, 2018 (Friday) in New Delhi. The Minutes of the meeting has been uploaded on CEA website: [www.cea.nic.in](http://www.cea.nic.in) (path to access – Home Page -Wing specific document/power system related reports/ Standing Committee on Power System Planning/ Northern region).

भवदीय /Yours faithfully,

अवधेश कुमार यादव (Awdhesh Kr Yadav)

निदेशक/ Director

**Copy to:**

PPS to Member (PS), CEA

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1.	Member, Secretary, NRPC, 18-A Shajeed Jeet Singh Sansanwal Marg, Katwaria Sarai, New Delhi - 110016 (Fax-011-26865206)	2.	Director (W &P) UPPTCL, Shakti Bhawan Extn,3rd floor, 14, Ashok Marg, Lucknow - 226 001 (Fax:0522-2287822)	3.	Director (Projects) PTCUL, Urja Bhawan Campus, Kanawali Road Dehradun-248001. Uttarakhand Fax-0135-276431
4.	Director (Technical), Punjab State Transmission Corporation Ltd. (PSTCL) Head Office The Mall Patiala -147001 Fax-0175-2304017	5.	Member (Power) BBMB, Sectot-19 B Madhya Marg, Chandigarh-1 60019 (Fax-01 72-2549857	6.	Director (Operation) Delhi Transco Ltd. Shakti Sadan, Kotla Marg, New Delhi-110002 (Fax-01123234640)
7.	Director (Technical) RRVNL, Vidut Bhawan, Jaipur-302005. Fax:-0141-2740794	8.	Director (Technical) HVPNL Shakti Bhawan, Sector-6 Panchkula-134109 Fax-0172-256060640	9.	Director (Technical) HPSEB Ltd. Vidut Bhawan, Shimla -171004 Fax-0177-2813554
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 Fax-0172-2637880	12.	Development Commissioner (Power), Power Department, Grid Substation Complex, Janipur, Jammu, Fax: 191-2534284
13	Chief Engineer (Transmission) NPCIL, 9-S-30, Vikram Sarabhai Bhawan, Anushakti Nagar, Mumbai-400094 Fax-022-25993570	14	Director (T&RE) NHPC Office Complex, Sector-33, NHPC, Faridabad-121003 (Fax-0129-2256055)	15	Director (Projects) NTPC, NTPC Bhawan, Core 7, Scope Complex-6, Institutional Area, Lodhi Road. New Delhi (Fax-011-24361018)
16	Director (Technical) THDC Ltd. Pragatipuram, Bypass Road, Rishikesh-249201 Fax: 0135-2431519)	17	Director (Projects) POWERGRID Saudamini Plot no. 2, Sector - 29. Gurgaon-122 001 (Fax-0124-2571809)	18.	CEO, POSOCO B-9, Qutab Institutional Area, Katwaria Sarai New Delhi – 110010 (Fax:2682747)
19	COO (CTU) POWERGRID, Saudamini, Plot no. 2, Sector -29, Gurgaon-122 001 (Fax-0124-2571809)				

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**Minutes of 40<sup>th</sup> Meeting of Standing Committee on Power System Planning of Northern Region held on 22nd June, 2018 (Friday) in New Delhi**

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List of participants is enclosed at Annexure-I.

Member (Power System), CEA welcomed the participants to the 40<sup>th</sup> meeting of the Standing Committee on Power System Planning of Northern Region (SCPSPNR). He informed that Ministry of Power has constituted the "Northern Region Standing Committee on Transmission" (NRSCT) along with its Terms of Reference (ToR) and the frequency of meeting (at least once in three months). Therefore, future meetings on power system planning of NR would be held as NRSCT meetings. He requested Chief Engineer, CEA to take up the agenda.

Chief Engineer (PSPA-I), CEA stated that we are meeting after a gap of one year and the agenda for the meeting interalia, includes important issues viz. evacuation of power from Singruli STPP, Khurja STPP, 4000 MW of Solar Park in Budelkhand area etc. He requested members to be specific in deliberation so that decisions could be arrived at through consensus. This is the last meeting of the SCPSPNR and the next meeting will be called the first meeting of NRSCT. The constitution of NRSCT mandates the meeting to be held every quarter. He requested constituents to send their proposals to CEA as soon as they conceive them, so as to facilitate preparation of the agenda for NRSCT in advance. He requested Director (PSPA-I), CEA to take up the agenda items for discussions.

**1.0 Confirmation of the Minutes of the 39<sup>th</sup> meeting of the Standing Committee on Power System Planning of Northern Region held on 29-30<sup>th</sup> May, 2017.**

- 1.1 CEA stated that the minutes of 39<sup>th</sup> meeting of the SCPSPNR were issued vide CEA letter no. 1/9/39/2017/PSP&PA-I/783-802 dated 28<sup>th</sup> July, 2017. Subsequently, PGCIL, HVPNL, PTCUL and RRVPNL had made some observations on the minutes of the meeting. Based on their observations a corrigendum to the minutes of 39<sup>th</sup> meeting of SCPSPNR was issued vide CEA's letter no. 1/9/39/PSP&A-I/2017/1462-1480 dated 28.12.2017 (copy enclosed at **Annexure-II**). No further comments have been received from the constituents.
- 1.2 He further stated that in the 39<sup>th</sup> meeting of SCPSPNR, upgradation of equipment at both ends of 400 kV Mahendragarh-Dhanonda D/C line was agreed (under SI no. 2 of Item no. 20 'Operational feedback'). In the corrigendum to the minutes of 39<sup>th</sup> meeting of SCPSPNR, it was mentioned that the equipment upgradation at Dhanonda end would be carried out by HVPNL. However, regarding equipment upgradation at Mahendragarh end nothing was mentioned. Mahendragarh being an ISTS sub-station, the 400 kV equipment upgradation at the sub-station would be carried out under ISTS.
- 1.3 Members were requested to confirm the minutes of the meeting along with the Corrigendum and 400 kV equipment upgradation works at Mahenderagarh substation under ISTS.
- 1.4 Members confirmed the same.

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## 2.0 Constitution of the "Northern Region Standing Committee on Transmission" (NRSCT) for planning of Transmission System in the Region:

2.1 CEA stated that MoP vide their office order no. 15/3/2017–Trans dated 13.4.2018 has constituted the "Northern Region Standing Committee on Transmission" (NRSCT) with the following Terms of Reference (ToR):

- (i) Evolve and finalize System Strengthening Schemes for removal of operational constraints and transfer of surplus power through inter-Regional corridors.
- (ii) Examine the proposals for transmission System for Access / Connectivity Applications.
- (iii) Examine the Associated Transmission System with Electricity Generators.
- (iv) Review the up-stream and down-stream network associated with Transmission schemes.
- (v) Examine and evaluate the intra-State transmission proposals.

2.2 The composition of the Committee is as given below and the NRSCT shall meet at least once in three months.

1.	Member (Power System), Central Electricity Authority (CEA)	Chairperson
2.	Chief Operating Officer, Central Transmission Utility (POWERGRID)	Member
3.	Director (System Operation), Power System Operation Corporation Ltd.	Member
4.	Heads of State Transmission Utilities (STUs) of Jammu & Kashmir, Himachal Pradesh, Punjab, Haryana, Rajasthan, Delhi, Uttar Pradesh, Uttarakhand, UT of Chandigarh#	Member
5.	Member Secretary of Northern Region Power Committee	Member
6.	Chief Engineer (PSPA-I), Central Electricity Authority	Member Secretary

# STUs to coordinate with their respective Distribution Companies (DISCOMs).

2.3 CEA further stated that Generators are not part of NRSCT. However, they may be invited as 'special invitee' if there is any agenda item concerning them. MoP order has assigned the responsibility of coordinating with Discoms to the respective STUs regarding transmission schemes. It implies that discoms will be represented through their STUs in the NRSCT.

2.4 Members noted the constitution and ToR of NRSCT. It was agreed that the next meeting of Standing Committee with above members would be called as 1<sup>st</sup> meeting of NRSCT.

## 3.0 Transmission system for Ultra Mega Solar Park in Fatehgarh, distt. Jaisalmer Rajasthan

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3.1 CEA stated that following transmission system associated with Ultra Mega Solar Park in Fatehgarh, Jaisalmer was agreed in the 38<sup>th</sup> meeting of SCSPNR held on 30-05-2016:

- i. Establishment of 400 kV Pooling Station at Fatehgarh (with a provision to upgrade at 765kV level).
- ii. Fatehgarh Pooling sub-station-Bhadla (PG) 765 kV D/C line (initially operated at 400 kV)
- iii. 2 nos. of 400kV line bays at Fatehgarh Pooling substation
- iv. 1x125 MVAR Bus reactor at 400 kV Fatehgarh Pooling station

**Note:** (i) Park Developer to construct 400 kV line from M/s AREPL solar park to Fatehgarh pooling station and provide 1x125 MVAR bus reactor at generation switchyard.

(ii) POWERGRID to provide two number of line bays at Bhadla (PG)

3.2 The scheme was recommended for implementation through TBCB in the 36<sup>th</sup> meeting of Empowered Committee on Transmission held on 26-07-2016. Subsequently, CTU in 39<sup>th</sup> meeting of Standing Committee of Power System Planning of NR had informed that they have received new connectivity applications for about 2100 MW from various wind / solar developers viz. M/s Suzlon and M/s Green Infra located around Fatehgarh. In the meeting, it was decided that CEA would call a separate meeting to decide the scope of works for the scheme “Transmission system for Ultra Mega Solar Park in Fatehgarh, Jaisalmer” in view of new applications received by CTU for grant of connectivity at Fatehgarh.

A meeting was held on 26.7.2017 in CEA, wherein, the scope of the scheme was revised to provide connectivity to these developers and same was intimated to Empowered Committee on Transmission in its 37<sup>th</sup> meeting held on 20.9.2017. The revised scope of the scheme, interalia, included the following:

- i) Provision of 220kV level at 400kV Pooling Station at Fatehgarh
- ii) 1x500 MVA, 400/220kV Transformer at Fatehgarh PS as a part of Common Transmission system required for grant of Connectivity to the applicants (subject to the submission of Construction Bank Guarantee by the applicants in line with the CERC regulations).
- iii) Deletion of provision of charging of
  - a) Fatehgarh-Bhadla 765 kV D/c line (initially charged at 400 kV level) at 765 kV level.
  - b) Fatehgarh substation at 765 kV level from the scope of the scheme.

Subsequently, a meeting was held in CEA on 12.12.2017, wherein, CTU had stated that the provisions of 220 kV level and 1x500 MVA, 400/220kV Transformer at Fatehgarh 400kV Pooling Station were included in the scope of the scheme, subject to the submission of Construction Bank Guarantee by the applicants. Further, CERC Connectivity Procedures were being revised as per CERC order No. 145/MP/2017 dated 29.9.2017 and connectivity to the applicants would be issued only after revision of the grant of connectivity procedure. Therefore, provision of 220kV level and 1x500 MVA, 400/220kV ICT may not be considered in the scope of works being considered

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for bidding. However, space provision for this ICT is to be kept in the scope. Based on the deliberations in the meeting, following was agreed;

- i) Provision of 220kV level and 1x500 MVA, 400/220kV Transformer at Fatehgarh 400kV Pooling Station not to be considered in the present RfP scope of the scheme 'Transmission system for Ultra Mega Solar Park in Fatehgarh, Distt Jaisalmer Rajasthan'. The same has been informed by CTU vide letter dated 08/09/2017. In total space provision for 5 nos. of 400/220 kV ICTs is to be kept at Fatehgarh.
- ii) As Fatehgarh Solar Park is to be commissioned by 30<sup>th</sup> September, 2019, the schedule of commissioning of the transmission scheme to be indicated as 30.9.2019 in the bidding document.
- iii) AREPL to provide details about the suitable land for the Fatehgarh substation and its tentative cost to PFCCL within a weeks' time

3.3 CEA added that the final transmission system that was included in the RfP of the scheme was as given below:

**Name of Scheme: Transmission system for Ultra Mega Solar Park in Fatehgarh, distt. Jaisalmer, Rajasthan**

- i) Establishment of 400kV Pooling Station at Fatehgarh
- ii) Fatehgarh Pooling station-Bhadla (PG) 765 kV D/C line (to be operated at 400 kV).
- iii) 2 Nos. of 400kV line bays at Fatehgarh Pooling station.
- iv) 1x125 MVAR Bus reactor at 400kV Fatehgarh Pooling station along with associated bay.
- v) Space for future 220 kV (12 nos.) line bays.
- vi) Space for future 400kV (8 nos.) line bays along with line reactors at Fatehgarh Pooling station.
- vii) Space for future 220/400kV transformers (05 nos.) along with associated transformer bays at each level.
- viii) Space for future 400kV bus reactor (2 nos.) along with associated bays.

**Note:**

- a) Park Developer to construct 400kV D/C line from M/s AREPL solar park to Fatehgarh along with 1x125 MVAR bus reactor at generation switchyard.
- b) POWERGRID to provide 2 nos. of 400kV line bays at Bhadla (PG) for termination of 765kV Fatehgarh PS-Bhadla (PG) D/c line (to be operated at 400kV) at Bhadla end.
- c) The Solar park developer (M/s AREPL) to provide adequate land for 400kV and 220 kV pooling station adjacent to the proposed solar park for which, transmission licensee shall coordinate with M/s AREPL including commercial aspects for transfer of land.
- d) 220 kV line bays at Fatehgarh Pooling station for future connectivity lines shall be under the scope of respective developer
- e) Solar park developer (M/s AREPL) to provide 2 nos. of 400kV line bays at Fatehgarh Pooling Station for termination of 400kV D/C line from AREPL solar park to 400kV Fatehgarh Pooling station.



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- 3.4 CEA further added that the bidding process of the scheme has been completed with above scope of works and the SPV has been transferred to the successful bidder i.e. M/s Adani Transmission Limited on 14<sup>th</sup> March, 2018.
- 3.5 Regarding the concern raised by the constituents about the beneficiaries of the project, CEA clarified that M/s Adani Transmission Limited has taken LTA based on target region, so he will be liable for sharing the transmission charges till its PPA is finalized as per CERC's Regulation on sharing of inter-state transmission charges.
- 3.6 GM (CTU) stated that CERC has given the order for the license and order states that "We are prima facie of the view that petitioner satisfies the conditions for grant of inter states transmission license under section 15 of Electricity Act, 2003 and the license will be granted after submission of certain information related to quality control as stipulated in article 5.1.1 and 5.4 of the TSA. He added that solar park developer (M/s AREPL) had written a letter dated 04<sup>th</sup> June, 2018 to M/s Adani Transmission Limited for time extension on account of force majeure. M/s Adani Transmission Limited has not accepted the request for time extension vide letter dated 13<sup>th</sup> June, 2018 and the commissioning schedule for the transmission system would remain same as indicated in the TSA i.e. September 2019.
- 3.7 Members noted and concurred the scope of works as indicated in RfP for the scheme.

**4.0 Issues related to transmission system for evacuation of power for Bajoli Holi HEP (180MW) of M/s GMR Energy Ltd. in Himachal Pradesh.**

4.1 CEA stated that M/s GMR Energy Ltd. is constructing Bajoli Holi HEP (3x60MW) on Ravi River in Himachal Pradesh. Long Term Access was granted to M/s GMR Bajoli Holi Hydropower Pvt. Ltd. in March 2014 for 155 MW from August 2018 for 25 years through the following transmission system being implemented by HPPTCL:

- i) Bajoli Holi-Lahal Pooling Station of Himachal 220 kV D/C line with Twin Moose conductor
- ii) Lahal Pooling Station-Chamera Pooling Station (PG) 400 kV D/c line

The first unit of the project is likely to be commissioned by March 2019. M/s GMR had anticipated some delay in the implementation of connectivity system to be implemented by HPPTCL for evacuation of power from the generation project due to difficult terrain, delay in forest clearance and severe ROW problem. In view of above, GMR had proposed following temporary arrangement for evacuation of power from their project till the originally planned system is completed:

- a) Connect Plant bus to Lahal pooling station through transmission line Bajoli Holi-Lahal P.S 220 kV D/c by expediting construction of the line.
- b) Lahal P.S–Budhil HEP 220 kV D/c line (nearing completion)
- c) Budhil HEP–Chamera-III 220 kV S/c line (existing)
- d) Chamera-III–Chamera Pooling station 220 kV D/C (existing ISTS transmission system).

The matter was discussed in 39<sup>th</sup> meeting of SCPSNR held on 29-30<sup>th</sup> May, 2017, wherein, it was agreed that a separate meeting would be convened by CEA with CTU, GMR, HPPTCL and HPSEB to deliberate on the issue. Accordingly, a meeting was convened in CEA on 14.7.2017 and following was agreed in the meeting:

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- i) The interim arrangement for evacuation of power from Bajoli Holi HEP till completion of the planned evacuation system is as given below:
  - a) Bajoli Holi to Lahal P.S. 220 kV D/C line (by HPPTCL, commissioning expected during the period July 2019 to December 2019)
  - b) Lahal P.S.–Budhil HEP 220 kV S/c line (by HPPTCL, commissioning during the period December 2017 to April 2018)
  - c) Budhil HEP–Chamera-III 220 kV S/c line (existing, dedicated line of Budhil HEP)
  - d) Chamera-III–Chamera Pooling station 220 kV D/C line (existing, ISTS line).
- ii) M/s GMR to implement necessary SPS to reduce / trip generation at Bajoli Holi HEP to avoid overloading of 400/220 kV 2x315 MVA ICTs at Chamera pooling station during outage of one 315 MVA ICT and overloading of Chamera III–Chamera pooling station 2200 kV D/C line during n-1 contingency condition.
- iii) M/s GMR (Bajoli Holi HEP developer) needs to arrive at mutual agreement with M/s GREENCO (Budhil HEP developer) for the interim arrangement and consent for the same to be taken from Central Electricity Regulatory Commission, for the use of dedicated system of Budhil HEP.
- iv) M/s GREENKO to furnish switchyard rating of Budhil generation switchyard and technical constraints w.r.t. quantum of power flow, if any, in the existing Budhil HEP – Chamera-III 220 kV S/c line.
- v) Master plan for evacuation of power from generation projects in Ravi basin would be reviewed by CEA, CTU and HPPTCL.

- 4.2** CEA further stated that M/s GMR Bajoli Holi Hydro Power Pvt Ltd. (GBHHPL) vide their letter dated 5.1.2018 has requested for rescheduling of commencement of LTA of 155MW from August 2018 for their generation project. The request was made due to delay in implementation of connectivity lines from Bajoli Holi plant to Chamera pooling station via Lahal pooling station being implemented by HPPTCL and also due to delay in (Bajoli Holi) their generation project. To discuss the issue, a meeting was held in CEA on 8.2.2017 with M/s GMR Bajoli Holi, HPPTCL and CTU, wherein, it was informed that M/s GMR was granted LTA for 155MW for Bajoli Holi HEP at Chamera pooling station from August 2018. For evacuation of power from the project, only intra state system were planned up to Chamera Pooling Station. Beyond Chamera Pooling Station, the existing system was found to be sufficient for further dispersal of power and no new transmission element was planned in ISTS.
- 4.3** M/s GBHHPL informed that first unit is expected to be commissioned by March 2019 and 2<sup>nd</sup> unit by April 2019. Regarding query from M/s GMR about start of LTA, CTU clarified that LTA to Bajoli Holi HEP can be started only after the commissioning of 400 kV Lahal-Rajera (Chamer Pooling Station) D/C line by HPPTCL.
- 4.4** HPPTCL informed that the 220kV switchyard of Lahal PS is expected to be completed by January 2019, the completion schedule for Bajoli Holi –Lahal PS 220 kV D/C line is Oct 2019 and that of Lahal PS –Chamera PS 400 kV D/C line is April 2020. Lahal P.S.–Budhil HEP 220 kV S/c line which is to be used for interim arrangement is expected to be completed by Nov 2018. HPPTCL was requested to expedite the construction of Bajoli Holi –Lahal PS 220 kV D/C line to match with the commissioning of first unit of the (Bajoli Holi) generation project.



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4.5 After further deliberation, it was decided that a separate meeting would be convened to discuss the interim arrangement with all stake holders viz. CEA, CTU, POSOCO, HPPTCL, M/s GMR and M/s GREENKO (Budhil HEP).

**5.0 Connectivity of Railways' Traction Sub Stations (TSSs) with ISTS Network for Ludhiana-Delhi-Sonnagar route:**

5.1 CEA stated that Railway Board vide its letter no. 2012/Elect(G)/150/1 Pt-II dated 28.12.2016 has requested to connect its existing TSSs in Ludhiana-Delhi-Sonnagar route to ISTS sub-stations at 220kV voltage level by constructing requisite infrastructure including transmission lines and bay extension works at ISTS sub-stations. Power requirement of Railways from the nearby proposed ISTS points is given below:

<b>CONNECTIVITY SCHEME OF TSS ALONG LUDHIANA-DELHI- SONNAGAR ROUTE</b>					
<b>S. No.</b>	<b>PGCIL GSS</b>	<b>Connectivity required at (kV)</b>	<b>Railway TSS to be supplied</b>	<b>Grid Voltage at TSS (kV)</b>	<b>Tentative load requirement (MW)</b>
1	Abdullapur	220	Jagadhari-I	220	50
2			Jagadhari-II	220	
3			Tapri	132	
4			Muzaffarnagar	132	
5	Meerut	220	Jaranda Nara	132	50
6			Hapur	132	
7			Gulaothi	132	
8			Wair	132	
9	Pasauli (Sasaram)	220	Durgaoti	132	75
10			Deoria	132	
11			Chandiapur	132	
12			Gadhion	132	
13			Jeonathpur	132	
14			Chunar	132	

5.2 CEA informed that the issue of providing connectivity to Railways' TSS with ISTS network for Ludhiana-Delhi-Sonnagar route was discussed in 39<sup>th</sup> meeting of SCPSNR held on 29-30<sup>th</sup> May, 2017, wherein, it was decided to convene a separate meeting to discuss the Connectivity of Railways' TSSs with ISTS Network at Abdullapur and Meerut (in Northern Region) and Sasaram (in Eastern Region) for

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Ludhiana-Delhi-Somnagar Railway route. Accordingly, a meeting was convened on 21.7.2017 in CEA and following decisions were taken:

- (i) Railways would utilize existing two number of 220 kV bays at Abdullapur substation (presently used for 220 kV supply to Jagadhari TSS) to meet their additional traction load requirement. The required technical upgradation of the 220 kV line (presently only two phases has been strung) would be carried out by Railways subject to fulfilment of all the existing agreements of HVPNL with Railways for this line.
- (ii) Two nos. of 220 kV (GIS) bays at Meerut 400/220 kV substation along with establishment of 220/132 kV, 2x100 MVA GIS in the premises of Meerut 400/220 kV substation was agreed for providing connectivity to Railways. The cost of above works shall be borne by Railways. Railways to implement 132kV D/c interconnection from Meerut (PG) to their 132kV substation.
- (iii) As no representative from Bihar was present in the meeting, no decision could be taken in respect of connectivity to Railways TSS at Sasaram substation.
- (iv) Indian Railways agreed to apply afresh for open access from UPPTCL instead of seeking connectivity as DISCOM's HT customer. UPPTCL agreed to consider Railways application for open access from their network.
- (v) Railways to carry out economic analysis of seeking connectivity through ISTS points considering LTA cost, RoW compensation cost etc. vis-à-vis seeking open access from STUs.

**5.3** In the meeting Railways representative informed that at present two phases of Abdullapur-Jagadhari 220 kV D/C lines are strung and there are some space constraint / safety clearance related issue for stringing of 3<sup>rd</sup> phase at Abdullapur sub-station. It was decided that a joint visit may be done by CEA, HVPNL, Railways and POWERGRID and necessary modifications required at Abdullapur sub-station for providing 2 no. 220 kV bays for Abdullapur-Jagadhari 220 kV D/C line may be done by Railways at their cost.

## **6.0 Inter connection of connectivity of Railway Traction GSS to 220 kV POWERGRID sub-station**

**6.1** CEA stated that Railways vide their letter no. EL/TRD/NCR/PGCIL dated 25.7.2017 has intimated that Railway Board has sanctioned two 2x150 MVA, 220/123 kV Grid sub-stations (GSS) at Bhogan and Fatehpur to augment traction power supply in Gaziabad-Allahabad section. Accordingly, Railways has proposed connectivity of their 220/132 kV GSSs at Bhogaon and Fatehpur with Mainpuri and Fatehpur sub-stations of POWERGRID respectively at 220 kV level. Railways has requested CEA to give clearance / approval for the inter connection of POWERGRID network for the proposed Railway GSS at Bhogaon and Fatehpur.

**6.2** POWERGRID confirmed that availability of space for two nos. 220 kV bays at Mainpuri and Fatehpur 400/220 kV sub-stations. POWERGRID informed that at Fatehpur sub-station space for two nos. bays was available at extreme ends of the substation.

**6.3** UPPTCL stated that allocation of two bays at Mainpuri to Railways for maximum drawl of about 50 to 100 MW would mean underutilization of ISTS assets. . In mainpuri area, to cater to a load of about 250-300 MW, they are also planning a new

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220 kV substation, for which they require 2 no. of 220 kV bays at Mainpuri 400/220 kV substation. .

- 6.4 After discussions, members agreed for providing 220 kV connectivity to Fatehpur GSS of Railways at Fatehpur 400/220kV S/s of POWERGRID. Regarding, connectivity at Mainpuri S/s, it was decided that CEA, POWERGRID, UPPTCL and Railways may carry out a site visit to check the availability of space for four numbers of 220kV bays ( two nos. for Railways and two nos. for UPPTCL) at Mainpuri (PG).

**7.0 Conversion of fixed line reactors to switchable reactors at Bassi(PG), Kankroli(PG) and Zerda(GETCO) substations:**

- 7.1 CEA stated that during 39<sup>th</sup> meeting of SCSPNR, the proposal of converting the following fixed line reactors to switchable line reactors was agreed:

Sl. No.	Name of the Line	Substation (sending end)	Reactor (MVAR)	Substation (receiving end)	Reactor (MVAR)
1	Sohawal - Ballia I	Sohawal	50	Balia	63
2	Sohawal - Ballia II	Sohawal	50	Balia	63
3	Kankroli - Zerda	Kankroli	50	Zerda	50
4	Abdullapur-Panchkula I	Abdullapur	50		--
5	Abdullapur-Panchkula II	Abdullapur	50		--
6	Bassi – Kotputli	Bassi	50		--

Subsequently, POWERGRID had informed that there were space constraints at Bassi and Zerda substations for conversion of fixed line reactors to switchable line reactors. Therefore, POWERGRID had proposed to drop the proposal of conversion of fixed line reactors to switchable line reactors at Bassi and Zerda sub-stations.

- 7.2 CEA added that in the 37<sup>th</sup> meeting of Empowered Committee on Transmission held on 20.9.2017, following scheme was agreed to be implemented through regulated tariff mechanism by POWERGRID:

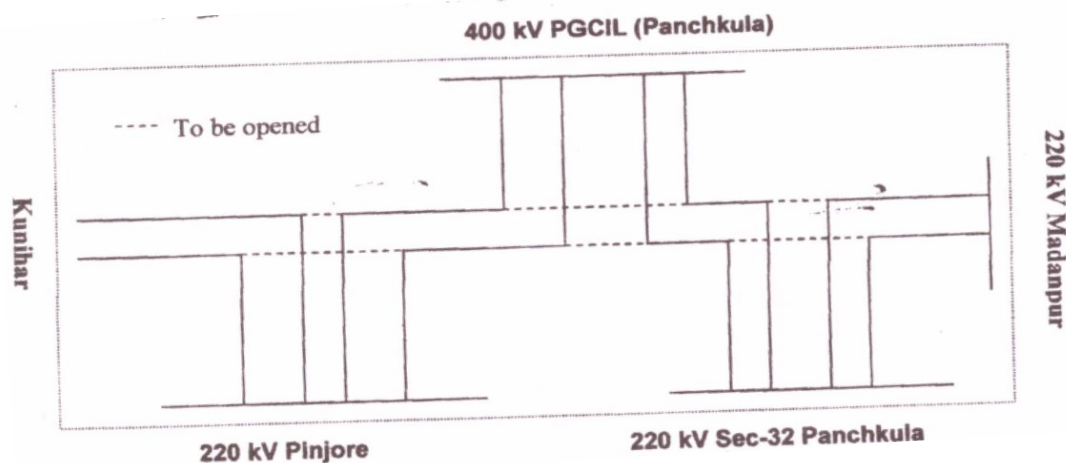
Sl. No.	Name of the Line	Substation (sending end)	Reactor (MVAR)	Substation (receiving end)	Reactor (MVAR)
i)	Sohawal - Ballia I	Sohawal	50	Balia	63
ii)	Sohawal - Ballia II	Sohawal	50	Balia	63
iii)	Abdullapur-Panchkula I	Abdullapur	50		--
iv)	Abdullapur-Panchkula II	Abdullapur	50		--

Note: Provision should be kept to use these line reactors as bus reactors in case the line is

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<i>not in operation</i>
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- 7.3 CEA further stated that Kankroli-Zerda 400 kV line being an inter-regional line POWERGRID proposal to convert fixed line reactor (420 kV, 50 MVar) at Kankroli end of Zerda-Kankroli 400kV line into switchable line reactor was discussed and agreed in the 42<sup>nd</sup> Meeting of Standing Committee on Power System Planning in Western Region (SCPSPWR) held on 17-11-2017,
- 7.4 After deliberations, members agreed to the following proposal:
- i) Conversion of fixed line reactor (420 kV, 50 MVar) at Kankroli end of Zerda-Kankroli 400kV line into switchable line reactor.
  - ii) Dropping of the proposal of conversion of fixed line reactors at Zerda and Bassi end of Kankroli-Zerda and Bassi-Kotputli 400 kV lines respectively.
- 8.0 **LILO of both circuits of Madanpur-Kunihar 220 kV D/c line at 220kV Pinjore (HVPNL) Substation**
- 8.1 CEA stated HVPNL vide their letter no.CH-92/HSS-350 dated 9.10.2017 has informed that both circuits of Madanpur-Kunihar 220kV D/c line were proposed to be LILO at three locations viz 220kV Pinjore S/s, 400/220kV Panchkula (PG) substation and 220kV Panchkula Sec-32 S/s (as shown below). HVPNL had completed the LILO section at 220kV Pinjore S/s and for connecting of this LILO section, HVPNL had requested NRLDC to provide shut down of Madanpur-Kunihar 220kV D/c line. However, NRLDC opined that 220kV Madanpur-Kunihar D/C line being an ISTS line, approval of the Standing Committee on Power System planning of Northern Region was required for the LILO of Madanpur-Kunihar 220kV D/c line at Panchkula (PG), Pinjore and Panchkula Sec-32 sub-stations.



Accordingly, on request from HVPNL, a meeting was held on 16.10.2017 in CEA with representatives from CTU, HVPNL, HPSEBL, HPPTCL and NRLDC, wherein following proposals were agreed in principle:

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- i) HVPNL proposal of LILO of both circuits of 220kV D/C Madanpur-Kunihar line (one circuit already LILO at Baddi) at Panchkula (PG), Pinjore and Panchkula Sec-32.
- ii) HPSEBL proposal of LILO of 2<sup>nd</sup> circuit 220kV D/C Madanpur-Kunihar line at Baddi (HP)
- iii) HVPNL proposal of 220kV outlets for utilization of six nos. of 220kV bays at Panchkula 400/22kV S/s as under:
  - a) Panchkula(PG) – Raiwali 220kV D/c line
  - b) LILO of both circuits of Madanpur-Kunihar 220kV D/C line at Panchkula (PG)

CEA vide letter no. 7/G/2015-PSPA-I dated 24.10.2017 had conveyed in- principle approval for LILO of both circuits of Madanpur- Kunihar 220kV D/c line (one circuit already LILO at Baddi) at 220kV Pinjore (HVPNL) substation.

**8.2** CEA further stated that HPPTCL vide their letter no. HPPTCL/Planning/CEA\_Vol-V/2017-18/7058-59 dated 24.1.2018 had forwarded the proposal of HPSEBL for LILO of 2<sup>nd</sup> circuit 220kV D/C Madanpur-Kunihar line at Baddi (HP). HPSEBL had informed that during winter they were drawing about 200-300 MW power from Baddi S/s through Madanpur-Kunihar 220kV D/C line and during high hydro generations in summer, they were exporting power towards Madanpur. However, due to unbalanced loading (due to LILO of only one ckt at Baddi), the line was not getting utilized up to its full capacity and they were also incurring high losses. Therefore, HPSEBL had requested to allow LILO of 2<sup>nd</sup> circuit 220kV D/C Madanpur-Kunihar line at Baddi(HP)

**8.3** After deliberation, members concurred the following proposals which were agreed in principle in a meeting held on in CEA on 16.10.2017:

- i) LILO of both circuits of Madanpur-Kunihar 220kV D/c line (one circuit already LILO at Baddi) at 220kV Pinjore (HVPNL) substation ( implementation by HVPNL)
- ii) LILO of 2<sup>nd</sup> circuit 220kV D/C Madanpur-Kunihar line at Baddi (HP) ( implementation by HPSEB/HPPTCL)
- iii) 220kV outlets for utilization of six nos. of 220kV bays at Panchkula 400/22kV S/s ( implementation by HVPNL):
  - a) Panchkula(PG) – Raiwali 220kV D/c line
  - b) LILO of both circuits of Madanpur-Kunihar 220kV D/C line at Panchkula (PG)

## 9.0 Operational Feedback (NR Region):

S. No	Corridor	Season/ Antecedent Conditions	Description of the constraints	Deliberations in SCSPNR
1	400kV Dadri-Greater Noida	All time	High MW loading also restricting flow of Rihand-Dadri HVDC. In last quarter loading of line remained in range of 600-1400MW for most of the time.	UPPTCL stated that one circuit of Dadri-Samaypur 400kV D/C line is LILO at Greater Nodia and Nawada,

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			<p><b>Remarks:</b> As reported by UPPTCL CT/CB/Isolators of Dadri bays installed at 400kV Greater Noida S/s are designed for 2000A only, with ambient temperature at 42°C &amp; above the current carrying capacity of above equipment goes down further. Similarly, at Dadri end the CT capacity is 2000A only &amp; at 400kV Nawada also the rating of CTs/CBs/isolators installed for Nawada Greater Noida line are of rating of 2000A only.</p> <p>Generation at Tehri and Koteshwar effects flow of 400kV Dadri-Gr. Noida. When generation at Tehri and Koteshwar is high, power flow is on the higher side from Meerut-Mandola-Dadri. Thus, when generation at Tehri &amp; Koteshwar is high, flow on Dadri-Gr. Noida increases. 400kV Gr Noida- Gr. Noida D/C has been commissioned however, loading of 400kV Dadri-Gr. Noida has not reduced. Thus, switchgear changes at Gr. Noida may be carried out so that any undue event/disturbance due to high line loadings may be avoided</p>	<p>thus forming 400kV Dadri-Greater Noida-Nawada-Samaypur line. The overloading of the line is due to more power drawl by Nawada as there is only one source to feed Nawada. Replacement of the switchgears is not the solution to reduce the loading of the line. UPPTCL opined that HVPNL needs to plan a new souce to feed power to Nawada. CEA opined that there are 2 nos. of 400 kV ckts between Dadri-samaypur. One ckt is LILO at Greater Noida and Nawada and the other circuit is LILO at Maharani bagh. In future LILO at Maharani bagh has been agreed to be bypassed, therefore, Nawada / Greater Noida LILO could be shifted to this ckt.</p> <p>It was decided that a separate meeting would be convened involving CEA, CTU, POSOCO, UPPTCL and HVPNL to study the proposal.</p>
2	400kV Anpara- Obra	Some times	<p>High MW loading.</p> <p>Remarks: Rihand-III (Unit#5 &amp; 6) has been shifted from NR to WR on 28th Nov 2017 by connecting through Rihand(III)-Vindhyachal PS 2xS/c lines as decided in 29<sup>th</sup> meeting of SCPSP of WR to shift it after commissioning of HVDC Champa-Kurukshetra bipole (operational since Sept 2017). This has helped in</p>	<p>UPPTCL stated that 765 kV Anpara D–Unnao S/C line is likely to be commissioned by December 2018.</p>



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			reducing line loadings in Singrauli-Anpara complex. Loading of Anpara-Obra increases in case of N-1 contingency of already heavily loaded Anpara-Sarnath 1 & 2 or Anpara-Mau. Loading of this line is likely to get reduced after commissioning of already planned 765kV Anpara D – Unnao S/C line.	
<b>ICT Constraints</b>				
<b>S. No</b>	<b>ICT/Constraint</b>	<b>Season/Antecedent Conditions</b>	<b>Description of the constraints</b>	<b>Remarks</b>
1	765/400kV Phagi ICTs (2x1500 MVA)	December	Two ICTs of 1500MVA each capacity at 765/400kV Phagi S/s. and not N-1 compliant beyond 1700MW. On commissioning of 765kV Phagi- Bhiwani 2nd ckt on 29/09/2016, loading at 765/400kV ICTs has reduced slightly. Thereafter, on commissioning 400kV Phagi-Heerapura D/C, the loading of 765/400kV ICTs at Phagi has been increased again and it would further increase after commissioning of upcoming 400kV Phagi-Ajmer D/C and generation at Chhabra Super Critical. Remarks: 3rd ICT of 1500MVA capacity at Phagi should be expedited as Rajasthan experiences high load in winter	RRVPNL stated that for 3 <sup>rd</sup> ICT of 1500MVA capacity at Phagi, NIT has been issued and would be awarded by October 2018 with commissioning period of 18 months (by March 2020)
2	400/220kV Azamgarh	All Time	Azamgarh has two ICTs one of 315MVA and another of 500MVA; total loading is in range 400-600 MW which is not N-1 compliant. At Azamgarh N-1 non-compliance is observed throughout the year.  <b>Remarks:</b> Capacity of one ICT has been enhanced from 315MVA to 500MVA (charged on 28.4.2017) but unless capacity of other ICT is also increased or new ICT is added, N-1 non-compliance will be present.	UPPTCL stated that the second transformer of 315 MVA is likely to be replaced by 500 MVA by September 2018
3	Single ICTs at following 400kV &		The issue of single ICT at Chhabra, Kalisindh and Raj West TPS was discussed in 39 <sup>th</sup> meeting of	CEA stated that 1 <sup>st</sup> meeting of the sub committee was held on

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	above Nodes		Standing Committee on Power System Planning of Northern Region (SCPSPNR) held on 29-30 <sup>th</sup> May 2017, wherein, it was agreed to form a Sub Committee involving the members from CEA, CTU, POSOCO, RVPNL and Rajasthan GENCOs to deliberate on the issues.	2.4.2018, wherein various inputs were desired from the members of subcommittee. The second meeting of the sub committee would be planned shortly. RRVPNL stated that they are planning to establish a new GSS either at a new location or additional 765/400kV ICT at Anta
4	400/220kV Wagoora/ Srinagar & 220kV Wagoora- Ziankote D/C & 220kV Wagoora- Pampore D/C		Wagoora has 4*315MVA ICTs & 4 Ckts at 220kV level; 220kV Wagoora Pampore D/C, 220kV Wagoora- Zainkote D/C. All four lines are critically loaded. ICTs at Wagoora are heavily loaded especially during winter months. <b>Remarks:</b> 220kV Kishenpur-Ramban line was out since <b>30.7.17 (revived on 25.12.2017)</b> increasing loading of Wagoora ICTs. 220 kV connectivity at 400/220 kV New Wanpoh (sub-station and 400/220 kV ICTs are ready since 2013) shall be expedited in order to diversify feed points for valley as well as reduce the loading at 400/220 kV Wagoora substation.	JKPDD stated that with Commissioning of new 400/220 kV Amargarh substation, the loadings on these lines are considerably reduced. Further, 220kV New Wanpoh–Mirbazar line (3-4 km) is likely to be commissioned by Dec-18, which would further relieve the loading on these lines
5	400/220kV Jodhpur	ALL time	Jodhpur has 2*315 MVA ICTs each remaining loaded in the range of 200-280MW. N-1 non-compliance was observed at Jodhpur in Q3 2017-18 (more in December).	RRVPNL stated a new 400/220kV S/s in Jodhpur is under construction. The civil works have been completed and the substation is likely to be commissioned by September 18.

#### 10.0 Connectivity to Luhri Hydro Electric Power Project Stage-I (210 MW) of SJVN Ltd. in Himachal Pradesh (Agenda by CTU)

10.1 CEA stated that the transmission system for Luhri HEP with capacity of 775 MW was discussed earlier in the 29<sup>th</sup> meeting of the SCPSPNR held on 20.1.2011 and following transmission system was agreed:

##### Associated transmission for Luhri generation:

1. LILO of Rampur-Nallagarh 400 kV line at Luhri
2. Luhri-Mohali 400 kV D/c (Triple Conductor)

##### System Strengthening:

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1. Mohali-Malerkotla 400 kV D/c
2. LILO of one circuit of Nallagarh-Patiala 400 kV D/c line at Mohali - 400 kV D/c
3. Establishment of 2x315 MVA 400/220kV GIS substation at Mohali

Subsequently, SJVNL had applied for connectivity of 588 MW for Luhri HEP (3\*196MW) located in HP in Dec. 2013. However, due to modifications in the capacity of the plant, it was decided to close the connectivity application. SJVNL submitted a new connectivity application for Luhri Stage-I for 210 MW capacity in November 2016. To discuss the issues regarding transmission system required for evacuation of power from Luhri HEP, a meeting was held on 10-01-2017 at CEA with CEA, CTU, SJVNL and HPPTCL / HPSEB. During this meeting, representative from SJVNL had informed that the project layout was reviewed and it was decided to develop LHEP in three stages with capacity of 210 MW (St-I), 207 MW (St-II) and 363 MW (St-III). All three stages of LHEP are to be developed by SJVNL. After discussions, it emerged that being the hilly terrain, there may be RoW constraints for implementation of the individual connectivity system for all three stages. Therefore, it was suggested that transmission system for Luhri HEP may be evolved in an integrated manner and one Pooling Station may be proposed for the same. Site visit for the same, if required can also be done by the officials from CEA, CTU and SJVNL.

- 10.2** CEA informed that a team of officers from CEA, SJVNL HPPTCL, HPSEB and CTU visited 3 sites of Luhri-I, II and III on 14.6.2018. The team also saw the tentative locations of the pooling station. Accordingly, the team proposed that power from all the three stages of Luhri HEP would be evacuated at 220 kV level and would be pooled at 400/220 kV proposed ISTS pooling station tentatively identified at a place Nange located near Luhri-II HEP and further evacuated to Koldam through 400 kV D/C line. System beyond Koldam sub-station shall be finalized after system studies. For taking up the implementation of the associated transmission system, SJVNL was advised to apply for LTA / connectivity for Luhri stage-III at the earliest.
- 10.3** CTU informed that connectivity applications for Luhri-I and III have been received but Long Term Open Access applications are yet to be received. It was also informed that the Connectivity application for Luhri-III has been rejected due to non-conformity with the detailed procedure for grant of connectivity. SJVNL would have to apply again for Luhri-III connectivity. SJVNL was requested to expedite the application of LTA of Luhri Stage -I so that transmission system could be finalized and taken up for implementation as per the tariff policy. NTPC was asked to confirm the availability of space at Koldam switchyard for construction of two number of 400 kV bays.
- 10.4** After deliberations members agreed to the following:
- i) Establishment of a 400/220 kV Pooling Station under ISTS at 'Nange' (tentatively identified) located near Luhri-II HEP along with a 400kV D/c line to Koldam.
  - ii) Transmission system for further dispersal of power would be planned after receiving connectivity / LTA applications for Luhri stage-II & III HEP.
- 11.0** **Connectivity to M/s HMEL (JV of HPCL - Mittal Energy Ltd) for load of 200MW at 400kV level through LILO of 400kV Talwandi Sabo Moga-Nakodar line – PSTCL proposal**

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- 11.1** CEA stated that M/s HMEL, a JV of M/s Hindustan Petroleum Corporation Ltd. and Mittal Investment Pvt Ltd have established a crude petroleum refinery at Bathinda. M/s HMEL have proposed establishment of an additional polymer unit with a total investment of Rs 22,000 Crore. For power supply to this proposed unit, they have approached PSTCL for connectivity at 400 kV level through LILO of Talwandi Sabo–Moga 400 kV S/C line at 400kV substation in their premises. PSTCL vide their letter dated 26.09.2017 has requested CEA to include M/s HMEL proposal for power connection of 200MW at 400kV level through LILO of 400kV Talwandi Sabo–Moga–Nakodar line (Talwandi Sabo–Nakodar is a 400 kV D/C line with LILO of one ckt at Moga (PG) 400kV S/s) in the agenda for the next standing committee meeting on power system planning in NR

To discuss the proposal of M/s HMEL, a meeting was held in CEA on 08.02.2018 with CTU, PSTCL and HMEL, wherein following was agreed:

- i) PSTCL would provide connectivity to M/s HMEL at 400 kV level through establishment of new 400 kV substation (of PSTCL) in premises of M/s HMEL. The new 400 kV substation would be owned and operated by PSTCL.
- ii) PSTCL and HMEL would mutually discuss the scope as well as implementation modalities of new 400 kV substation.
- iii) PSTCL will finalize the scheme and the same would be included in the agenda for the next SCSPNR for ratification / approval.

- 11.2** CEA stated that PSTCL vide their letter dated 27.03.2018 has intimated the following scope of works to be executed in phases for providing power to M/s HMEL:

Phase-1 Establishment of 400 kV AIS switching station at the premises of M/s HMEL through LILO of 400kV Talwandi Sabo–Moga section of Talwandi Sabo – Nakodar 400 kV D/C line along with auxiliary required for Ph-1 (along with 2 nos. of 400 kV line bays for power supply to M/s HMEL) like control room, extension provisions etc

Phase-2 Provision of land considering the space required for

- a) LILO of 2<sup>nd</sup> ckt of 400kV Talwandi Sabo–Nakodar 400 kV D/C line ( Talwandi Sabo–Nakodar is a 400 kV D/C line with LILO of one ckt at Moga (PG) 400kV S/s)
  - b) 2 nos. of 400/220kV ICTs for PSTCL
  - c) 10 nos. of 220kV transmission lines for PSTCL (future)
- 11.3** CEA observed that provision of space for 2 nos. of 400/220 kV ICTs would not be sufficient for feeding power to 10 number 220 kV lines. Therefore, space for 3<sup>rd</sup> ICT may also be kept in the 400 kV switching station. M/s HMEL agreed to provide space for 3<sup>rd</sup> 400/220kV ICT also.
- 11.4** After deliberations, the following proposal to be implemented by PSTCL was agreed:
- i) Establishment of 400 kV AIS switching station at the premises of M/s HMEL through LILO of 400kV Talwandi Sabo–Moga section of Talwandi Sabo – Nakodar 400 kV D/C line along with auxiliary required for Ph-1 (along with 2 nos. of 400 kV line bays for power supply to M/s HMEL) like control room, extension provisions etc.

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ii) Provision of land (to be provided by M/s HMEL) considering the space required for the following future augmentation

- LILO of 2<sup>nd</sup> ckt of 400kV Talwandi Sabo–Nakodar 400 kV D/C line ( Talwandi Sabo–Nakodar is a 400 kV D/C line with LILO of one ckt at Moga (PG) 400kV S/s)
- 3 nos. of 400/220kV ICTs for PSTCL (future)
- 10 nos. of 220kV transmission lines for PSTCL (future)

## 12.0 Connectivity and Long Term Access (LTA) to HPPCL 450 MW from Shongtong Karcham HEP

12.1 CEA stated that in the 29<sup>th</sup> meeting of SCPSPNR held on 29<sup>th</sup> December 2010, a task force was constituted with representatives from Govt. of HP, HPPCL, HPPTCL, CEA and POWERGRID to study and work out a master plan for evacuation of power from HEPs in Satluj Basin and Chandrabhaga Basin considering a number of new hydro projects planned in the upper part of Satluj Basin and severe Right-of-Way constraints. The Task Force members visited the site in the month of September, 2011 and observed that for evacuation of power in upper part of the Satluj Basin, only one corridor is available and there are many projects like Shongtong, Jangi Thopan Powari, Khab and many other projects totaling around 3400 MW capacity. It was also observed that from Jangi PS to Wangtoo, only one line can be constructed, therefore it was planned to construct a high capacity line from Shongtong to Wangtoo, equivalent to 3000 MW capacity and with implementation of more projects, the line would be extended in backward / upward towards the Jangi and Jhangi Thopan side. This master plan was discussed in the 30<sup>th</sup> meeting of SCPSPNR held on 19<sup>th</sup> December, 2011 and agreed as a comprehensive scheme. This line was considered as part of the ISTS line and in future it would be utilized for the evacuation of power from other hydro projects in the upstream considering the physical constraints.

12.2 During the 36<sup>th</sup> meeting of SCPSPNR / connectivity / LTA meeting held on 13-14 July, 2015, HPPCL informed the commissioning schedule of the Shongtong generation project as Aug, 2019. In the 36<sup>th</sup> meeting of Empowered Committee on Transmission held on 26<sup>th</sup> July, 2016 the transmission system associated with Shongtong Karcham HEP with following scope of work was agreed to be implemented through Tariff Based Competitive Bidding (TBCB) route:

Scope of the Transmission Scheme
<ol style="list-style-type: none"> <li>1. Shongtong Karcham – Wangtoo 400 kV D/c Line (Quad HTLS Conductor Equivalent to about 3000MW on each ckt)</li> <li>2. 2 nos. of bays at Wangtoo</li> </ol>

*Note: Establishment of 220/400kV GIS Pooling Station at Wangtoo along with LILO of both circuits of 400 kV Karcham Wangtoo-Abdullapur D/c line at Wangtoo S/s -Implementation by STU*

Subsequently, MoP had appointed PFCCL as Bid Process Coordinator for the scheme. Further, a meeting was held on 14.07.2017, wherein, CTU pointed out that as the generator i.e. HPPCL had applied for LTA with target region as beneficiary State, they need to take regulatory approval from CERC, before implementation of the scheme and



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it was decided that PFCCCL would transfer the SPV to the successful bidder only after consulting CEA and CTU.

- 12.3 CEA said that CTU filed a petition in CERC on 11.08.2017, which, inter alia, include grant of Regulatory Approval for execution of the Transmission System associated with Shongtong Karcham. CERC admitted the petition on 16.01.2018. CERC issued the order on 19.3.2018 stating:

*“the scheme was envisaged in the year 2011 i.e. 7 years back. A considerable time has lapsed since the inception of the complete scheme and there may be changes in the commissioning schedules of projects in the Satluj Basin. Therefore, there is a need to review the scheme in the Standing Committee. In the light of this, we are not inclined to grant regulatory approval at this stage. We direct CTU to discuss the scheme in the Standing Committee Meeting of the Northern Region again in consultation with CEA and may approach Commission for regulatory approval, if required.”*

In a meeting held in CEA on 19.3.2018, PFCCCL had informed that they had completed the Bidding Process and had issued LoI to the successful bidder i.e M/s Essel Infra Projects Ltd on February 21, 2018. As per the CERC timeline, the COD for completion of project is 44 months. Even if, the SPV is transferred in March 2018 and considering the commissioning schedule of September 2021 for HEP, the time available for implementation of the Transmission Project by the successful bidder would be 42 months, which is less than CERC timeline of 44 months. Therefore, the SPV needs to be transferred at the earliest to avoid any mismatch in the implementation of evacuation system of the Shongtong generation project.

- 12.4 CEA further added that a team comprising of officers from CEA, CTU, HPPTCL, HPPCL and Directorate of Energy (GoHP) visited the dam and power house sites of Shongtong Karcham HEP on 13.6.2018. It was learnt that there are some issues related to land acquisition / forest clearance, which was yet to be resolved. Civil works for main dam were expected to start after Monsoon i.e. by Sep. / Oct. 2018. Further, in the meeting held on 15.6.2018) the status of major hydro projects upstream of Shongtong Karcham HEP was furnished by Energy Directorate, Himachal Pradesh. As per the status (enclosed as **Annexure-III**), no major hydro project is expected by 2029-30. HPPCL informed that the earlier commissioning schedule of September 2021 for Shongtong Karcham HEP is revised and the HEP is anticipated to be commissioned by December, 2023.
- 12.5 Members of the SCSPNR opined that looking at the present status of the projects in the upstream of Shongtong Karcham HEP, the connectivity line from Shongtong Karcham to Wangtoo may be implemented as dedicated line of Shongtong Karcham HEP by HPPCL.
- 12.6 After deliberations following was agreed:
- i) The scheme ‘Connectivity and Long Term Access (LTA) to HPPCL 450 MW from Shongtong Karcham HEP’ may be dropped and the SPV for the scheme may be closed
  - ii) The developer of Shongtong Karcham HEP (HPPCL) may implement the connectivity line from Shongtong Karcham to Wangtoo as dedicated line as per the CERC Regulation in vogue.



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- iii) CTU to revoke the connectivity and HPPCL to apply connectivity to STU. LTA granted to HPPCL needs to be revised by CTU including revised commissioning schedule and system requirement.
- iv) As agreed earlier HPPCL shall provide one 80 MVAR bus reactor at their generation switchyard. This aspect to be kept in view while grant of connectivity by STU.

### **13.0 Power Evacuation of the projects in Chenab Basin and establishment of 400/132kV Substation at Kishtwar:**

**13.1** CEA stated that Chenab Valley Power Projects Ltd. (CVPPL), (JV of NHPC, JKSPDC and PTC) vide their letter dated 28.2.2018 had informed that they were implementing 1000 MW Pakaldul, 624 MW Kiru and 540 MW Kwar HEPs in Kishtwar district of J&K. Investment approval of Pakaldul project from GoI has been obtained and first major package of the project was awarded on 21.2.2018. Regarding Kiru HEP, both civil works and HM works packages were already evaluated and contracts could be awarded immediately after investment approval from GoI. PIB proposals are under consideration of Ministry of power for both Kiru and Kwar HEP.

CEA further stated that following transmission system was discussed in 31<sup>st</sup> meeting of SCSPNR for evacuation of power from Kiru, Kwar and Pakal Dul HEP:

- **Kiru HEP (660 MW):**
  - 400 kV D/c (Triple HTLS Conductor –Equivalent to about 2300MW) line from Kiru HEP – Kishtwar Pooling station (High capacity common corridor-II)
  - Switchyard Capacity etc. must be able to handle about 2300MW power generated by the generation projects located in downstream of the Kiru HEP. It is proposed that the GIS switchyard equipment and XLPE cables provided may be designed for carrying 4000 Amps current.
  - 400 kV, 125 MVAR Bus Reactor
- **Kwar HEP (560 MW):**
  - LILO of one circuit of 400 kV D/c (Triple HTLS Conductor –Equivalent to about 2300MW) line from Kiru HEP – Kishtwar Pooling station
  - Switchyard Capacity etc. must be able to handle about 2300MW power generated by the generation projects located in downstream of the Kiru HEP. It is proposed that the GIS switchyard equipments and XLPE cables provided may be designed for carrying 4000 Amps current.
  - 400 kV, 125 MVAR Bus Reactor
- **Pakaldul HEP (1000 MW):**
  - LILO of one circuit of 400 kV D/c (Triple HTLS Conductor –Equivalent to about 2300MW) line from Kiru HEP – Kishtwar Pooling station

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- Establishment of 400 kV switching station at Kishtwar (establishment of Kishtwar pooling station has also been proposed with Himachal Projects).
- Establishment of 400/220 kV, 2x315 MVA substation near Gurdaspur/Sirhand by LILO of both circuits of 765 kV (operated at 400 kV) Kishenpur – Moga S/c lines.
- 765 kV Kishtwar- Gurdaspur/Sirhand D/c line (to be operated at 400 kV initially)
- Switchyard Capacity etc. must be able to handle about 2300MW power generated by the generation projects located in downstream of the Kiru HEP. It is proposed that the GIS switchyard equipment and XLPE cables provided may be designed for carrying 4000 Amps current.
- 400 kV, 125 MVAR Bus Reactor

M/s CVPPL had made request for establishment of 400/132kV S/s at Kishtwar to provide construction power (approx. 40MW) for Pakaldul HEP (1000MW), Kiru (624 MW) and Kwar (540 MW).

- 13.2** CVPPL informed that for Pakal Dul HEP, out of five packages, two packages have been awarded. The commissioning schedule for Pakaldul HEP is March 2024. For Kiru project, the Investment Approval (IA) is awaited and commissioning schedule for project is 54 months after IA. For Kwar project, the tender for award of first package is under evaluation.
- 13.3** CTU stated that they have not received connectivity/ LTA application for any of the project.M/s CVPPL was requested to apply for connectivity/LTA so that implementation activities of the evacuation system could be started.
- 13.4** After deliberations, it was agreed that various activities like identification of suitable site for establishment of Kistwar pooling station, phasing of the identified evacuation system etc would be taken up only after application for connectivity / LTA by the project developer.
- 14.0 Intra State Green Energy Corridor-I planned for evacuation of Renewable energy addition in Rajasthan:**
- 14.1** CEA stated that the intra-state transmission system required for integration of RES generation in the state of Rajasthan was agreed in the 32<sup>nd</sup> meeting of SCSPNR. Subsequently, RRVPNL has informed that due to inability of wind farm developers to get land for the proposed wind power projects in Banswara district and in view of new wind and solar power projects in Jaisalmer, Bikaner, Jodhpur and Barmer districts of Rajasthan, it has revised the scheme of evacuation of power from RE generation.
- 14.2** CEA informed that to evacuate Solar and Wind power projects coming at Jaisalmer, Bikaner, Jodhpur and Barmer districts of Rajasthan, RRVPNL had submitted the final DPR to CEA comprising revised list of intra-state transmission schemes costing about 1018.30 Crore in the State of Rajasthan to be funded from KfW and NCEF and in-principle approval for implementation of transmission schemes costing Rs 1018.30 Cr was given to RRVPNL. Schemes costing around 522.19 crores are under implementation, the transmission schemes included one 400 kV GSS at Jaisalmer-2, five 220 kV GSS (at Pokaran, Undoo, Kolayat, Chhatrail and PS-1/Bajju) and five 132 kV GSS along with associate transmission lines. Subsequently, RRVPNL deferred the

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transmission schemes costing Rs. 486.32 Cr. due to inactivity of wind and solar park developers. In place of Rs. 486.32 Crore schemes, which have been deferred, RRVPNL had proposed the alternate transmission schemes with total estimated cost of Rs. 218.80 Crore (excluding IDC). The details of alternate transmission schemes proposed by RRVPNL in lieu of the deferred projects under Green Energy Corridor Phase-I are given at Annexure-IV.

14.3 Members noted the alternate transmission schemes proposed by RRVPNL.

**15.0 UPPTCL's proposal for connectivity of various under construction/planned 220 kV & 132 kV substations with ISTS/other state substations:**

15.1 CEA stated that UPPTCL vide letter 3069/SE(TP&PSS)/CEA dated 03.04.2018 had intimated that three number of 220kV substations (C.G. City, Lucknow 220/33kV S/s, Bachrawan (Raibareli) 220/132/33kV, Sikandra (Kanpur Dehat)220/132kV), two number of 132/33kV Substations (Ambala Road-II (Saharanpur), Sherkot (Bijnor)) and one number of 400/132kV S/s (Masauli (Allahabad)) have been completed / nearing completion. UPPTCL had requested "in principle" approval for the connectivity lines of these substations.

15.2 CEA based on the request from UPPTCL has examined the connectivity proposal and vide its letter No.CEA-PS-11-22(18)/1/2018-PSPA-I Division dated 8.5.2018 had accorded 'in principle' approval for following connectivity's of UPPTCL substations. The same is put up for formalization by the members of SCSPNR:

S. No.	Substation	Connectivity lines	Remarks
1.	C.G. City (Chakgajaria), Lucknow 220/33 kV S/s (3x60MVA)	- LILO of Raibareli (PG) – Chinhat 220 kV S/c line at C.G. City - Sultanpur Road (400)-Chakgajaria (Lucknow) 220 kV D/C line	- Earlier interconnection with sultanpur road 400/220 kV substation. Substation schedule uncertain
2.	Bachrawan (Raibareli) 220/132/33 kV S/s (2x160 + 2x40 MVA)	- LILO of Amawan, Raibareli (PG)–Sarojninagar, Lucknow 220 kV S/c line at Bachrawan (Raibareli) - Bachrawan (220)–Bachrawan (132) 132 kV D/c line - Bachrawan (220)–Sareni (132) 132 kV D/c line	- Earlier interconnection with Raibareli 400/220 kV substation. Commissioning schedule of the substation is March 2020
3.	Sikandra (Kanpur Dehat) 220/132 kV S/s (2x160 MVA)	- LILO of Orai (400)–Bhauti (PG) Kanpur 220 kV S/c line at Sikandra (Kanpur Dehat).	-
4.	Masauli (Allahabad) 400/132 kV S/s	- LILO of one circuit of Meja TPS–Rewa Road 400 kV D/c line (Quad) at Masauli 400/132	- Substation approved as Kareligha 400/132 kV substation in the 35 <sup>th</sup>

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(3x200 MVA)	kV S/s	meeting of SCSPNR.
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Regarding the connectivity of Sherkot 132/33kV S/s and Ambala Road-II, a meeting was held in CEA on 4.4.2018, wherein, it was deliberated that the transmission schemes viz LILO of Dhampur–Kalagarh 132 kV S/c line at 132/33 kV Sherkot S/s and LILO of Ambala Road-I–Bhagvanpur (Uttarakhand) 132 kV line at Ambala Road-II (Saharanpur) 132 kV substation, which are inter-state in nature i.e. involving transmission network of Uttarakhand and Uttar Pradesh to be mutually discussed and agreed between UPPTCL and PTCUL.

- 15.3** After deliberations, in-principle approval for connectivity's of UPPTCL i.e C.G. City, Lucknow 220/33kV S/s, Bachrawan (Raibareli) 220/132/33kV, Sikandra (Kanpur Dehat)220/132kV) and 400/132kV S/s (Masauli (Allahabad)) issued by CEA was concurred.

Regarding connectivity of Sherkot 132/33kV S/s and Ambala Road-II (Saharanpur) 132 kV substation, it was observed there would not be any significant change in power flow pattern as Sherkot and Ambala Road-II area as they are already connected to UPPTCL network. Establishment of connectivity of Sherkot and Ambala Road-II with Uttarakhand would enhance connectivity and hence reliability of Sherkot, Kalagarh, Ambala Road-II and Bhagvanpur. For operationalisation of the connectivity, the matter may be further deliberated between UPPTCL and PTCUL.

- 15.4** Members also also agreed that all intra-State schemes, which involve reconfiguration of ISTS elements, inter-connection with ISTS elements and all 400kV intra-state transmission schemes planned by State needs to be specifically deliberated in the meetings of the Standing Committee on Power System planning before taking up their implementation. Also, other intra state schemes planned by the State may be intimated to SCSPNR.

**16.0 Modification in approved evacuation network of 2x660MW Jawaharpur Thermal Power Plant.**

- 16.1** CEA stated that transmission system for evacuation of power from Jawaharpur TPS (2x660 MW) was agreed in the 38<sup>th</sup> meeting of SCSPNR held on 30.5.2016. UPPTCL vide their letter dated 16.9.2017 has suggested following modifications in the agreed transmission system due to RoW issues and over loadings on evacuation lines:

S. No.	Agreed Transmission System	Modifications suggested by UPPTCL
1.	<b>2x660 MW Jawaharpur (Etah) TPS (2021-22):</b>	
i)	Evacuation at 765 kV with G.T. 21/765 kV	no change
ii)	LILO of Mainpuri–Greater Noida 765 kV S/C line at Jawaharpur TPS - 30 km	no change
iii)	765/400 kV, 2x1500 MVA ICT at Jawaharpur TPS	no change
iv)	400/220 kV 2x500 MVA ICT at Jawaharpur TPS	no change
v)	Jawaharpur TPS–Firozabad 400 kV D/C line – 80 km	Jawaharpur TPS–Firozabad 400 kV D/C (Quad) line – 80 km

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vi)	Firozabad–Agra South 400 kV D/C– 40 km	LILO of one circuit of Fahteabad (Agra 765 kV)- Agra South 400kV D/C line at Firozabad -20km
vii)	Etah–Jawaharpur TPS 220 kV D/C – 20 km & Jawaharpur TPS – Sirsaganj 220 kV D/C – 40 km	LILO of Mainpuri–SikandraRao 220kV existing S/c line at Jawaharpur TPS -15km (for startup power also)
		Creation of 220/132/33 kV UPPTCL S/S Kasganj(2x160+2x40 MVA)
		LILO of 220kV line SikandraRao(220)-Jawaharpur TPS(220) section at Kasganj(220)-45km
viii)	330 MVAR, 765 kV Bus Reactor at Jawaharpur TPS	No change
2.	<b>Firozabad 400/220/132 kV 2x500, 2x160 MVA substation</b>	
i)	Firozabad – Jawaharpur TPS 400 kV D/C line – 80 km	Jawaharpur TPS–Firozabad 400 kV D/C (Quad) line – 80 km
ii)	Firozabad (400 kV) – Agra South 400 kV D/C line – 50 km	LILO of one circuit of Fahteabad (Agra 765 kV)- Agra South 400kV D/C line at Firozabad -20km
iii)	Firozabad (400 kV) – Tundla 220 kV D/C line	No change
iv)	Firozabad (400kV) – Firozabad 220 kV D/C line	LILO of Firozabad(220) –Agra (765-PGCIL) 220kV S/c line at Firozabad(400)-20km
v)		Firozabad(400)- Narkhi 132kV D/c line -30km
vi)		LILO of Etmadpur – Brhan 132kV S/c line at Firozabad (400)-35km

**16.2** After deliberation, modifications proposed by UPPTCL were agreed. UPPTCL was requested to examine n-1 contingency condition at Agra South and necessary changes to be made if in case of non compliance of n-1 condition.

**17.0** **Agenda for issues related to Rihand, Anpara, Singrauli Generation project:**

- i) Capacity enhancement of Rihand- Dadri HVDC from 1500MW to 2500MW**
- ii) High short circuit levels in Rihand Singrauli, Anpara generation complexes**
- iii) High Loading on Singrauli-Anpara line 400kV**
- iv) NTPC proposal regarding connectivity from ISTS for Singrauli STPP St-III (2x660 MW)**

**17.1** For issues related to i), ii) and iii) : CEA stated that the proposal of capacity enhancement of Rihand-Dadri HVDC from 1500MW to 2500MW was discussed in 36<sup>th</sup>, 37<sup>th</sup> and 38<sup>th</sup> meetings of SCSPNR held on 13-07-2015, 20-01-2016 and 30-05-2016 respectively. The proposal was agreed in principle during 36<sup>th</sup> and 37<sup>th</sup> meetings of SCSPNR. However, as per the minutes of 38<sup>th</sup> meeting of SCSPNR, additional studies were required to be carried out.

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Studies were carried out by PGCIL and were presented in the 39<sup>th</sup> meeting of SCSPNR held on 29-30<sup>th</sup> May, 2017 and after deliberations, it was agreed that the studies may be reviewed considering the following:

- a) Rihand-III –Vindhyachal 400 kV link (1000 MW)
- b) Relieve the overloading of Singrauli-Anpara 400 kV line
- c) To reduce the high short circuit level in Singrauli –Anpara complex.

The studies were carried out considering the following generation in and around the complex:

S. No.	Generation	Capacity (MW)	Dispatch (MW)	Voltage level (kV)
1	Singrauli	2000 (200x5 +500x2 )	1700	400
2	Obra 4	1000 (200x5 )	900	400
3	Obra 2	288 ( 94+94+50+50)	155	220
4	Anpara C	1200 ( 600x2 )	1080	765
5	Anpara D	1000 ( 500x2 )	900	765
6	Anpara A&B	1630 ( 210x3 + 500x2 )	1380	400
7	Rihand I&II	2000 ( 500x4 )	1800	400
8	Rihand -III	1000 ( 500x2 )	900	400
9	Obra C	1320 ( 660x2 )	960	765
	<b>Total</b>	<b>11438</b>	<b>0</b>	

Two different cases were studied (i) With Rihand-III connected in Northern Region (with and without Anpara-Singrauli 400kV line) and (ii) With Rihand-III connected in Western Region (with and without Anpara-Singrauli 400kV line) and it was observed that overloading of some of the lines in the complex is due to the loop flow and with opening of Singraul-Anapara 400kV line, the flows on the lines gets reduced. It was also seen that the 3 phase fault current also reduces significantly with the opening of Singraul-Anapara 400kV line. Studies were also carried out with outage of one pole of Rihand–Dadri HVDC link considering Rihand -III connected in Western Region without Singrauli–Anapara 400kV line and no overloading was observed in the generation complex. Hence capacity enhancement of Rihand-Dadri HVDC from 1500 MW to 2500 MW not required.

- 17.2 With regard to transmission system for evacuation of power from Singrauli STPP -III (2x660 MW) of NTPC, CEA stated that NTPC vide their letter dated 22.3.2018 had informed that they have planned to construct Singrauli STPP-III (2x660 MW) within the existing Singrauli TPS complex in UP. Tendering process for main plant, EPC package for the project is in advance stage and NIT has already been issued. Regarding sale of power from the project, NTPC also informed that they have commitment for purchase of 85% of power from UP. NTPC had requested to freeze the generation switchyard provisions for evacuation of power from Singrauli STPP-III (2x660 MW), so that the same could be included in their tender document.

A meeting was held in CEA on 7.5.2018, wherein, following was agreed in respect of provisions at the generation switchyard for evacuation of power from Singrauli:

- i) Step up voltage of 400 kV.
- ii) 6 nos. of 400kV line bays.
- iii) 1x125 MVAR, 400 kV bus reactor.



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Regarding the transmission system for evacuation of power from Singrauli STPP –III, CEA stated that keeping in view the high short circuit level in Singrauli, Anpara generation complex, Singrauli St-III may be connected to Vindhyachal 765/400kV pooling station through Vindhyachal St-IV/V. Also, Singrauli-III–Rihand-III 400kV D/c line may be considered, which would provide additional evacuation path to both generations (Singrauli St-III and Rihand-III). To examine availability of space at Vindhyachal St-V, Rihand St-III, Vindhyachal 765/400kV pooling station and feasibility of 400kV link with Rihand St-III, a site visit was carried out by CEA, CTU and NTPC during the period 01.06.2018 to 02.06.2018.

Findings of the site visit is as given below:

- i) Space availability at Vindhyachal-IV:** Tie line (Vindhyachal stage-IV to Vindhyachal stage-V 400kV D/C Twin Moose line) from stage-V is terminated at opposite DIAs in stage-IV generation switchyard. After construction of Vindhyachal Stage-IV to Vindhyachal pool (765/400) 400 kV D/C quad line (2<sup>nd</sup> line), no spare bay is available on line side in stage-IV generation switchyard.

Space is available in the existing yard for erection of one number GIS DIA, but termination of a new D/C line may not be possible due to extensive ROW constraints in the vicinity of the yard.

Shifting of 400kV Tie line (terminated at opposite Dias in stage-IV generation switchyard) second circuit to GT side (from Line side) would require shifting of existing GT#11 and ST#7 to adjacent bays for creating spare bay, which would involve long unit shutdown.

In view of the above, proposal of LILO of both circuits of Tie line (Vindhyachal Stage-IV to Vindhyachal Stage-V 400kV D/C Twin Moose line) at Singrauli Stage-III for providing connectivity is feasible. Reconductoring of Singrauli Stage-III - Vindhyachal stage-IV 400 kV D/C TM line with HTLS conductor would meet n-1 criteria of power flow. Other options would involve many implementation issues.

- ii) Space availability at 400kV Rihand-III generation switchyard:** Space for creation of additional 400kV DIA is available in Rihand-III generation switchyard after straightening of switchyard fence and road. This could be used for termination of Rihand-III – Singrauli STPP Stage-III interconnection.
- iii) Space availability at proposed Singrauli Stage-III:** The space identified for GIS switchyard by NTPC for Singrauli Stage-III is located between existing MGR Railway line and foot of Kota hill inside plant boundary and has severe space constraint. Any additional area requirement would involve cutting of Kota hill to achieve site levelling and it would increase the civil works involved in the switchyard.

The space identified for GIS switchyard would be sufficient for accommodating 6 nos. of 400kV line bays, 1x125 MVAR, 400 kV bus reactor.

- iv) Space availability at Vindhyachal pool 765/400 kV substation:** 3x1500 MVA, 765/400 kV ICT is already implemented and space for one more ICT is available. In the switchyard layout provision of space for three nos. of future bays has been between the future 4<sup>th</sup> ICT bays and substation boundary. Out of the three future bays, 2 bays adjacent to the 4<sup>th</sup> (future) ICT bay has been allocated for Vindhyachal pool – Varanasi 765 kV lines.

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- 17.3 CTU stated that they have also carried out the studies and their results and fault levels are different.
- 17.4 NTPC stated that plant capacity of Singrauli Stage-III has been revised to 2x800 MW from 2x660 MW.
- 17.5 UPPTCL stated UP is also planning for implementation of Anpara-E (2x660 MW) and Obra-D (800 MW) in Anpara and Obra complex respectively, in vicinity of Singrauli Generation Complex.
- 17.6 POSOCO stated that the Vindhyachal, Singrauli, Rihand, Anpara generation complex is huge generation complex and all the credible contingencies needs to be studied thoroughly. The evacuation of proposed Singrauli STPP-III (2x800 MW) is being planned through Vindhyachal pool 765/400 kV substation, therefore, its implications in terms of power flow on other lines like Sasan-Satna, Satna- Orai, WR-NR inter-regional lines needs to be studied.
- 17.7 After deliberations, the following was agreed:
- (i) Revised joint studies involving CEA, CTU and POSOCO to sort out the issues related to Rihand, Anpara, Singrauli Generation projects and also studies for the increased capacity of the Singrauli STPP-III generation from 2x660 MW to 2x800 MW would be carried.
  - (ii) NTPC to furnish new application for connectivity of Singrauli STPP-III (2x800 MW) to CTU
  - (iii) Generation switchyard provisions by NTPC for evacuation of power from Singrauli Stage-III:
    - a) Step up voltage of 400 kV.
    - b) 6 nos. of 400kV line bays.
    - c) 1x125 MVAR, 400 kV bus reactor.

**18.0 Evacuation plan for 4000 MW power from Solar plants in Bundelkhand region of Uttar Pradesh under Green Energy Corridor (GEC-II) (in Phased manner in four years (2020-23))**

- 18.1 CEA stated that UPPTCL vide their letter no. 2902/TP&PSS/Solar Energy dated 07.02.2018 has submitted the proposal for evacuation of power from 4000 MW in Bundelkhand region and later amended it vide their letter no 3265/SE(TP&PSS)CEA dated 22.5.2018 based on comments from CEA.

The proposed system was studied by integrating of the proposed RE corridor with existing Parichha TPS and Lalitpur TPS. Based on the studies, following changes were suggested in the system proposed by UPPTCL:

Evacuation Plan of 1 <sup>st</sup> Year Solar Power for 1000 MW			Remarks
	Proposed by UPPTCL	Proposed by CEA	
1.	Creation of 220/132/33 kV, 2x160+2x40 MVA Rampura (Jalaun) a) 220 kV S/C line Rampura-Sikandra (220)-30km	Creation of 220/132/33 kV, 1x160+1x40 MVA Rampura(Jalaun) a) 220 kV S/C line Rampura-Sikandra (220)-30km	1x160+1x40 MVA ICTs at Rampura deleted
2.	Creation of 220/132/33 kV,	Creation of 220/132/33 kV,	No change

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	<b>2x160 + 2x40 MVA Talbahat (Lalitpur)</b> a)220kV DC line Talbahat (Lalitpur)-Babina (Jhansi) - 40 km	<b>2x160 + 2x40 MVA Talbahat (Lalitpur)</b> a) 220kV DC line Talbahat (Lalitpur)-Babina(Jhansi) - 40 km	
3.	<b>Creation of 220/132/33 kV, 2x160 + 2x40 MVA Birdha (Lalitpur)</b> a) 220kV SC line Birdha(Lalitpur)-Lalitpur(220) -35km	<b>Creation of 220/132/33 kV, 1x160 + 1x40 MVA Birdha (Lalitpur)</b> a) 220kV SC line Birdha(Lalitpur)-Lalitpur(220) -35km	1x160+1x40 MVA ICTs deleted
4.	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Mandawra (Lalitpur)</b> a) 220kV SC line Mandawra (Lalitpur) - Lalitpur(220) -50km	<b>Creation of 220/132/33 kV, 1x160+1x40 MVA Mandawra (Lalitpur)</b> a) 220kV SC line Mandawra (Lalitpur)- Lalitpur(220) -50km	1x160 + 1x40 MVA ICTs at Mandawra deleted
5.	<b>Creation of 132/33 kV, 2x40 MVA Kadaura(Jalaun)</b> a) 132kV SC line Kadaura-Hamirpur(Patara) - 35km	<b>Creation of 132/33 kV, 1x40 MVA Kadaura(Jalaun)</b> a) 132kV SC line Kadaura-Hamirpur(Patara) - 35km	1x40 MVA ICT at Kadaura (Jalaun) deleted
6.	<b>Creation of 132/33 kV, 2x40 MVA Kuthond (Jalaun)</b> a) 132kV SC line Kuthond(Jalaun)-Madhogarh -25km	<b>Creation of 132/33 kV, 1x40 MVA Kuthond (Jalaun)</b> a) 132kV SC line Kuthond(Jalaun)-Madhogarh -25km	1x40 MVA ICT deleted
7.	<b>Creation of 132/33 kV, 2x40 MVA Kurara(Hamirpur)</b> a) 132kV SC line Kurara(Hamirpur)-Bharua(Sumerpur) -32km	<b>Creation of 132/33 kV, 1x40 MVA Kurara(Hamirpur)</b> a) 132kV SC line Kurara(Hamirpur)-Bharua(Sumerpur) -32km	1x40 MVA ICT deleted
8.	<b>Creation of 132/33 kV, 2x40 MVA Gohand(Hamirpur)</b> a) 132kV SC line Gohand(Hamirpur)-Bharua(Sumerpur) -50km	<b>Creation of 132/33 kV, 1x40 MVA Gohand(Hamirpur)</b> a) 132kV SC line Gohand(Hamirpur)-Bharua(Sumerpur) -50km	1x40 MVA ICT deleted
9.	<b>Creation of 132/33 kV, 2x40 MVA Moth(Jhansi)</b> a)132kV SC line Moth(New) Jhansi-Moth(existing Jhansi) -10km	<b>Creation of 132/33 kV, 2x40 MVA Moth(Jhansi)</b> a)132kV SC line Moth(New) Jhansi-Moth(existing Jhansi) -10km	No change
10	<b>Creation of 132/33 kV, 2x40 MVA Barokh Khurd(Banda)</b> a)132kV SC line Barokh	<b>Creation of 132/33 kV, 2x40 MVA Barokh Khurd(Banda)</b> a)132kV SC line Barokh khurd(Banda)- Banda(400)	No change

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	khurd(Banda)- Banda(400) -25km	-25km	
11	Creation of 132kV Voltage level at Banda 400/220/132 kV	Creation of 132kV Voltage level at Banda 400/220/132 kV	No change
<b>Evacuation Plan of 2<sup>nd</sup> Year Solar Power for 1000 MW</b>			
1.	<b>Creation of 400/220/132 kV, 2x500+2x160 MVA Maheba(Jalaun)</b> a) LILO one ckt of Banda(400)-Orai(400) 400kV DC line at Maheba (Jalaun)-25km	<b>Creation of 400/220/132 kV, 2x500+2x160 MVA Maheba(Jalaun)</b> (a) 400 kV Maheba–Orai 400 kV DC line (if line bays are available) <b>OR</b> (b) LILO of one ckt of Banda 400)-Orai (400) 400 kV DC line at Maheba (Jalaun)-25km	Additional option provided
2.	<b>Creation of 400/220/132 kV, 2x500+2x160 MVA Sarila(Hamirpur)</b> (a) 400kV SC line Sarila (Hamirpur)-Maheba(Jalaun) -104km (b) 400kV SC line Sarila (Hamirpur)-Banda -74km	<b>Creation of 220/132 kV, 2x160 MVA Sarila(Hamirpur)</b> (a) 220kV Sarila (Hamirpur)-Maheba (Jalaun) D/C line -104km	400 kV Sarila – Banda line deleted
3.	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Dakaur (Jalaun)</b> (a) 220kV DC line Dakaur-Maheba(400) - 35km	<b>Creation of 220/132/33 kV, 1x160+1x40 MVA Dakaur (Jalaun)</b> (a) 220kV SC line Dakaur-Maheba(400) - 35km	1x160 + 1x40 MVA ICTs deleted. SC line in place of DC line
4.	<b>Creation of 220/132 kV, 2x160+2x40 MVA Panwari(Mahoba)</b> (a) 220kV SC line Panwari (Mahoba)-Sarila(Hamirpur) -40km	<b>Creation of 220/132 kV, 1x160+1x40 MVA Panwari(Mahoba)</b> (a) 220kV SC line Panwari (Mahoba)-Sarila(Hamirpur) -40km	1x160 + 1x40 MVA ICTs deleted
5.	<b>Creation of 132/33 kV, 2x40 MVA Muskara (Hamirpur)</b> (a) Muskara (Hamirpur)-Sarila (Hamirpur) 132 kV DC line -15km	<b>Creation of 132/33 kV, 2x40 MVA Muskara (Hamirpur)</b> (a) Muskara (Hamirpur)-Sarila (Hamirpur) 132 kV DC line -15km	No changes
<b>Evacuation Plan of 3<sup>rd</sup> Year Solar Power for 1000 MW</b>			
1.	<b>Creation of 765/400/220 kV, 2x1500+2x500 MVA</b>	<b>Creation of 765/400/220 kV, 2x1500+3x500 MVA</b>	400 kV Gurusarai –

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	<p><b>Gurusarai(Jhansi)</b></p> <p>a) 765kV SC line Gurusarai(Jhansi)-Mainpuri -185km</p> <p>b) Construction of 765kV Bays at Mainpuri S/S</p>	<p><b>Gurusarai(Jhansi)</b></p> <p>a) 765kV SC line Gurusarai(Jhansi)-Mainpuri -185km</p> <p>b) Construction of 765kV Bays at Mainpuri S/S</p> <p>c) 400 kV Gurusarai – Orai (Quad) DC line</p> <p>d) LILO of 400 kV Parichha – Mainpuri line at Gurusarai</p>	<p>Orai (Quad) DC line and LILO of 400 kV Parichha – Mainpuri line at Gurusarai <b>are added</b></p>
2.	<p><b>Creation of 400/220/132 kV, 2x500+2x160 MVA Charkhari(Mahoba)</b></p> <p>a) 400kV SC line Charkhari(Maheba)-Sarila(Hamirpur) -40km</p> <p>b) 400kV SC line Charkhari(Mahoba)-Gurusarai(Jhansi) -80km</p> <p>c) 220kV DC line Fatehpur(400)-Malwa(Fatehpur) -35km</p>	<p><b>Creation of 220/132 kV, 1x160 MVA Charkhari(Mahoba)</b></p> <p>a) 220kV DC line Charkhari(Mahoba)-Gurusarai(Jhansi) -80km</p>	<p>220kV S/s in place of 400 kV S/s.</p> <p>400 kV lines deleted</p>
3.	<p><b>Creation of 400/220/132 kV, 2x500+2x160 MVA Farrukhabad</b></p> <p>a) 400kV DC line Maheba (Jalaun) -Farrukhabad -140km</p> <p>b) 400kV SC line Farrukhabad-Badaun -95km</p> <p>c) 220kV DC line Farrukhabad(400)-Neebkarori -50km</p> <p>d) 220kV DC line Farrukhabad(400)-Etah(220) -90km</p>	<p><b>Creation of 400/220/132 kV, 2x500+2x160 MVA Farrukhabad</b></p> <p>a) 400kV DC line Maheba (Jalaun) -Farrukhabad -140km</p> <p>b) 400kV SC line Farrukhabad-Badaun -95km</p> <p>c) 220kV DC line Farrukhabad(400)-Neebkarori -50km</p> <p>d) 220kV DC line Farrukhabad(400)-Etah(220) -90km</p>	<p>400kV DC line Maheba (Jalaun) -Farrukhabad <b>deleted</b></p>
4.	<p><b>Creation of 400/220/132 kV, 2x500+2x160 MVA Fatehpur</b></p> <p>a) 400kV SC line Fatehpur(400) - Sarila (Hamirpur) -115km</p> <p>b) 400kV SC line Fatehpur (400) -Charkhari (Mahoba) -120km</p> <p>c) 400kV DC line Fatehpur(400)-Fatehpur(PG) -50km</p> <p>d) 220kV DC line Fatehpur(400)-Malwan(Fatehpur)-35km</p>		<p>S/s deleted</p>

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5.	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Bamaur(Jhansi)</b> (a) 220kV DC line Bamaur (Jhansi)-Gurusarai(Jhansi) -12 km	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Bamaur(Jhansi)</b> (a) 220kV SC line Bamaur (Jhansi)-Gurusarai(Jhansi) -12 km	SC line in place of DC line
6.	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Bangra(Jhansi)</b> (a) 132kV SC line Bangra(Jhansi)-Gurusarai(Jhansi) -15km	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Bangra(Jhansi)</b> (a) 220kV SC line Bangra(Jhansi)-Gurusarai(Jhansi) -15km	No changes
7.	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Kabrai(Mahoba)</b> (a) 220kV DC line Kabrai (Mahoba) - Charkhari(Mahoba) -26km	<b>Creation of 220/132/33 kV, 1x160+1x40 MVA Kabrai(Mahoba)</b> (a) 220kV SC line Kabrai (Mahoba) - Charkhari(Mahoba) -26km	SC line in place of DC line
<b>Evacuation Plan of 4<sup>th</sup> Year Solar Power for 1000 MW</b>			
1.	<b>Creation of 400/220/132 kV, 2x500+2x160 MVA Jakhora(Lalitpur) &amp; with a provision of extension of s/s to 765kV</b> a) 765kV SC line Jakhora(Lalitpur)-Gurusarai(Jhansi) -115km(line to initially operate at 400kV) b) 400kV SC line Jakhora(Lalitpur)-Lalitpur TPS -30km(After Development of 400kV Voltage level of Lalitpur TPS) c) 400kV DC line Jakhora-Orai(PG)765 -167km	<b>Creation of 400/220/132 kV, 2x500+2x160 MVA Jakhora(Lalitpur) &amp; with a provision of extension of s/s to 765kV with 1x1500 MVA 765/400 kV ICT</b> a) 765kV SC line Jakhora(Lalitpur)-Gurusarai(Jhansi) -115km(line to initially operate at 400kV) b) Interconnection of Lalitpur TPS through 220 kV Jakhora – Lalitpur TPS (HTLS) DC line. c) LILO of one circuit of 765 kV Lalitpur TPS – Agra DC line at Jakhora S/s (in time frame of creation of 765 kV level at Jakhora)	Interconnection with Lalitpur TPS provided. Jakhora – Orai line <b>deleted</b>
2.	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Baragaon(Jhansi)</b> (a) 220kV DC line Baragaon(Jhansi)-Gurusarai (Jhansi) -50km	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Baragaon(Jhansi)</b> a) 220kV SC line Baragaon(Jhansi)-Gurusarai (Jhansi) -50km	SC line in place of DC line



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3.	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Jaitpur(Mahoba)</b> a) 220kV DC line Jaitpur(Mahoba)- Charkhari(Mahoba) -22km b) 220kV DC line Talbahat(Lalitpur)- Jakhora(Lalitpur) -16km c) 220kV SC line Rampura(Jalaun)- Maheba(Jalaun)- 36km	<b>Creation of 220/132/33 kV, 2x160+2x40 MVA Jaitpur(Mahoba)</b> a) 220kV SC line Jaitpur(Mahoba)- Charkhari(Mahoba) -22km	Talbahat- Jakhora and Rampura – Maheba lines deleted
4.	<b>Creation of 132/33 kV, 2x40 MVA Mehrauni(Lalitpur)</b> a) 132kV DC line Mehrauni(Lalitpur)- Jakhora(Lalitpur) -45km	<b>Creation of 132/33 kV, 2x40 MVA Mehrauni(Lalitpur)</b> a) 132kV DC line Mehrauni(Lalitpur)- Jakhora(Lalitpur) -45km	No changes
5.	<b>Creation of 132/33 kV, 2x40 MVA Barh(Lalitpur)</b> a) 132kV DC line Barh(Lalitpur)- Jakhora(Lalitpur) -26km	<b>Creation of 132/33 kV, 2x40 MVA Barh(Lalitpur)</b> a) 132kV DC line Barh(Lalitpur)- Jakhora(Lalitpur) -26km	No changes

18.2 UPPTCL representative stated that they were in agreement with the changes suggested by CEA, however he requested to consider the 400 kV Maheba (Jalaun)–Farrukhabad D/c line proposed by them, as it would cater the load requirements of Farrukhabad & Badaun area. This line would provide an alternative path for evacuation of power from Bundelkhand area in addition to Orai–Mainpuri corridor. He also requested to make the space provision for future ICTs, wherever the same has been deleted from the UPPTCL’s proposal.

18.3 After deliberations, the following evacuation plan for 4000 MW Solar power in Bundelkhand region of Uttar Pradesh under Green Energy Corridor (GEC-II) was agreed: :

**I. Evacuation Plan of 1<sup>st</sup> Year Solar Power for 1000 MW**

**220kV Substations**

- i) Creation of 220/132/33 kV, 2x160+2x40 MVA Rampura (Jalaun)**
  - a) Rampura-Sikandra (220) 220kV S/C on D/C line -30km
- ii) Creation of 220/132/33 kV, 2x160+2x40 MVA Talbahat (Lalitpur)**
  - a) Talbahat (Lalitpur)-Babina (Jhansi) 220kV D/C line - 40 km
- iii) Creation of 220/132/33 kV, 2x160+2x40 MVA Birdha (Lalitpur)**
  - a) Birdha (Lalitpur)-Lalitpur (220) 220kV S/C on D/C line -35km
- iv) Creation of 220/132/33 kV, 2x160+2x40 MVA Mandawra (Lalitpur)**

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- a) Mandawra (Lalitpur)- Lalitpur (220) 220 kV S/C on D/C line -50km
- v) 220 kV bays at Sikandra (1 no.), Babina (1 no.) & Lalitpur 220kV (2 nos.) substation of UPPTCL.

**132kV Substations**

- i) **Creation of 132/33 kV, 2x40 MVA Kadaura (Jalaun)**
  - a) Kadaura-Hamirpur (Patara) 132kV S/C on D/C line -35km
- ii) **Creation of 132/33 kV, 2x40 MVA Kuthond (Jalaun)**
  - a) Kuthond (Jalaun)-Madhogarh 132kV S/C on D/C line -25km
- iii) **Creation of 132/33 kV, 2x40 MVA Kurara (Hamirpur)**
  - a) Kurara (Hamirpur)-Bharua (Sumerpur) 132kV S/C on D/C line -32km
- iv) **Creation of 132/33 kV, 2x40 MVA Gohand (Hamirpur)**
  - a) Gohand (Hamirpur)-Bharua (Sumerpur) 132kV S/C on D/C line -50km
- v) **Creation of 132/33 kV, 2x40 MVA Moth (Jhansi)**
  - a) Moth (New) Jhansi-Moth (existing Jhansi) 132kV S/C on D/C line -10km
- vi) **Creation of 132/33 kV, 2x40 MVA Barokh Khurd (Banda)**
  - a) Barokh Khurd (Banda)-Banda (400) 132kV S/C on D/C line -25km
  - b) Creation of 132kV Voltage level at Banda – (installation of 220/132 kV, 2x160 MVA ICT at Banda 400 kV S/s)

**II. Evacuation Plan of 2<sup>nd</sup> Year Solar Power for 1000 MW****400kV Substations**

- i) **Creation of 400/220/132 kV, 2x500+2x160 MVA Maheba (Jalaun)**
  - a) LILO of one ckt Banda (400)-Orai (400) 400kV D/C (Quad) line at Maheba (Jalaun)-25km
  - b) 1x125 MVAr, 420 kV Bus Reactor

**220kV Substations**

- i) **Creation of 220/132 kV, 2x160 MVA Sarila (Hamirpur)**
  - a) Sarila (Hamirpur)-Maheba (Jalaun) 220kV D/C line with High Ampacity conductor-104km
- ii) **Creation of 220/132/33 kV, 1x160+1x40 MVA Dakaur (Jalaun)**
  - a) Dakaur-Maheba (400) 220kV S/C on D/C line -35km
- iii) **Creation of 220/132 kV, 1x160+1x40 MVA Panwari (Mahoba)**
  - a) Panwari (Mahoba)-Sarila (Hamirpur) 220kV S/C on D/C line -40km

**132kV Substation**

- i) **Creation of 132/33 kV, 2x40 MVA Muskara (Hamirpur)**
  - a) Muskara (Hamirpur)-Sarila (Hamirpur) 132kV S/C on D/C line -15km

**III. Evacuation Plan of 3<sup>rd</sup> Year Solar Power for 1000 MW**

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**765kV Substation**

- i) Creation of 765/400/220 kV, 2x1500+3x500 MVA Gurusarai (Jhansi)**
  - a) Gurusarai (Jhansi)-Mainpuri 765kV S/C line -185km
  - b) Construction of 765kV bay at Mainpuri S/S
  - c) 400kV Gurusarai-Orai (Quad) D/C line – 100km
  - d) 1x125 MVA, 420 kV Bus Reactor
  - e) 1x330 MVA, 765 kV Bus Reactor

**400kV Substations**

- i) Creation of 400/220/132 kV, 2x500+2x160 MVA Farrukhabad**
  - a) Maheba (Jalaun)-Farrukhabad 400kV D/C line -140km
  - b) Farrukhabad-Badaun 400kV D/C line -95km
  - c) Farrukhabad (400)-Neebkarori 220kV D/C line -50km
  - d) Farrukhabad (400)-Etah (220) 220kV D/C line -90km
  - e) 1x125 MVA, 420 kV Bus Reactor

**220kV Substations**

- i) Creation of 220/132 kV, 1x160 MVA Charkhari (Mahoba)**
  - a) Charkhari (Mahoba)-Gurusarai (Jhansi) 220kV D/C line with High Ampacity conductor -80km
- ii) Creation of 220/132/33 kV, 2x160+2x40 MVA Bamaur (Jhansi)**
  - a) Bamaur (Jhansi)-Gurusarai (Jhansi) 220kV S/C on D/C line -12 km
- iii) Creation of 220/132/33 kV, 2x160+2x40 MVA Bangra (Jhansi)**
  - a) Bangra Jhansi)-Gurusarai (Jhansi) 220kV S/C on D/C line -15km
- iv) Creation of 220/132/33 kV, 1x160+1x40 MVA Kabrai (Mahoba)**
  - a) Kabrai (Mahoba)-Charkhari (Mahoba) 220kV SC on DC line -26km

**IV. Evacuation Plan of 4<sup>th</sup> Year Solar Power for 1000 MW****765/400/220/132kV Substation**

- i) Creation of 765/400/220/132 kV, 1x1500+2x500+2x160 MVA Jakhora (Lalitpur)**
  - a) Jakhora (Lalitpur)-Gurusarai (Jhansi) 765kV S/C line -115km
  - b) Interconnectin of Lalitpur TPS through 220kV Jakhora – Lalitpur TPS (HTLS) D/C line -50km
  - c) LILO of one ckt of Lalitpur TPS–Agra 765kV 2xS/C line at Jakhora S/S – 50 Kms and shifting of 330 MVAR 765kV line reactor of Lalitpur TPS–Agra 765kV S/C line at Lalitpur TPS end to Jakora end of the Jakhora–Agra 765 kV S/C line.
  - d) 1x125 MVA, 420 kV Bus Reactor

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- e) 1x330 MVA, 765 kV Bus Reactor
- f) 220 kV bays at Lalitpur TPS -2 nos

**220kV Substations**

- i) Creation of 220/132/33 kV, 2x160+2x40 MVA Baragaon (Jhansi)**
  - a) Baragaon (Jhansi)-Gurusarai (Jhansi) 220kV S/C on D/C line -50km
- ii) Creation of 220/132/33 kV, 2x160+2x40 MVA Jaitpur (Mahoba)**
  - a) Jaitpur (Mahoba)-Charkhari (Mahoba) 220kV S/C on D/C line -22km

**132kV Substations**

- i) Creation of 132/33 kV, 2x40 MVA Mehrauni(Lalitpur)**
  - (a) Mehrauni (Lalitpur)-Jakhora (Lalitpur) 132kV D/C line -45km
- ii) Creation of 132/33 kV, 2x40 MVA Barh(Lalitpur)**
  - (a) Barh (Lalitpur)-Jakhora (Lalitpur) 132kV D/C line -26km

*Note: Provision for the space for future expansion may be kept at all the new proposed 765kV, 400 kV, 220 kV and 132 kV sub-stations*

**19.0 HVPNL proposal for creation of 400kV Nain Substation near Madlauda area (district Panipat)**

**19.1** CEA stated that HVPNL vide their letter dated 19.4.2017 has submitted the following proposal regarding creation of 2x500 MVA 400/220 kV and 2x160 MVA, 220/132kV Nain Substation near Madlauda area by LILO of both circuits of 400kV Kurukshetra HVDC (PGCIL)–Jind (PGCIL) D/c line:

- i) Establishment of 2x500MVA 400/220kV and 2x160 MVA, 220/132kV Nain Substation near Madlauda
- ii) LILO of both circuits of 400kV Kurukshetra HVDC(PGCIL) – Jind Khatkhar (PGCIL) D/c line at Nain
- iii) Establishment of 2x100 MVA, 220/33kV Sawaha S/s
- iv) Establishment of 2x100 MVA, 220/33kV Jattal S/s
- v) LILO of both circuits of 220kV Jind-PTPS (5-8) D/c line at Sawaha s/s
- vi) LILO of both circuits of 220kV Sawaha-PTPS(5-8) D/c line at Nain
- vii) LILO of both circuits of 220kV PTPS(1-4)–Sewah (BBMB) D/c line at Jattal S/s
- viii) Establishment of 2x20/25 MVA, 132/33kV S/s at Ballah
- ix) Nain –Ballah 132kV D/c line
- x) Nain –Madlauda 132kV D/c line
- xi) Nain -Urlana132kV D/c line
- xii) LILO of Mundlana-Israna 132kV D/c line at Nain S/s

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Subsequently, HVPNL vide their letter dated 1.9.2017 has proposed LILO of both circuits of 220kV Jind (HVPNL)-Safidon D/c line at Khatkhar Jind (PG).

- 19.2** HVPNL stated that due to less load growth projection in the 19<sup>th</sup> EPS, the above proposed scheme may be deferred at present. New scheme to meet the load requirements, if required, would be taken up in future.
- 19.3** After deliberation, the proposal for creation of 400kV Nain Substation near Madlauda area (district Panipat) was deferred.

**20.0 Transmission system for evacuation of power from Khurja STPP (2x660 MW) of THDC:**

- 20.1** CEA stated that THDC vide their letter dated 14.3.2018 has informed that they are implementing Khurja STPP (2x660 MW) in District Bulandshahar (UP) (with provision of one more unit of 660 MW in future) with expected date of commissioning as November 2022 (for 1<sup>st</sup> Unit) and April 2023 (for 2<sup>nd</sup> Unit). The project site is at National Highway-9 between Khurja and Aligarh. All the major clearances such as environmental clearance, water commitment etc. are in place. THDCIL also informed that PPA's have already been signed (prior to 5<sup>th</sup> January 2011) with following entities as beneficiary:

- a) Delhi (BSES Rajdhani Power Limited) - 125 MW
- b) Uttar Pradesh (UPPCL) - 792 MW
- c) Uttarakhand (Uttarakhand Power Corporation Limited) - 328 MW
- d) Rajasthan (Jaipur Vidyut Vitran Nigam Limited, Jodhpur Vidyut Vitran Nigam Ltd.) - 328 MW
- e) Himachal Pradesh (Himachal Pradesh State Electricity Board Limited) 200 MW as beneficiary states.

THDC has requested CEA / CTU to plan a suitable power evacuation system for 2x660 MW Khurja STPP.

- 20.2** CEA further stated that a meeting was held on 7.5.2018 in CEA with representatives from CTU, THDC and UPPTCL. In the meeting, it was pointed out that as per the information provided by THDC, UP has share of 60% of the total power from the plant and remaining 40% power is for the other states in Northern Region. As majority of the power is purchased by UP, the evacuation system may be planned by UP provided other beneficiaries agrees to pay intrastate transmission charges for their share of power. The beneficiary States were requested to present their views regarding the implementation of the system under ISTS or Intra-State.
- 20.3** Director (operation), DTL informed that BSES Rajdhani Power Limited has already conveyed to THDC would not be procuring power from THDC Khurja project. All the beneficiaries except UP opined that ISTS network should be planned for drawl of their allocated power from Khurja STPP. It was opined that UPPTCL may plan its own system for drawl for their share from the project.
- 20.4** THDC stated that as per the Detailed Project Report of Khurja STPP, provision for step up voltage of 400 kV and power evacuation at 400 kV level has been made. Start-up power requirement shall be met by back charging from 400 kV level. The commissioning schedule of 1<sup>st</sup> unit is October 2022 and of 2<sup>nd</sup> unit is April 2023. THDC

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also opined that the transmission system for evacuation of power from Khurja STPP may be constructed under ISTS.

**20.5** After deliberations, following was agreed:

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

**21.0 Agenda by UPPTCL :**

**21.1 Construction of 400/220kV 2x500, 2x200 MVA Basti substation:**

**21.1.1** CEA stated that UPPTCL vide their letter dated 22.5.2018 has proposed a new 400/220kV substation at Basti in the North Eastern part of U.P to cater to the increasing load in and around Gorakhpur in addition to the existing two nos. of 400kV substations (Gorakhpur(PG) & Gorakhpur UPPTCL). The existing 400/220 kV substations are insufficient to cater load requirement of various 220 kV substations namely Bansi, Basti, Gorakhpur-II, Bharuwa Gorakhpur, Gola (Gorakhpur), Deoria, Hatta (Kushinagar) and upcoming new substations namely Maharajganj, Anandnagar and Khalilabad. UPPTCL proposal is as given below:

- i) Construction of 400/220/132 kV, 2x500, 2x200 MVA GIS substation at Basti along with 1x125 MVAR bus reactor.
- ii) LILO of both ckt of Gorakhpur PG–Lucknow PG 400 kV D/C (Quad) existing PGCIL line at Basti (400) substation – 25km.  
(LILO point distance from Lucknow PG 200 km and from Gorakhpur PG 60 km)
- iii) LILO of Gonda (220)–Basti (220) (UPPTCL) 220 kV S/C line at Basti (400) substation – 20 km
- iv) Basti (400)–Bansi (220) 220 kV D/C line – 50 km
- v) LILO of Gorakhpur PG(400)-Bansi (220) 220 kV S/C existing line at Khalilabad (220) - 20 km
- vi) Khalilabad–Pharenda (Ananadnagar) 220 kV D/C line - 40 km
- vii) Basti (400)–Haraiya 132kV D/C lines
- viii) Basti (400)–Nathnagar 132kV D/C lines
- ix) Basti (400)–Mehdawal 132kV D/C lines

**21.1.2** UPPTCL stated that Basti 400 kV substation has been planned to be implemented in 18 months time and tender for substation has already been floated. He requested that 400 kV connectivity could be agreed, so that they could proceed ahead with implementation of the scheme.



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**21.1.3** CTU stated that there are two nos. of 400 kV D/C quad line between Lucknow (PG) and Gorakhpur (PG) with FSC on both D/C line at Lucknow end. Both the 400 kV D/C line has got 63 MVAR line reactors at both ends. After LILO, the Gorakhpur-Lucknow 400 kV D/C line at Basti, Basti-Lucknow section would be about 225 km in length, for which, UPPTCL needs to provide line reactors at Basti end along with 125 MVAR bus reactor at Basti.

**21.1.4** After deliberations the following proposal of UPPTCL was agreed by the members:

- i) Construction of 400/220/132 kV, 2x500, 2x200 MVA GIS substation at Basti along with 1x125 MVAR Bus reactor.
- ii) LILO of both ckt of Gorakhpur (PG)–Lucknow (PG) 400 kV D/C (Quad) existing PGCIL line at Basti (400) substation resulting in formation of Gorakhpur (PG)-Basti (UPPTCL)-Lucknow (PG) 400 kV D/C Quad line.  
(LILO section apprx - 25 km, LILO point distance from Lucknow (PG) 200 km and from Gorakhpur (PG) 60 km)
- iii) 50 MVAR line reactors in both circuits of Lucknow (PG)-Basti 400 kV D/C Quad line at Basti end.
- iv) LILO of Gonda (220)–Basti (220) (UPPTCL) 220 kV S/C line at Basti (400) substation – 20 km
- v) Basti (400)–Bansi (220) 220 kV D/C line – 50 km
- vi) LILO of Gorakhpur PG (400)-Bansi (220) 220 kV S/C existing line at Khalilabad (220) - 20 km
- vii) Khalilabad–Pharenda (Ananadnagar) 220 kV D/C line - 40 km
- viii) Basti (400)–Haraiya 132kV D/C lines
- ix) Basti (400)–Nathnagar 132kV D/C lines
- x) Basti (400)–Mehdawal 132kV D/C lines

**21.2 Revision in evacuation system of 2x660 MW Tanda Extn. Thermal Power Project of NTPC :**

**21.2.1** UPPTCL stated that following transmission system was agreed in 39<sup>th</sup> meeting of SCSPNR for evacuation of power from 2x660 MW Tanda (NTPC) :

- i) Generation of Tanda Extn. Units at 400 kV
- ii) LILO of Azamgarh–Sultanpur 400 kV S/C (UPPTCL) existing line at Tanda TPS  
(At present LILO line about 65 km is being constructed by UPPTCL and expected to match with 1st unit COD).
- iii) 400/220 kV, 2x315 MVA ICTs at Tanda TPS (at NTPC switchyard).
- iv) 400/220/132 kV 2x315, 2x100 MVA Gonda substation. (Intra-state being constructed under PPP mode)
- v) Tanda-Gonda (400)–Shahjahanpur PG 400 kV D/C (Quad) line. (This is an intra state line -230 km. and is being constructed under PPP mode)
- vi) Start-up power through 400/220 kV ICTs from existing Tanda TPS 220 kV bus.

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However, while construction work at (ii) is likely to match 1<sup>st</sup> unit COD, the items (iv) & (v) under PPP mode may get delayed due to serious financial issues with PPP licensee. It is therefore, planned to evacuate the generation as follows: -

**(i) 1<sup>st</sup> Unit :**

- (a) LILO of Azamgarh–Sultanpur 400 kV S/C line at Tanda TPS (As approved in earlier meeting of SCSPNR).
- (b) 400/220 kV 2x315 MVA ICTs at Tanda TPS (As approved in earlier meeting of SCSPNR) to be ensured by NTPC.

**(ii) 2<sup>nd</sup> Unit :**

**Phase-I:**

- i) Construction of 400kV S/S at Basti.
- ii) Construction of Tanda Extn–Basti 400 kV D/C (Quad) line – 50 km.

**Phase-II:**

- i) Tanda Extn.–Gonda 400 kV D/C (Quad) line (Only one ckt to terminate at Tanda Extn.)
- ii) Gonda (400)–Shahjahanpur 400 kV D/C (Quad) line
- iii) Disconnection of one ckt. of Tanda (400)–Basti 400 kV D/C line from Tanda Extn. and connecting it with one circuit of Tanda–Gonda 400 kV D/C line resulting in following configuration from Tanda Extn. (Proposed due to space limitation at 400 kV level at Tanda Extn.).
  - a. Tanda TPS Extn.–Gonda (400) S/C (Quad) line.
  - b. Tanda TPS Extn.–Basti (400) S/C (Quad) line.
  - c. Gonda (400)–Basti 400 kV S/C (Quad) line.
  - d. Gonda (400)–Shahjahanpur 400 kV D/C (Quad) line.

**21.2.2** CEA enquired about the commissioning schedule of Tanda generation projects and transmission elements under implementation by UPPTCL.

**21.2.3** NTPC stated that the commissioning schedule of 1<sup>st</sup> and 2<sup>nd</sup> units are March, 2019 and July, 2019 respectively. 400/220 kV 2x315 MVA ICTs at Tanda TPS would be completed by October 2018.

**21.2.4** On enquiry about the commissioning schedule of Basti S/s, UPPTCL informed that LILO of Azamgarh–Sultanpur 400 kV S/C line at Tanda TPS would be completed by November- December 2018. Basti substation would be awarded by July 2018 with commissioning period of 15 months i.e, by October 2019. However, they would make all efforts to complete Basti GIS substation in matching time frame of the 2<sup>nd</sup> unit of Tanda TPS (2x660 MW).

**21.2.5** UPPTCL further informed that for reliable evacuation of power from Tanda TPS expansion, Tanda (NTPC)-Tanda (New) (UPPTCL) 220 kV D/C line has also been planned, which would be completed by October 2018.

**21.2.6** After deliberations members agreed the following UPPTCL proposal:

Evacuation system in time frame of 1<sup>st</sup> unit (March 2019) of 2x660 MW Tanda TPS (NTPC):

- i) LILO of Azamgarh–Sultanpur 400 kV S/C line at Tanda TPS by UPPTCL

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- ii) 400/220 kV 2x315 MVA ICTs at Tanda TPS by NTPC.
- iii) Tanda (NTPC)-Tanda (New) (UPPTCL) 220 kV D/C line including 220 kV bays Tanda (NTPC) by UPPTCL.

Alternate transmission system for evacuation of power in time frame of 2<sup>nd</sup> Unit (July 2019) of 2x660 MW Tanda TPS (NTPC) till availability of Tanda- Gonda- Shajahanpur 400 kV D/C quad line)

- i) Construction of 400/220/132 kV, 2x500, 2x200 MVA GIS substation at Basti.
- ii) Construction of Tanda TPS–Basti 400 kV D/C quad line – 50 km.
- iii) On completion Tanda-Gonda 400 kV D/C Quad line, one ckt. of Tanda (400)–Basti 400 kV D/C line and one ckt of Tanda- Gonda would be connected bypassing Tanda TPS 400 kV switchyard (due to limited 400 kV bays at Tanda TPS), resulting in following configuration:
  - a) Tanda TPS–Gonda 400 kV S/C Quad line.
  - b) Tanda TPS–Basti 400 kV S/C Quad line.
  - c) Gonda–Basti 400 kV S/C Quad line.

**21.2.7** With above modifications members also noted the modified transmission system (Intra-State) for evacuation of power from 2x660 MW Tanda TPS (NTPC) under scope of UPPTCL, as given below:

- i) Tanda TPS–Gonda 400 kV S/C Quad line.
- ii) Tanda TPS–Basti 400 kV S/C Quad line.
- iii) Gonda–Basti 400 kV S/C Quad line.
- iv) Gonda–Shahjahanpur (PG) 400kV D/C Quad line
- v) Establishment of 2x315 MVA, 400/200kV S/s at Shahjahanpur by LILO of both circuits of Lucknow (PG)–Bareilly (PG) 400kV D/C line.
- vi) Establishment of 400kV substation at Gonda with 400/220kV, 2x315 MVA ICTs.
- vii) LILO of Azamgarh-Sultanpur 400 kV S/C line at Tanda TPS
- viii) Tanda (NTPC)-Tanda (New) (UPPTCL) 220 kV D/C line including 220 kV bays Tanda (NTPC).
- ix) NTPC to provide space for two nos. of 220 kV bays

**21.3 Additional 220 kV line bays at Sohawal (400kV) (PG) substation and Strengthening of 220 kV system around Gonda, Behraich & Devipatan area :-**

**21.3.1** UPPTCL stated out of the six nos. 220 kV bays available at 2x315 MVA, 400/220kV Sohawal (PG) substation, 2 nos of bays have already been utilized by UP for Sohawal (PG)-Sohawal (UP) 220kV D/c line. The remaining 4 nos of bays would be utilized for providing connectivity to Barabanki 220 kV s/s and New Tanda (220kV) S/s (Two line bays each). In addition 2 nos. of 220 kV bays are also required at Sohawal (400kV) (PG) substation for a new proposed 220 kV D/C line to Gonda.

**21.3.2** Gonda and Behraich are existing 220 kV UPPTCL substations besides Gonda (400kV) S/S. To meet the growing demand of the area a number of 220 kV substations are also proposed in the area. On review of loading of 220 kV line and their n-1 non-compliance, following is proposed: -

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- i) Sohawal (400kV) (PG)–Gonda (220) 220 kV D/C line - 40 km. One ckt to terminate at UPPTCL Gonda (220) and other ckt at Behraich (220) substation.
- ii) Construction of New 220/132/33 kV 2x160,2x40 MVA GIS substation by UPPTCL at Ayodhya(Faizabad)
- iii) LILO of one ckt of Sohawal 400(PG)–Tanda (New) 220 kV D/C line (of UPPTCL) at Ayodhya substation.

**21.3.3** UPPTCL further stated that with above inter connections, the 2x315 MVA transfoemation capacity at 400/220kV Sohawal (PG)) S/S will soon be n-1 non-compliant. Therefore, augmentation of the transformation capacity is required at Sohawal (PG) 400/220kV S/S.

**21.3.4** After deliberations, UPPTCL proposal for additional two no. 220 kV bays at Sohawal (400) (PG) substation and Strengthening of 220 kV system around Gonda, Behraich & Devipatan area was agreed. The construction of 02 no. 220kV bays at Sohawal (PG) 400kV Substation shall be done by UPPTCL. Regarding augmentation of the transformation capacity at Sohawal (PG) 400/220kV S/S, it was decided that the same would be considered in future depending upon the incearse in loadings on existing transformers. Members agreed to the following additional 220 kV system from Sohawal (400kV) (PG) substation and 220 kV system strengthening around Gonda, Behraich and Devipatan area by UPPTCL:

- i) Sohawal (400kV) (PG)–Gonda (220) 220 kV D/C line - 40 km. One ckt to terminate at Gonda (220) S/S and other ckt at Behraich (220) S/s of UPPTCL.
- ii) Contstruction of two nos. 220 kV bays by UPPTCL at 2x315 MVA, 400/220kV Sohawal (PG) substation. POWERGRID to provide space for 2 nos. of 220 kV bays.
- iii) Construction of new 220/132/33 kV 2x160,2x40 MVA GIS substation at Ayodhya(Faizabad)
- iv) LILO of one ckt of Sohawal (400kV) (PG)–Tanda (New) 220 kV D/C line (of UPPTCL) at Ayodhya substation.

#### **21.4 Downstream network of Gorakhpur (400kV) (PG) substation:-**

**21.4.1** UPPTCL stated that Gorakhpur (400kV) (PG) substation is presently feeding Bansi and Barahuwa (Gorakhpur) 220kV substations of UPPTCL through 220 kV S/c lines. Another 220kV UPPTCL substation Gola (Gorakhpur) shall soon get connected to Gorkahpur (PG) substation through 220 kV D/c line and the same had already been agreed in the previous meetings of SCSPSNR. In the 39<sup>th</sup> meeting SCSPSNR, augmentation of transforamation capacity by 1x315 MVA 400/220 kV transformer alongwith 2nos. 220kV bays at Gorakhpur (PG) (subject to confirmation of line bays by POWERGRID) was agreed. The following downstream network from Gorakhpur (PG) to utilize addiitional 2 no. 220kV bays is planned:-

- i) Gorakhpur(PG) – Maharajganj 220 kV D/C line (Twin Moose) – 40 km
- ii) Maharajganj- Pharenda, Anandnagar 220 kV DC line -30 km

**21.4.2** Members noted the same.

#### **21.5 Utilization of 220kV bays at 400kV Shahjahanpur (PG) and 765kV Mataur (PG) S/S:**

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**21.5.1** UPPTCL stated that 220kV bays are available at Shahjahanpur(PG) S/S and shall be utilized with the following downstream 220 kV network:

- i) Creation of 220/132/33 kV 2x160+2x40 MVA S/S at Azizpur (Shahjahanpur)
- ii) Shahjahanpur (PG) (400kV)-Azizpur (Shahjahanpur) 220kV D/C line - 20km
- iii) Shahjahanpur (220)-Azizpur(220) 220kV S/C line – 20km

**21.5.2** Two number of 220kV bays are under construction at 765/400/220kV Mataur / Meerut (PG) S/S. The 220 kV bays at the S/S will be connected as given below:

- (a) Meerut PG (765)-Charla (220) Meerut 220kV S/C line. (Presently Charla (220) UPPTCL S/S is being fed from Muzzafarnagar (400)).
- (b) Meerut PG (765) –Partapur (220) 220kV S/C line (Partapur (220) (Meerut) UPPTCL S/S will also be fed from Hapur (765) S/S).

**21.5.3** Members noted the same.

## **21.6 New 220kV transmission system:**

**21.6.1** UPPTCL stated that they have planned following new 220 kV substations/lines under Intra State transmission system:

### **a) Creation of 220/132/33 kV 2x160+2x40 MVA S/S Malwan (Fatehpur)**

- i) LILO of one ckt of Fatehpur(UP)-Unchahar(TPS) 220kV D/C line of UPPTCL at Malwan(220) S/S -30km

Members agreed to the proposal.

### **b) LILO of Ghazipur (DTL)-Badarpur Delhi (TPS) 220kV D/C line at Noida (Sec-20) of UPPTCL.**

UPPTCL stated that Noida (Sec-20) 220kV substation is an important substation of UPPTCL. Its gets feed from Gr.Noida (400/220 kV) substation through a 220 kV D/C line. One ckt of Greater Noida (400)-Noida (Sec-20) 220 kV D/C line is tapped to feed Noida sector-62 sub-station as there is no space for additional bay for proper LILO arrangement at Noida sector 62 S/s. During peak load conditions the 220 kV line section between Sector-62 and Sector-20 is often kept open. Further, Noida (Sec-20) is also connected by T-off on Ghazipur (DTL)-Badarpur (TPS) 220kV S/C line. For giving an additional feed to Noida Sector-20, it is proposed to construct LILO of this line instead of T-off for proper sharing of loads, thus forming Gazipur-Noida (Sec-20) –Badarpur 220 kV S/C line. UPPTCL further stated that the section from Noida (Sec-20) to Badarpur will be kept open from Badarpur end and will be kept charged from Noida end in order to avoid theft of the conductor.

Members agreed with the proposal of UPPTCL for converting T-off arrangement on Ghazipur (DTL)-Badarpur (TPS) 220 kV S/C line for Noida (Sec-20) 220 kV S/S into LILO, thus forming Gazipur-Noida (Sec-20)–Badarpur 220 kV S/C line. Noida (Sec-20) –Badarpur 220 kV S/C line would be normally kept charged from Noida Sec-20 and would remain open from Badarpur end.

### **c) Creation of 220/33 kV S/S Botanical Garden GIS (Noida) (3x60 MVA)**

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- i) Noida (sec-148)-Botanical Garden(GIS) 220kV D/C line -27km
- ii) LILO of Ghazipur-Noida 220kV S/C line at Botanical garden (GIS) – 01km

CEA stated that a Master Plan had been prepared by WAPCOS for the Power System Planning upto 2031 for transmission and distribution system of Noida in consultation with CEA. CEA enquired UPPTCL whether the interconnection of the proposed Botanical garden 220 kV substation was in line with the Noida transmission master plan.

UPPTCL stated they would look into the same and modifications, if any, would be intimated.

Members noted the same.

## **21.7 New 220kV S/S Intra State Under Construction by UPPTCL:**

**21.7.1** UPPTCL stated that in view of development and load growth in Gr. Noida area, following substations have been planned and are under construction:-

### **A. Construction of 220/33 kV Substation IITGNL (Integrated Industrial Township Greater Noida)(GIS)**

- i) Creation of 220/33 kV, 4x60 MVA S/S at IITGNL (GIS)
- ii) Gr.Noida (765) UPPTCL-IITGNL 220 kV D/C line -45km
- iii) Sikandrabad (400) UPPTCL-IITGNL 220kV D/C line – 42km

### **B. Construction of 220/33 kV 2x60 MVA S/S Jewar (Gautam Budh nagar)**

- i) LILO of one ckt of Gr.Noida (765) UPPTCL-IITGNL 220kV D/C line at 220/33 kV, 2x60 MVA Jewar (GB Nagar) S/S -20km

**21.7.2** Members noted the same and CEA requested UPPTCL to check the proposal with respect to Noida Master Plan.

## **21.8 Modification in the scheme of upgradation of existing 220/132kV Sahupuri (Chandauli) Substation to 400/220kV, 2x500 MVA (GIS)**

**21.8.1** UPPTCL stated that in 39<sup>th</sup> meeting of SCSPNR, upgradation of existing 220/132kV Sahupuri Substation to 400/220 kV, 2x500 MVA was approved as:

- i) Upgradation of existing 220/132kV (1x160+2x200) MVA, Sahupuri Substation to 2x500 MVA, 400/220 kV level.
- ii) LILO of both circuits of Biharshariff-Varanasi PG (765) 400kV D/C (Quad) lines at 400kV Sahupuri (GIS) - 30kms along with 50/63 MVAR line reactor at Sahupuri end.
- iii) Extension of 220kV bus of 400/220 kV Sahupuri Substation for interconnection with Sahupuri 220/132kV Substation with twin moose conductor.
- iv) 1x125 MVAR, 400kV bus reactor at 400/220 kV Sahupuri.

**21.8.2** UPPTCL added that considering availabilities of route and load orientation, the above transmission system has been modified as given below:

- i) Upgradation of existing 220/132kV (1x160+2x200) MVA, Sahupuri (Chandauli) Substation to 2x500 MVA, 400/220 kV level (GIS).



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- ii) LILO of both circuits of Biharshariff-Varanasi PG (765) 400kV D/C (Quad) lines at 400kV Sahupuri (GIS) - 30kms along with 63 MVAR line reactor at Sahupuri end on each line.
- iii) **Extension of 220kV bus of 400/220 kV Sahupuri (GIS) Substation for interconnection with Sahupuri 220/132kV Substation with U/G Cable - 2x0.7 km.**
- iv) **Shifting of 220kV Sahupuri (220)-Bhelupur (220) D/C line to 400/220 kV Chandauli with U/G cable- 2x0.7 km**
- v) 1x125 MVAR, 400kV bus reactor at 400/220 kV Sahupuri (Chandauli).

**21.8.3** Members agreed with modification proposed by UPPTCL.

### **21.9 Augmentation of transformation capacity of 400/220kV UPPTCL Substations**

**21.9.1** UPPTCL informed that they have planned augmentation of transformation capacity at the following substations 400/220 kV sub-stations of UPPTCL:

- i) Replacement / Augmentation of Obra TPS 400/220kV S/S from 2x240 MVA to 2x315+1x240 MVA – under implementation (one 315MVA transformer has already been replaced and another 315MVA would be replaced in a week and one 240MVA transformer would be added in 6 month time after refurbishment)
- ii) Replacement / Augmentation of Moradabad 400/220kV substation from 1x315+1x500 MVA to 2x500 MVA - already completed.
- iii) Augmentation of Muradnagar-II (UP) 400/220kV S/S from 1x315+1x240 MVA to 1x315+2x240 MVA - under implementation
- iv) Replacement / Augmentation of Azamgarh 400/220kV S/S from 1x315+1x500 MVA to 2x500 MVA - under implementation
- v) Augmentation of Motiram Adda Gorakhpur (UPPTCL) 400/220kV S/S from 1x315+1x500 MVA to 1x315+1x500+1x240 MVA (1x240 MVA would be added in 6 months time)
- vi) Replacement of 2x240 MVA transformer at Panki 400/220kV substation with 2x315 MVA.
- vii) Augmentation of Unnao 400/220kV S/S from 2x315 MVA to 3x315 MVA – under implementation would be done in 6 months
- viii) Replacement / Augmentation of Sarnath 400/220kV S/S from 2x315+1x500 MVA to 1x315+2x500 MVA
- ix) Replacement / Augmentation of Math, Mathura 400/220kV S/S from 2x315 MVA to 1x315+1x500 MVA or 3x315 MVA

**21.9.2** UPPTCL informed that after augmentation, the transformation capacity at Obra 400/220kV S/s would be 2x315+ 1x240 MVA. 1x315 MVA has already been added and other 315 MVA would be added in a week's time. Out of the replaced 2x240 MVA ICTs, one 240 MVA would be added at Obra TPS itself and other would be shifted to Gorakhpur (UPPTCL) 400/220 kV substation. Augmentation at Moradabad S/s from 1x315+1x500 MVA to 2x500 MVA has already been completed.

**21.9.3** Members noted the same.

### **22.0 DTL agenda regarding Reactive power Compensation in Delhi:**

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- 22.1 CEA stated that in the 39<sup>th</sup> meeting of SCSPNR installation of reactors at various 400kV and 220kV sub-stations were agreed in and around Delhi to control high voltage, particularly during winter off peak period. The installation of reactors were agreed subject to availability of space. DTL vide their letter no F.DTL/202/Opr(Plg)/DGM(Plg)/2018-19/F-20/50 dated 11.06.2018 has informed that there are some difficulty in installation of these reactors at some locations. The details are as under:

**Table 1**

S. No.	Bus Name	Voltage Level (kV)	Reactor agreed in 39 <sup>th</sup> meeting of SCSPNR (MVAR)	Remarks
1.	Mundka	400	125	Space is available. 400kV bay is also required to be erected.
2.	Narela	220	25	No space is available
3.	R.K.Puram-I	220	25	No space is available
4.	Patparganj-II	220	2x25	No space is available
5.	Maharani Bagh	220	2x25	Could be considered after the erection of new GIS Stn.
6.	Bamnauli	220	25	Space is available. Considering the reactive power injection under high voltage conditions two no. reactors are proposed to be installed. Though the bays are available, some of the equipments are required to be erected.
7.	Subzi Mandi	220	2x25	At present, no space. Would be considered after the remodeling of the substation with GIS.
8.	Gopalpur	220	2x25	At present, no space. Would be considered at the time of establishment of 400kV S/Stn.
9.	Indrapastha	220	2x25	Space is available and 220kV bays are also required to be erected.
10.	Geeta Colony	220	2x25	No space.
11.	Harsh Vihar	220	2x25	Space and 220kV GIS bays are available at present. Due to space constraints at Patparganj and Preet Vihar Substations and to reduce the Reactive power injection two no. 50MVAR reactors are proposed.
12.	Wazirabad	220	2x25	No space.
13.	Electric Lane	220	2x25	Space constraint is there, so 1x50 MVAR is proposed. 220kV GIS bay is also required to be erected.
14.	Mandola	220	25	No space.

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15.	AIIMS	220	2x25	No space.
16.	Sarita Vihar	220	25	No space.
17.	Bawana	220	25	No space.
18.	Preet Vihar	220	25	No space.
19.	Mundka	220	25	Space is available. 220kV bay is also required to be erected.
20.	Masjid Moth	220	25	No space.
21.	Maharani Bagh (PG)	400	125	To be installed in under ISTS.
22.	Mandola (PG)	400	125	
TOTAL			<b>1100</b>	

**22.2** CEA added that based on the above, DTL has decided that at present, reactors would be installed in Delhi system at the following locations. DTL has also decided that in future, wherever new 220kV sub station will be installed and in-feeds are envisaged through 220kV cables, two nos. 25 MVAR reactors should be considered in the scheme.

Table 2

S. N	Bus Name	Voltage Level (kV)	Reactor (MVAR)	Remarks
1.	Mundka	400	125	To be installed by DTL
2.	Bamnauli	220	2x25	
3.	Indrapastha	220	2x25	
4.	Harsh Vihar	220	2x50	
5.	Electric Lane	220	1x50	
6.	Mundka	220	25	
7.	Peeragarhi	220	1x50	One GIS 220kV bay is spare at Peeragarhi. The S/Stn. is connected with 1000sq.mm 220kV Mundka-Peeragarhi D/C (13KM) and 220kV Peeragarhi- Wazirpur D/C (8.3KM) cables. Due to these cables, during off-Peak hrs particularly during winter nights, voltage shoots up beyond the permissible limits. Therefore, during winter night's one ckt. is kept in operation out of the four 220kV cable circuits to control high voltage issue to some extent. This ckt. also trips on account of high voltage affecting the areas fed from Peeragarhi S/Stn. To overcome high voltage issue one 220kV, 50 MVAR Reactor is proposed to be installed at Peeragarhi S/Stn. considering the fact that one 220kV GIS bay is also available.
8.	Maharani Bagh (PG)	400	125	To be installed under ISTS.

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9.	Mandola (PG)	400	125	
TOTAL			700	

**22.3** CEA further stated that DTL has forwarded the studies conducted by M/s Siemens in coordination with DTL, wherein following recommendations were made:

- a) 75MVAR (inductive) to 200MVAR (capacitive) SVC at 400kV Bamnauli S/Stn. with 125MVAR Fixed Reactor.
- b) 125MVAR Fixed Reactor at 400kV Level and 25 MVAR Fixed Reactor at 220kV Level at Mundka.
- c) 50MVAR Fixed Reactor at 220kV Maharani Bagh, Harsh Vihar and Electric Lane.

**22.4** CEA stated that the SVC proposed needs to be studied in details. DTL stated that pending recommendation for the SVC, other fixed reactors as given in Table 2 above (slightly modified with respect to the recommendations made in the 39<sup>th</sup> SCPSNR, in view of availability of space and implementation feasibility) may be agreed, as severe overvoltage problem is being experienced in their system.

**22.5** After deliberations the following fixed reactors were agreed to be implemented by DTL:

S. No.	Substation	Voltage (kV)	Rating
1	Mundka	400	125
2	Bamnauli	220	2x25
3	Indrapastha	220	2x25
4	Harsh Vihar	220	2x50
5	Electric Lane	220	1x50
6	Mundka	220	25
7	Peeragarhi	220	1x50

**23.0 Proposal for conversion of 400kV D/c Bamnoli- Ballabgarh O/H line into cable in Global City Project Gurugram (a JV of Centre & State Govt.) by DMICDC**

**23.1** CEA stated that Delhi-Mumbai Industrial Corridor Development Corporation (DMICDC) and Haryana State Industrial and Infrastructure Development Corporation (HSIIDC) are jointly developing Global City in Gurugram (Haryana). The Global City is a joint venture of DMICDC and HSIIDC to develop a city of international standard all along Delhi-Mumbai Industrial Corridor, which is covering States viz. Maharashtra, Gujarat, Rajasthan, Haryana and Uttar Pradesh. The Global city, Gurugram project covers approx. 1004 Acres of land between NH-8 to Pataudi Road near Northern Peripheral Road (NPR) and Central Peripheral Road (CPR). The Global City is unique Project containing facilities like Metro connectivity, High way connectivity, etc. and all the utilities are underground (U/G) as per international standards. Therefore, section of various 400 kV, 220 kV and 66 kV overhead (O/H) lines passing through the proposed Global city area are proposed to be converted as underground sections.

**23.2** CEA added that a section of the 400 kV Bamnauli-Ballabgarh D/C line of DTL is also passing across the Global City. DMICDC has earlier intimated that they had examined

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the possibility of shifting the line through O/H arrangement, which is not found feasible. Therefore, conversion of O/H section of the line falling in the Global city area into U/G is the only option.

- 23.3** CEA further stated that a meeting was held with DTL on 06-12-2017 in New Delhi, wherein, DTL had requested that matter of conversion of section of O/H 400 kV Bamnauli-Ballabgarh D/C line to U/G may be technically assessed by CEA, as it forms a 400 kV hybrid system i.e. O/H transmission line - U/G cable - O/H transmission line.

The matters of conversion of a section of 400 kV Bamnauli-Ballabgarh D/C O/H line into U/G was discussed preliminarily in a meeting held on 18.12.2017 in CEA and following was emerged:

- a) 400 kV Bamnauli-Ballabgarh D/C is an ACSR quad Bersimis line, which belongs to M/s DTL. Therefore, consent of M/s DTL would be required for the conversion.
- b) Cable of eq. rating to ACSR Quad Bersimis conductor would be required for the conversion along with spare cable.
- c) Adequate protection system is required for the fault in the U/G cable.
- d) The U/G cable would be provided with Distributive Temperature Sensing (DTS) system all along the cable to identify to hotspot.
- e) Global city to provide parameters & rating of the cable to assess the reactive compensation requirement.
- f) Global city to explore following techno-economies options for conversion of the O/H section to U/G:
  - i) Using of buried cable
  - ii) Use of cable through trenches
  - iii) Gas Insulated line (GIL)

- 23.4** The following clarifications were submitted by HSIDC:

- i) The consent of M/s DTL would be taken after obtaining feasibility report from CEA.
- ii) 2500 sq. mm size XLPE cable - two cable per phase will be laid as already laid in this line at Bamnoli end for 900 mtr stretch.
- iii) Adequate protection will be implemented i.e. DTS-Distributive Temperature Sensing System all along the cable to identify the hot spot and OFC cable will also be laid for protection as well as communication etc.
- iv) With respect to different options explored by HSIDC for conversion of the O/H section to U/G, it was observed that cost of GIL (without civil work) would be around 210 Crore and that of XLPE cable (without civil work) would be around 182 crore. The cost of civil works would also be higher in case of GIL, therefore, for conversion of the O/H section to U/G, cable is a better option.

- 23.5** DTL stated that the length of 400kV Ballabgarh- Bamnoli is 52km and at Bamnoli end 900m underground cabling has already been done by DTL. The cable stretch has given trouble in the past many times and there have been many instances of mal-operation of PLCC. The proposed hybrid system would also result in non-availability of Auto-reclose option in the 400 kV D/C line. In the transmission line involving cable, joints are the

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weakest points. In the 3 km stretch of cable, there would be atleast 80 nos. of cable joints. They are already facing problem in 900 m length of cable, ever since it's commissioning. Also, the 400kV Ballabhgarh- Bamnoli line is part of 400kV ring around Delhi, laying of cable may impact the reliability of 400 kV ring.

- 23.6** CEA stated that with the LILO of Ballabhgarh-Bamnoli 400 kV D/C line at Tuglaqabad, the line would become Ballabhgarh-Tuglaqabad-Bamnoli 400 kV D/C line. With HSIDC proposal, the Tuglaqabad-Bamnoli 400 kV line would contain sections of 33 km O/H line, 3km U/G cable, 15.1 km O/H line and 0.9 km U/G cable from Tuglaqabad to Bamnoli end. In case of opening of the 400 kV Delhi ring due to fault in the cable sections, feeding from Tuglaqabad gets increased and there may be instances of 2x500 MVA, 400/220 kV ICTs at Tuglaqabad becoming n-1 non compliant.
- 23.7** HSIDC representative stated that to take care of the reliability concern, two cables per phase along with spare cable in each circuit is being provided in the 3 km stretch of U/G cable section.
- 23.8** The issue was further deliberated and keeping in view the reliability concerns of Delhi 400 kV ring, HSIDC was suggested to explore other options including re-routing of the line (overhead) to avoid Goble City, use of GIL etc. in association / consultation with DTL.
- 24.0 Construction of 220/ 33 kV GIS Baramwari (Rudrapur) and its associated 220 kV D/C line from proposed 220/33 kV substation Baramwari (Rudrapur) to LILO point of Singoli Bhatwari HEPP (L&T) under Intra State Strengthening Scheme:**
- 24.1** CEA stated that 2x50MVA, 220/33 kV Baramwari Substation & and its associated 220 kV line was proposed in UITP scheme for power evacuation of proposed 99 MW Singoli Bhatwari HEPP (M/s L&T) and 76 MW Phatabyung HEPP (M/s Lanco) which was approved by CEA vide their letter No. 12A/G/2006-SP&PA/39 dated 03/01/2007. UITP scheme of PTCUL has been accorded deemed ISTS Status by Hon'ble CERC vide its order dated 31/01/2013. Subsequently, a meeting was held in CEA on 25.09.2017, wherein, it was deliberated that Baramwari 220kV S/s would not be required in timeframe of 99MW Singoli Bhatwari HEP of M/s L&T and the same could be taken up by PTCUL, when 76 MW Phatabyung HEP of M/s Lanco comes in future. Due to uncertainty of Phatabyung HEP, it was advised to PTCUL to take up the Baramwari-Srinagar 220kV D/c line in two phases:-
- Phase-I: Point of interconnection (of Singoli Batwari HEP with proposed Baramwari-Srinagar 220KV D/c line) to Srinagar substation (matching with the commissioning of Singoli Bhatwari HEP). Dedicated line from Singoli Bhatwari switchyard to point of interconnection would be built by M/s L&T as an interim connectivity. With implementation of Baramwari switching station, M/s L&T would be required to construct 220kV D/c line from point of interconnection to Baramwari Switching station (as a part of final connectivity)
  - Phase II: Baramwari to Point of interconnection (of Singoli Batwari HEP with proposed Baramwari-Srinagar 220kV D/c line). (to be taken up for implementation matching with the commissioning schedule of Phatabyung HEP)
- 24.2** CEA further stated that PTCUL vide their letter no C-1506/dir (Projects)/PTCUL/camp dated 15.6.2018 has proposed to implement 220/33 kV 10x6MVA Baramwari (Rudrapur) substation and 220 kV D/C line from proposed 220/33 kV substation Baramwari (Rudrapur) to LILO point of Singoli Bhatwari HEP (L&T) under Intra State Transmission network. This would be implemented to meet local demand in Baramwari (Rudrapur) area



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and also for injection of power from SHPs of UJVN Ltd (Kaliganga-I - 4 MW, Kaliganga-II - 4.5MW & Madhyamaheshwar - 15 MW). The necessary approval from the State Electricity Regulatory Commission will be sought by PTCUL. The proposed 220/33 kV substation will be connected to 400kV Srinagar S/s i.e ISTS network through Baramwari-Srinagar 220kV D/c line (Phase -I & II), which is also part of ISTS Network. PTCUL has raised the following issues:

- (i) Commercial treatment of second phase of 220kV Baramwari –Srinagar line by changing its status from ISTS to Intra STS and accordingly its recovery through ARR of PTCUL.
- (ii) Recovery mechanism when this Intra STS will be used in conjunction with deemed ISTS network
- (iii) Status of 220kV Baramwari switching station and phase-II of 220kV D/c Baramwari to Point of interconnection (of Singoli Batwari HEP with proposed Baramwari-Srinagar 220kV D/c line) when Phata Byung will come in future.

**24.3** M/s Lanco (developer of Phatabyung HEP) stated that construction activities at the project site have been revived and expected commissioning schedule of HEP is March 2020.

**24.4** In view of the above, PTCUL was advised to revisit their proposal. The issue needs to be further deliberated in a separate meeting with CEA, CTU and PTCUL.

**25.0 Issue related to signing of Transmission Agreement/LTA Agreements for implementation of UITP Scheme (deemed ISTS) by PTCUL for evacuation of power from various Generators:**

**25.1** CEA stated that PTCUL is implementing UITP scheme as deemed ISTS as per CERC order dated 31.10.2013 for evacuation of power from Tapovan Vishnugad HEP (520MW) by M/s NTPC, Singoli Bhatwari 99MW (M/s L&T), Phata Byung (76MW) by Lanco mandakini HEPL), Pipalkoti (444 MW) by THDC Ltd, Naitwar Mori (60 MW) by SJVNL. CTU is the nodal agency for grant of connectivity and LTA to these generators in accordance with CERC Connectivity Regulations. Accordingly, intimation for connectivity & LTA had been issued to the above generators by CTU.

**25.2** CEA further stated that PTCUL vide their letter no C-1506/dir (Projects)/PTCUL/camp dated 15.6.2018 has forwarded their view on connectivity / LTA intimations (issued by CTU), which are given below:

- i) On the intimations of Connectivity/LTA for evacuation of power from Tapovan Vishnugad HEP, Singoli Bhatwari, Phata Byung, Pipalkoti and Naitwar Mori, PTCUL has raised its objection at various platforms/meetings and with CTU on the alleged treatment of Transmission System being implemented by PTCUL as connectivity lines & transmission system required for LTA. It is understood that Connectivity & LTA are two different provisions and are to be dealt accordingly as per CERC (Grant of Connectivity, Long term Access and Medium term Open Access in inter-State Transmission and related matters) Regulations, 2009. But at the same time, it is implicit that the whole Transmission System is being developed and implemented by PTCUL under coordinated system planning of CEA/CTU and accordingly all the elements of Associated Transmission System being implemented by PTCUL is to be made part of LTA intimations/LTA Agreements, so as to ensure its recovery through beneficiaries rather than executing a separate Transmission Agreement for Connectivity lines as per CTU. As per CERC Regulations, a Transmission Agreement is signed for dedicated lines only. Further, CTU is not

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including 400kV Srinagar S/s and Srinagar-Srinagar PH 400kV D/c line (already implemented by PTCUL as ISTS Network) in LTA intimations.

- ii) As per intimations of Connectivity issued by CTU, Pipalkoti 400kV S/s is not required in time frame of Tapovan Vishnugad HEP, Mori 220/132 kV S/s is not required in time frame of Naitwar Mori HEP and Baramwari 220kV S/s is not required in time frame of Singoli Bhatwari HEP. With this approach, the Transmission System required for Connectivity for these Generators up to the point of Connectivity becomes a single link/line (i.e the Transmission lines section to be constructed by the Generator i.e. by M/s L&T & M/s SJVN and section of lines to be constructed by PTCUL are basically a single link up to the point of Connectivity). Similarly, the transmission lines to be constructed by PTCUL for Tapovan Vishnugad HEP i.e. Tapovan Vishnugad–Pipalkoti 400kV D/C line and Pipalkoti –Srinagar 400kV D/c is a single link. Thus, the transmission system seems to be treated as dedicated lines by CTU for which CTU is insisting for signing a Transmission Agreement for recovery of Transmission Charges against these lines between PTCUL and Generators. Only Srinagar- Kashipur 400kV D/c (Quad Bersimis) line is included in LTA intimations issued by CTU to M/s NTPC, M/s L&T & M/s Lanco.

**25.3** CEA said that in view of the above, PTCUL has raised following issues: -

1. To include complete Associated Transmission System to be implemented by PTCUL, as agreed between Generators & PTCUL in the implementation Agreements, in the LTA intimations/LTA Agreements so as to ensure its recovery through beneficiaries. Otherwise, in the absence of any security against the investment made by PTCUL, PTCUL will be unable to fulfill the commitments of timelines for completion of Associated Transmission System of various Generators in the absence of LTA Agreements.
2. As Transmission Agreement is to be signed for dedicated lines (if implemented by ISTS licensee). So, is there any need for signing the Transmission Agreement for connectivity lines with Generators and what would be the sanctity of these Transmission Agreements after implementation of above mentioned substations i.e. Pipalkoti 400kV S/s, Baramwari 220kV S/s and Mori 220kV S/s at later stage, when these connectivity lines / Transmission system including these substations will be shared by upcoming Generators.
3. To include Srinagar 400kV S/s & Srinagar-Srinagar PH 400kV D/c line in the LTA intimations / Agreements (which are also agreed between PTCUL & Generators in the Implementation Agreements).
4. In the Meeting held at CEA on 04.04.2018, regarding LTA issues of Singoli Bhatwari HEP, it was stated by CEA quoted as below –

*“CEA stated that with change in commissioning schedule of Tapovan Vishnugarh (September 2020) its connectivity system can be implemented in matching time frame of Srinagar-Kashipur 400 kV D/C line. However, in case of SBHEP operationalization of LTA would be delayed by about 18 months. Hence, it is advisable to explore the possibility of operationalization of LTA of SBHEP, before commissioning of the Srinagar-Ksahipur 400 kV D/C line in the existing margins and/or with alternate arrangement.”*

**25.4** After further deliberations, it was decided to convene a separate meeting to discuss the above issues.

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**26.0 Construction of 2 No. 400 kV bays at 400/220 kV Chamera Pooling Station of PGCIL under Northern Region System Strengthening scheme:**

- 26.1** CEA stated that in the 27<sup>th</sup> meeting of Standing Committee on Power System Planning of Northern Region held on 30.05.2009, it was decided that HPPTCL would establish a 400/220 kV substation at Lahal in the time frame of Kutehar HEP, which would be connected to Chamera Pooling Station by a 400 kV D/C line. HPPTCL vide their letter no No HPPTC L/PI ann ing/CEA\_Vol-VI/20 18-3215 dated 18.5.2018 has informed that HPPTCL has awarded the package of construction of 400 kV D/C line from Lahal to Chamera on 02.04.2018 and the line is scheduled to be completed by June, 2020. As the system comes under Northern Region System Strengthening and approved master plan of Ravi Basin, therefore, HPPTCL had requested the committee to approve the proposal of provision of 2 No. 400 kV Bays by PGCIL at 400/220 kV Chamera Pooling Station of PGCIL under Northern Region System Strengthening scheme.
- 26.2** POWERGRID confirmed the availability of space for two nos. of 400 kV bays at Chamera 400/220 kV pooling station.
- 26.3** After discussion, members agreed for thr provision of two nos. of 400 kV bays at Chamera 400/220 kV pooling station for termination of Lahal-Chamera 400 kV D/c line (of HPPTCL) under ISTS.

**27.0 Transmission System for evacuation of power from Nakhtan (4x115 MW) HEP:**

- 27.1** CEA stated that the issue regarding evacuation of power of Nakhtan HEP (4x115 MW) was discussed in the 39<sup>th</sup> meeting of Standing Committee on Power System Planning of Northern Region (SCPSPNR) held on 29-30<sup>th</sup> May, 2017, wherein it was agreed that a subcommittee consisting of CEA, CTU, HPSEB and HPPTCL would work out the transmission system in coordinated manner considering other projects along with the small hydro projects in that area.
- 27.2** Accordingly, a team consisting of representatives from CEA, CTU, HPPTCL and HPSEB visited the project site on 10.6.2018 to take a view on the ROW related issues. Based on the site visit it was observed that a separate 400 kV system would be required to evacuate power of Nakhtan HEP. The 400 kV system could be LILO of Banala-Hamirpur 400 kV line of PGCIL at Nakhtan due to non-availability of space for 400 kV bays at Banala. The estimated route length of LILO would be of the order of 55 kms. The proposal is tentative and shall be finalized after further studies and receipt of application for grant of connectivity and LTA from the HPPCL, the developer of the generation project.
- 27.3** To a query about the project capacity and commissioning schedule of the project, HPPCL informed that DPR of Nakhtan HEP is under preparation and the project is planned to be commissioned by 2025-26. It was also informed that capacity of Nakhtan HEP could vary by  $\pm 25$  MW.
- 27.4** After deliberations, it was agreed that the transmission System for evacuation of power from Nakhtan HEP would be finalized after receipt of application for grant of connectivity and LTA from HPPCL.

**28.0 Evacuation arrangement for Solar Park (1000 MW) in Spiti Valley:**

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**28.1** CEA stated that HPSEBL is the nodal agency for development of 1000 MW Solar Park. The confirmation regarding consumption of 20% of power from Solar Park by DISCOM is not yet confirmed by HPSEBL.

**28.2** CEA added that to ascertain the tentative evacuation for the solar park, a team consisting of representatives from CEA, CTU, HPPTCL and HPSEBL visited locations of proposed Solar Park in Kaza Tehsil of Distt. Lahaul & Spiti on 12.6.2018. The tentative evacuation envisages pooling of power from all solar parks spread out in the valley to 400/220 kV pooling station at Kaza (tentative) and construction of 400 kV D/C line up to Wangtoo 400/220 kV substation.

**29.0 Additional 1x500 MVA, 400/220kV ICT at Saharanpur (PG) 400/220kV substation:**

**29.1** UPPTCL stated that at present Saharanpur (PG) 400/220 kV substation in Uttar Pradesh has an installed capacity of 2x315 MVA and following 220kV substations are getting feed from this substation:

- i) Saharanpur 220/132kV 2x160 MVA S/s
- ii) Nanauta 220/132kV 2x200 MVA S/s.

The maximum power flow at Saharanpur (PG) 400/220kV substation is about 420MW. During outage of one transformer i.e. for scheduled maintenance activities or because of any forced outages, remaining transformer gets overloaded. Further UPPTCL has planned the following 220 kV system, which would increase the drawal from Saharanpur (PG):

- i) Saharanpur (PG)–Sarsawa 220kV D/c line
- ii) LILO of Khara–Shamli 220kV line at Saharanpur (PG)
- iii) Augmentation of transformation capacity at Saharanpur (UP) 220/132kV S/S from 2x160MVA to 2x200MVA

To meet future load drawal requirements with reliability, UPPTCL proposed augmentation of the transformation capacity at Saharanpur (PG) 400/220kV substation by 1x500 MVA ICT under Regional system strengthening scheme.

**29.2** Members agreed to UPPTCL's proposal of augmentation of transformation capacity at Saharanpur (PG) 400/220kV substation by 1x500 MVA ICT under ISTS.

**30.0 Implementation status of 500MVA Thyristor Controlled Reactor(TCR) at Kurukshetra 400kV bus and commissioning of 80 MVA Bus Reactor at Kurukshetra:**

**30.1** CEA stated that Kurukshetra is connected to Champa Pooling Station in Western Region through high capacity HVDC link and to Northern Region grid through various other AC links. Phase-I of Champa-Kurukshetra HVDC link i.e. 3000MW been commissioned and is in operation. Phase-II of the HVDC link is expected to be commissioned shortly.

**30.2** CEA further stated that to mitigate the problem of persistent high voltages at Kurukshetra HVDC terminal during winter season (due to low load conditions in Northern Region and the hydro & thermal generations in Himachal Pradesh, Punjab & Haryana remaining out of service most of the times except for peak hours), installation of 1 No. of 500MVA TCR (Thyristor Controlled Reactors) at Kurukshetra 400 kV was agreed in 39<sup>th</sup> meeting of SCSPNR. The commissioning of TCR would take time (approx. 2 to 3 years). The

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scheme has been allotted to POWERGRID for implementation under RTM (Regulated Tariff Mechanism) by MoP (Ministry of Power).

- 30.3** CTU informed that based on budgetary quotations, the estimated cost of the project is about 267 crores including interest during construction (IDC). However, the final price would be known at the time of finalisation of award.
- 30.4** CTU further stated that, as the implementation of 500 MVAR would take time, the 80 MVAR shunt reactor (part of filter bank) which was planned with Champa–Kurukshetra Bipole-II has been commissioned to mitigate the high voltage problem at Kurukshetra HVDC. CTU requested approval for the same.
- 30.5** Members noted the implementation status of 500 MVAR TCR and approved the commissioning of 80 MVAR shunt reactor (part of filter bank associated with Champa–Kurukshetra Bipole-II) at Kurushetra HVDC.
- 31.0 Ownership of 4x105 MVA ICT & 2x63 MVAR Bus Reactor along with GIS bay at Dehar (BBMB) S/s.**
- 31.1** CTU stated that in the 38<sup>th</sup> TCC and 41<sup>st</sup> NRPC meeting held on 27<sup>th</sup> & 28<sup>th</sup> February, 2018, it was decided that the matter regarding ownership of ICTs and Bus reactors along with GIS bay at Dehar BBMB S/s shall be discussed in separate meeting. Accordingly, a meeting was held on 14.05.2018 at Committee room of BBMB, Chandigarh with representatives of all the partner states of BBMB and it was agreed that ownership of 4x105 MVA, 400/220 kV ICT and 2x63 MVAR Bus reactor at Dehar (BBMB) shall remain with POWERGRID as part of regional system strengthening and the assets would become a part of POC pool. O&M shall be borne by BBMB for which the charges would be reimbursed by POWERGRID.
- 31.2** Members noted the same.
- 32.0 Charging of 63 MVAR line reactor of Lucknow-Sohawal 400kV line as bus reactor.**
- 32.1** CTU stated that for transfer of power from ER to NR, Balia-Lucknow 400kV D/c line (about 320 km length) was planned with 63 MVAR line eractors at both ends. Subsequently, 400/220kV, 2x315MVA, substation at Sohawal was established by LILO of both circuits of Balia-Lucknow 400kV D/c line at Sohawal under Northern Regional Transmission Strengthening Scheme (scheme agreed in the 26<sup>th</sup> Meeting of Northern Regional Power Committee held on 13/10/2008). In the approved scheme, provision for adequate reactive compensation was also kept, so as to ensure smooth operation of transmission system under various scenarios. With the LILO of both circuits of Balia-Lucknow 400kV D/c line at Sohawal, 2x63 MVAR reactors at Lucknow were not required in the line and the same was shifted to Sohawal for use as Bus reactor.
- 32.2** CTU further stated that as per earlier practice, only main elements of transmission scheme i.e. lines and substation were discussed and agreed in the Standing Committee meetings. Generally, the reactive compensation was finalized by CTU at the DPR stage, when more accurate details about line lengths and voltage profile become available. Accordingly, 2x63MVAR Bus reactor at Sohawal, which is a part of “Northern Regional Transmission Strengthening Scheme”, was incorporated in the DPR. Subsequently, after investment approval the scope of work including the reactors has been also circulated to the constituents. CTU requested for approval for usage of 2x63 MVAR reactors at



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Sohawal after being spared from Lucknow. It was informed that the same has been commissioned.

32.3 Members agreed the same.

**33.0 Revocation of 850 MW Connectivity granted to M/s GVK Ratle Hydro Electric Project Pvt. Ltd (GVKRHEPPL)**

33.1 CTU stated that GVK Ratle Hydro Electric Project Pvt. Ltd. was granted connectivity for 850MW power vide letter dated 16.12.2013. Further, LTA for transfer of 690MW power was also granted to GVK Ratle Hydro Electric Project Pvt. Ltd. vide letter dated 03.02.2014. Subsequently, LTA was revoked vide letter dated 30.11.2017 due to failure of M/s GVKRHEPPL to sign the LTA agreement. Notice for revocation of 850MW Connectivity granted to M/s GVKRHEPPL was also served vide the above referred letter,

33.2 CTU added that M/s GVKRHEPPL vide letter dated 09.12.2017 has informed that project works has been suspended and PPA with PDD J&K Govt. has been terminated and the matter is pending for adjudication. The implementation activities at site are in stand still condition.

33.3 Keeping above in view, CTU proposed that the connectivity granted to M/s GVK Ratle Hydro Electric Project Pvt. Ltd (GVKRHEPPL) vide intimation dated 16.12.2013 may be revoked with immediate effect on account of insufficient progress.

33.4 Members agreed with CTU proposal for closure of connectivity granted to M/s GVK Ratle Hydro Electric Project Pvt. Ltd (GVKRHEPPL).

**34.0 2 nos. of 220kV bays at 400/220kV, 4x315MVA Abdullapur (PG) Substation**

34.1 CTU stated that 2 nos. of 220kV bays at 4x315MVA, 400/220kV Abdullapur (PG) Substation were agreed in 39<sup>th</sup> meeting of SCSPNR held on 29-30<sup>th</sup> May, 2017. The bays shall be used for feeding the proposed 220kV Substation at Rajhokheri. Further, during 37<sup>th</sup> meeting of Empowered Committee on Transmission held on 20.09.2017, it was decided to implement the above bays through TBCB route. Subsequently, HVPNL vide letter no. 15/cw-579 dated 29.05.2018 requested the shifting of this matter back to standing committee considering the construction of 220kV Substation at Rajokheri is of utmost importance.

34.2 CEA stated that the MoP vide Gazette notification dated 4<sup>th</sup> May, 2018 has appointed REC as the Bid Process Coordinator for the scheme NRSS-XL, which inter-alia includes the implementation of 2 nos. of 220kV bays at 400/220kV Abdullapur (PG) Substation.

34.3 HVPNL stated that the bays would be required in time frame of Nov 2019. Members were of the opinion that small schemes like implementation of bays need not be implemented through tariff based competitive bidding route.

34.4 After deliberations, CEA/CTU agreed that while preparing the inputs for bidding documents of the scheme, the completion schedule of November 2019 would be mentioned for 2 nos. of 220kV bays at 4x315MVA, 400/220kV Abdullapur (PG) Substation.

**35.0 High Voltage at Agra**



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**35.1** CTU stated that Agra is connected to Bishwanath Chariyali and Alipurduar in North Eastern Region through high capacity HVDC link and to Northern/Western region grid through various other 765kV links. Details of the same is given below:

- i) Agra – Gwalior 765kV D/c line
- ii) Agra – Fatehpur 765kV D/c line
- iii) Agra – Jhatikara 765kV S/c line
- iv) Agra – Aligarh 765kV S/c line
- v) +/- 800KV HVDC Bipole link between Agra – Alipurduar -Bishwanath Chariyali MTDC Link

**35.2** CTU further stated that Agra is also connected to Northern Grid through number of 400kV AC links. +/- 800kV HVDC Bipole link between Agra–Alipurduar-Bishwanath Chariyali MTDC Link is an important link for import/export of power to/from NR. Agra 765 & 400kV bus experiences very high voltage during various operating conditions. This result in operational problem associated with HVDC Bipole. Therefore, for smooth and reliable operation of HVDC Bipole, 1 Nos. of TCR (Thyristor Controlled Reactors) of capacity 500 MVAR is proposed to be installed at Agra 400 kV bus.

**35.3** After deliberations, it was decided that studies need to be done for the above proposal and the same would be discussed the next Standing Committee Meeting.

### **36.0 Downstream network by State Utilities from ISTS Stations**

**36.1** CEA 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. CEA requested STUs to implement the 220kV system for proper utilization of the line bays. The status of downstream network as furnished by STUs is as under:

S. No	Substation	Downstream network requirement	Downstream network	Status as given by STUs
1	400/220kV , 3x315 MVA Samba - Commissioned	2 nos. bays utilized under ISTS. Balance 4 Nos to be utilized	LILO of 220kV Bishnha – Hiranagar D/c line under PMDP scheme	PDD, J&K informed that -LoA has been issued and Material has reached the site. Target Completion is – Nov'18
2	400/220kV, 2x315 MVA New Wanpoh - Commissioned	6 Nos. of 220 kV bays to be utilized	220kV New Wanpoh –Mirbazar D/c line	PDD, J&K informed the Completion schedule as Dec'18
3	400/220kV, 2x315 MVA Parbati Pooling Station - Commissioned	2 Nos. of 220 kV bays to be utilized.	220kV Charor-Banala D/c line (18km)	HPSEBL informed the Completion schedule as Sept'18
4	400/220kV, 2x500 MVA Kurukshetra	8 nos. of 220 kV bays to be utilized	LILO of one circuit of Kaul-Pehowa	HVPNL informed that the work awarded on

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S. No	Substation	Downstream network requirement	Downstream network	Status as given by STUs
5	(GIS) - Commissioned  400/220kV, 2x500 MVA Bagpat GIS - Commissioned	3 nos. of 220 kV downstream lines to Shamli, Muradnagar and Bagpat commissioned. Balance 5 Nos. of 220 kV bays to be utilized	220kV D/C line	12.03.2018.
			LILO of one circuit of Kaul-Bastara 220kV D/C line	Completion schedule - March 2019.
			220kV D/C line to Salempur with HTLS conductor equivalent to twin moose	HVPNL informed that price bid opened on 30.03.2018 and likely to be awarded by 30.06.2018. -Likely to be completed by 31.12.2018.
			Bagpat- Baraut 220kV S/C Line	UPPTCL stated that there is severe RoW issue.
6	400/220 kV, 2x315 MVA Saharanpur - Commissioned	2 nos. 220 kV downstream lines commissioned. (Saharanpur (UP) and Nanauta) Balance 4 Nos. of 220 kV bays to be utilized	LILO of 220 kV Muradnagar II -Baghat (PG) at Baghat UP	UPPTCL informed the Completion schedule as Oct'18
			Baghat(PG)- Modipuram New 220kV D/c	UPPTCL informed the Completion schedule as Oct'18
7	400/220kV, 2x315 MVA Dehradun - Commissioned	Out of 6 bays, only two bays used. Balance 4 bays to be utilised.	LILO of 220 kV Khara- Shamli at Saharanpur PG	Commissioned
			Saharanpur(PG)- Sarsawa (new) 220kV D/C	Commissioned
			2 bays for 220 kV Dehradun – Jhajra line	PTCUL to provide the details
8	400/220 kV, 2x315 MVA Sohawal - Commissioned	6 Nos 220 kV bays to be utilized.	One bay for proposed Naugaon S/s	
			2 bays for proposed S/s at Selakui	
			2 nos of bays utilized for Sohawal 220kV UP	UPPTCL informed following:
			2 nos for Barabanki 220 kV s/s	Commissioned April' 18
			2 nos of bay of	Severe RoW at several

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S. No	Substation	Downstream network requirement	Downstream network	Status as given by STUs
			utilized for 220kV New Tanda-Sohawal line	locations
9	Shahjahanpur, 2x315 MVA 400/220 kV - Commissioned	Partially utilized. Balance 5 Nos. of 220 kV bays to be utilized.	One bay used for 220 kV Shahjahnpur-Hardoi line	Commissioned
			2 no of bays for 220kV Shahjahnpur - Azizpur D/c line	planned
10	02 nos. bays at Moga - Commissioned	Partially utilized. Balance 2 nos. of 220kV bays to be utilized.	Moga-Mehalkalan 220kV D/c line	Work completed. Forest case approved. But commissioning pending due to tree cutting

- Hamirpur 400/220 kV 2x 315 MVA Sub-station (Augmentation by 3x105 MVA ICT) - To be completed by Sep'18
- 04 nos. 220 kV downstream lines commissioned under Dehan - Hamirpur ISTS. Balance two 220kV D/c line bays to be utilised by HPSEBL
- 11
- Kaithal 400/220 kV 1x 315 MVA Sub-station (Commissioned)
- 220kV Kaithal(PG)-Neemwala D/C line of Transformer from and Ballabgarh). Neemwala
- 12
- Sikar 400/220kV 1x 315 MVA S/s - Commissioned
- 2 Nos. of 220 kV bays
- 13
- 400/220kV Kota 1 No. of 400 kV Bay - Commissioned for Anta-Kota 400 kV S/c line of RRVPNL
- 1 No. of 400 kV Bay Anta-Kota 400 kV S/c line
- 14
- HPPTCL informed that earlier 2 nos. of bays were planned to be utilised for connecting 220/132kV Kangoo substation by HPSEBL. Presently, HPPTCL is implementing Dehan - Hamirpur 220kV D/c line with commissioning schedule as April 2020
- HVPNL informed following:  
-Work awarded on 08.06.2018.  
-Tentative completion date is 31.12.2019.  
RRVPNL representative stated that studies would be conducted to formulate how bays could be utilized.
- RRVPNL informed following:  
Work completed. Final patrolling of the line work completed. All formalities for line charging has been

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S. No	Substation	Downstream network requirement	Downstream network	Status as given by STUs
15	Bhiwani 400/220kV S/s - Commissioned	6 nos. of 220kV bays	220kV D/C line Bhiwani to 220kV S/stn. HVPNL Isherwal	completed and line is ready for charging. informed from PGCIL following: The tender is dropped and fresh tender enquiry will be floated shortly. Likely to be completed by 31.12.2019.
16	Jind 400/220kV S/s - Commissioned	6 nos. of 220kV bays	220kV D/C line Narwana - Mund line at 400kV S/stn. Khatkar (PGCIL Jind)	

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

Sl. No.	Name of Substation	Expected Schedule	Downstream connectivity	Status as given by STUs
1	400/220kV, 4x500MVA, Dwarka-I GIS	Oct'18	i) 2x 160MVA , 220/66kV transformers	Being implemented by DTL. Expected by 2021-22.
			ii) 2x 160MVA , 220/66kV transformers	Future.
			iii) 220kV Dwarka-Papankalan- III, Ckt.1	Loop- in- Loop -out of 220kV Papankalan-III – Naraina & Papankalan-I line is undertaken by Powergrid as a deposit work of DTL.
			iv) 220kV Dwarka-Papankalan- III, Ckt.2	
			v) 220kV Dwarka-Papankalan- I, Ckt.	
			vi) 220kV Dwarka-Naraina, Ckt.	Expected along with charging of 400kV ISTS.
			vii) 220kV Dwarka-Budella D/c line (1200 sq.mm U/G)	Being undertaken by DTL . Work awarded. Expected by 2019-20.
			viii) 220kV Dwarka-	Being implemented by

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Sl. No.	Name of Substation	Expected Schedule	Downstream connectivity	Status as given by STUs
			Papankalan I D/c line (2000 sq.mm U/G)	DTL. Scheme under preparation. Expected by 2021-22.
			ix) 220kV Dwarka-Papankalan II D/c line (2000 sq.mm U/G)	Being implemented by DTL. Scheme under preparation. Expected by 2021-22.
2	400/220kV, 4x500MVA, Tughlakabad GIS	Oct'18	i) LILO of Badarpur TPS – Mehrauli 220kV D/c line at Tughlakabad ii) Okhla – Tughlakabad 220kV D/c line iii) Masjid Moth – Tughlakabad 220kV D/c line iv) Tughlakabad - R.K.Puram (U/G Cable) 220kV D/c line	DTL informed that eleent mentioned at (i) and(ii)are being undertaken by Powergrid as a deposit work of DTL and are expected along with charging of 400kV ISTS. The element (iii) & (iv) would be implemented by DTL. Scheme under preparation. Expected by 2020-21.
3	220/66kV, 2x160MVA, Chandigarh GIS	Feb'19	8 nos. of 66kV bays.	No representative was present from UT of Chandigarh
4	400/220kV, 2x315MVA, Jauljivi GIS	Dec'2019	2 bays for 220kV AlmoraJauljibi line 2 bays for 220kV Brammah-Jauljibi line	PTCUL to provide the details
5	400/220kV, 2x500MVA, Sohna Road Sub-station (TBCB)	May'19	8 nos. of 220kV bays. Creation of LILO of both circuits of 220kV D/C Sector-69 Roj Ka Meo line at 400kV Sohna Road, Gurugram with Single Moose ACSR Conductor Creation of LILO of both circuits of 220kV D/C Badshahpur-Sec-77 line at 400kV Sohna Road, Gurugram with 0.4 sq. inch AL-59 Conductor	Under survey – as informed by HVPNL
6	400/220kV,	May'19	8 nos. of 220kV bays.	HVPNL informed

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Sl. No.	Name of Substation	Expected Schedule	Downstream connectivity	Status as given by STUs
	2x500MVA, Prithla Sub-station (TBCB)		LILO of both ckt of 220kV D/C Ranga Rajpur – Palwal line	following: -NIT floated on 21.05.2018. -Likely date of award by Oct'18 -Tentative completion by Mar'20
			220kV D/C for Sector-78, Faridabad	HVPNL informed following: -NIT likely to be floated by Jun'18. -Tentative completion by Sept'19
7	400/220kV, 2x500MVA, Kadarpur Sub-station (TBCB)	May'19	8 nos. of 220kV bays.	HVPNL informed that downstream line of 400kV S/stn. Kadarpur could not be envisaged by TS wing due to non-finalization of Kadarpur sub-station site by M/s Sterlite.
8	400/220kV, 2x315MVA, Kala Amb GIS (TBCB)	Commissioned	HPSEBL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s. Details for remaining 4 nos. of line bays may be provided.	HPPTCL informed that they have planned 220kV Kala Amb- Trilokpur 220kV D/c line. the site for the substation has been identified
9	400/220kV, 2x315MVA, Amargarh GIS (TBCB)	(commissioned)	LILO of 220kV D/c Zainkote - Delina line at Amargarh	. Erection of towers completed: 13, Stringing work completed but line yet not charged.

### 37.0 Proposal to connect Lalitpur TPS with 765 kV PGCIL substation Bina through 765 kV line for stability- Prposal by UPPTCL

37.1 UPPTCL stated that following evacuation system was approved in 32<sup>nd</sup> meeting of SCSPNR held on 31-08-2013 for 3x660 MW Lalitpur Thermal Power Station:

- i) Generation at 765 kV & 765/220 , 2x315 MVA Transformers (by Developer)
- ii) Lalitpur TPS-Agra(UP) 765 kV 2xS/C line- 400 Km each (with 50% series compensation)



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- iii) Agra-Agra(PG) 400 kV one ckt LILO at Agra(UP)
- iv) Agra-Moradnagar 400 kV S/C line LILO at Agra(UP)
- v) LILO of Agra - Moradnagar 400 kV S/C line at Math
- vi) Agra-Math 400 kV S/C line
- vii) Agra(UP)-Agra South 400 kV D/C line
- viii) LILO of Jabalpur-Orai 765 kV S/C Inter-State Transmission (ISTS) Line at Lalitpur TPS to provide stable operation of plant.
- ix) Lalitpur TPS-Jhansi 220 kV D/C line

**37.2** UPPTCL said that the LILO of Jabalpur-Orai 765 kV S/C line, referred above was however cancelled later by PGCIL due to long LILO length. Thus the generator is presently evacuating power in radial mode. The distance from plant to Agra (765kV) substation was reduced from 400 km to 335 km using RoW of Madhya Pradesh. Under normal conditions, the plant is evacuating power on radial mode satisfactorily mainly on Lalitpur-Agra 765 kV 2xS/C lines and partially on 220 kV lines to Jhansi and Lalitpur substation.

**37.3** UPPTCL further stated that area through which Lalitpur-Agra 765 kV line is traversing is prone to high winds and storm and recently both 765 kV S/C lines tripped jeopardizing evacuation. To prevent any effect on generation due to any disturbance on 765 kV lines, it is felt necessary that such large capacity generators should be anchored with a nearby strong grid substation. The plant is located in a chicken-neck area and there does not exist any intra-state 765kV / 400 kV grid substation. Creation of 400 kV level at Lalitpur TPS and construction of Parichha-Lalitpur 400 kV D/C line about 100 Km was also considered, but the line survey carried out suggested that it would not be constructed due to lot of city area and forest etc. on way. Connection of Lalitpur TPS with Bina 765 kV PGCIL S/S located at a shorter distance of 60-70 km through 765 kV lines appear to be quite suitable and was deliberated in 39<sup>th</sup> meeting of SCSPNR and also in meetings at Lucknow. Bina PGCIL substation being in other state, the construction of lines could preferably be done under ISTS. The acceptance has somehow not materialized in spite of its merit of plant needing anchoring and access to strong grid and help in reduction of WR-NR congestion. To obviate any commercial issues arising due to construction under ISTS, UPPTCL alternatively proposed to construct the line under intra-state scheme. Considering commitment by U.P. Govt. for power for all, the uninterrupted supply from generators needs to be ensured all time. Hence following 765 kV line along with bay is proposed:-

- i) Lalitpur TPS-Bina (PGCIL) 765 kV DC line- 70 Km (To be constructed by UPPTCL).
- ii) 765 kV Bays at 765 kV Bina (PGCIL) Substation- 2 nos (To be constructed by UPPTCL).

**37.4** CEA stated that under the transmission plan for evacuation of power of about 4000 MW from proposed Solar pParks in Bundelkhand area, UPPTCL has proposed Jakhora (Lalitpur)- Gurusaraii-Maipuri 765 kV link. The same could be taken up earlier by UPPTCL for providing additional connectivity to Lalitpur.

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**37.5** UPPTCL stated that Jakhora (Lalitpur)–Gurusarai- Maipuri 765 kV link would be 300 km in length and it would involve many RoW issues. Lalitpur-Bina 765 kV interconnection is a shorter link and could be implemented in a shorter timeframe and UPPTCL is ready to construct the line. He requested committee members to consider the proposal.

**37.6** The matter was deliberated and it was noted that the Lalitpur TPS-Bina (PGCIL) 765 kV D/C line would be an inter-state / inter-regional line, hence cannot be implemented by UPPTCL as an intra-state transmission system. In case of outage of Lalitpur-Agra 765 kV 2xS/C lines, Lalitpur power would be evacuated through WR-NR inter-regional links, which would effect the WR-NR ATC and may lead to congestion in the corridor. It was decided that issue to provide additional anchoring to Lalitpur TPS could be further deliberated separately with CEA, CTU, UPPTCL and POSOCO.

### **38.0 Transmission elements under construction by RRVPNL:**

**38.1** RRVPNL informed that following elements are under construction by RRVPNL under intra-state Transmission system:

- i) 400 kV Ramgarh-Bhadla D/C(Twin Moose) line (160km) alongwith 2x50MVA line Reactor
- ii) 400 kV D/C line (195 km) from Bhadla 400/220 kV Pooling Station to LILO point at 400kV S/C Jodhpur-Merta line (Twin Moose) alongwith 2x50MVA line Reactor at Bhadla
- iii) 400 kV Akal-Jodhpur (New) D/C line (Quad Moose) (240 km) along with 2x50 MVAR, 400 kV Shunt Reactor (line type) at 400 kV GSS Jodhpur (New)
- iv) 400 kV bays at Jodhpur (New) for LILO of one ckt. of 400 kV D/C Raj West LTSPS-Jodhpur line
- v) 1x125 MVAR, 400 kV Shunt Reactor (Bus type) at 400 kV GSS Barmer
- vi) The augmentation of transformer capacity to 2000MVA [1X500 + (3x500-3x315) MVA] was approved at 400kV Akal GSS. However, due to space constraint only two 315 MVA transformers would be replaced by two 500MVA transformers and total installed capacity at Akal would be 1815MVA (3x500 MVA+ 1x315MVA).
- vii) The already procured 500MVA transformer for 400kV GSS Akal would be installed at 400kV GSS Jodhpur (New) [Kankani]. The installed capacity of Jodhpur (New) would be 815MVA; (1x500 MVA+ 1x315MVA) instead of 630MVA; 2x315MVA). The second 1x315 MVA transformer at Jodhpur new would be installed at 400kV GSS Hindaun
- viii) In view of increased transformation capacity at Jodhpur (New), the installation of 3<sup>rd</sup> transformer at 400kV GSS Jodhpur (Soorpura) is dropped and the installed capacity at 400kV GSS Jodhpur (Soorpura) will remain as 630MVA; (2x315MVA)

Members noted the same.

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**39.0 Various LTA/ Connectivity applications discussed in 12<sup>th</sup> Connectivity/Long-Term Access meeting of Northern Region held along with 40<sup>th</sup> SCM of NR.**

Connectivity and Long Term Access (LTA) applications from various applicants were discussed and agreed during 12th Connectivity/ Long-Term Access meeting of Northern Region held along with the 40th meeting of SCSPNR. The detailed Minutes for the same are being issued by CTU separately.

Meeting ended with thanks to the chair.

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Annexure-I**List of Participants of the 40<sup>th</sup> Meeting of Standing Committee on Power System Planning of Northern Region held on 22.6.2018**

<b>Sl. No.</b>	<b>Name Shri/Smt</b>	<b>Designation</b>
<b>I CEA</b>		
1.	P.S. Mhaske	- Member (Power System)
2.	Ravinder Gupta	- Chief Engineer, (PSPA-I)
3.	Awdhesh Kumar Yadav	- Director (PSPA-I)
4.	Manjari Chaturvedi	- Dy. Director
5.	Vikas Sachan	- Asstt. Director
6.	Jitesh Srivas	- Assistant Director
7.	Kanhaiya Singh Kushwaha	- Assistant Director
8.	Vikas Kumar Sahu	- Senior Engineer
<b>II NRPC</b>		
9.	M.A.K.P Singh	-Member Secretaty
<b>III CTU/POWERGRID</b>		
10.	Subir Sen	-COO (CTU-Plg & SG)
11.	Mukesh Khanna	-GM (CTU-Plg.)
12.	Jyoti Prasad	-DGM
13.	V.M.S. Prakash	-Dy. Mgr. (CTU-Plg.)
14.	Rajesh Verma	-Chief Manager
15.	Yatin Sharma	-Engineer
16.	Dibyendu Khan	-Engineer
<b>IV NLDC/POSOCO</b>		
17.	H.K. Chawla	-DGM
18.	N. Nallarasam	-DGM
19.	Rahul Chakrabarti	-Dy. Manager
20.	Phanisankar Chilukuri	-Senior Engineer
<b>V HSIIDC</b>		
21.	M.K. Vats	-SE/Electrical

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**VI THDCIL**

22. U.C. Kannaujia -GM (NCR)  
 23. S.V. Appa Sarma -Consultant  
 24. Manoj Sardana -AGM  
 25. Sudesh Gora -Sr. Engr.  
 26. Vishalakshi Malor -Jr. Engr.

**VII HVPNL**

27. J.K. Juneja -Consultant planning  
 28. M.M. Matta -SE

**VIII PTCUL**

29. Sanjay Mittal -Director (Projects)  
 30. Vikas Sharma -SE (C&R)  
 31. Himanshu Baliyan -Ex. Engr  
 32. Kamal Kant -C.E.  
 33. Sachin Rawat -S.E.  
 34. Ashok Kumar -S.E.  
 35. H.S. Hyanki -S.E.

**IX NTPC**

36. Subhash Thakur -Adl. GM (PE-E)

**X HPPTCL**

37. Kaushalesh Kapoor -GM  
 38. Sandeep Sharma -DGM (Planning)

**XI HPSEBC**

39. Ajay Sharma -Sr. Xen (SP)

**XII S&O POO/**

40. Muzafar Mattu -C.E.

**XIII PSTCL**

41. A.K. Kapoor -Director/Tech.

**XIV SJVN**

42. Pramod Behera -Dy. Manager  
 43. Chandan Mehta -Manager

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**XV CHENAB VALLEY**

44. Amrik Singh -CE

**XVI DTL**

45. Prem Prakash -Director

46. H.Vyas -Executive Director (T)

47. Birendra Prasad -GM

48. S.K. Sharma -GM

49. R.S. Meena -Dy. GM(T)

50. B.L. Gujar -DGM(T)

51. Paritosh Joshi -Mgr (T)

**XVII UPPTCL**

52. Suman Guchh -Director (Comml. &amp; Planning)

53. Neeraj Swaroop -SE

54. Satyendra Kumar -EE

**XVIII N.C. Railway**

55. Suresh Chandra Tiwari -Dy. CE

**XIX RVPNL**

56. B.P. Sharma -CE (PP&amp;D)

57. V.A. Kale -Xen (Automation)

58. Anjana Agrawal -Executive Engineer (Plan)

**XX GMR Bajoli**

59. Ajaya Kumar Nathani -Head Trans

60. G. Murali Dhar Gupta -AGM

**XXI DFCCIL**

61. S.K. Gupta -GGM/EL

62. Pradeep Bhatt -Manager

**XXII REMCL**

63. Dr. N.S. Saxena -Expert

**XXIII HPPCL**

64. Bipan Guleria -Sr. Manager

**XXIV HMEL**



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- |     |                 |              |
|-----|-----------------|--------------|
| 65. | K.K. Singh      | -CE/Engineer |
| 66. | Saurabh Kapoor  | -DGM         |
| 67. | Vipin Kumar     | -DM          |
| 68. | Gurminder Singh | -Manager     |

**XXV EIL**

- |     |                 |          |
|-----|-----------------|----------|
| 69. | Sunita Anand    | -CGM     |
| 70. | Virendra Tiwari | -Manager |

**XXVI LANCO**

- |     |                   |            |
|-----|-------------------|------------|
| 71. | Gyanesh Shukla    | -DM        |
| 72. | Gurminder Singh   | -Sr. DGM   |
| 73. | B.B. Bhattacharya | -Head-Tech |

Annexure-II


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**Corrigendum to Minutes of 39<sup>th</sup> Meeting of  
Standing Committee on Power System Planning in Northern Region (SCPSPNR)  
held on 29-30<sup>th</sup> May, 2017 at NRPC, Katwaria Sarai, New Delhi**

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The minutes of 39<sup>th</sup> meeting of the Standing Committee on Power System Planning of Northern Region were issued vide 1/9/38/2016/PSP&PA-I/783-802 dated 28<sup>th</sup> July, 2017. RRVPNL, PTCUL, POWERGRID, HVPNL and PSTCL had given observations on the minutes. Following corrigendum is issued based on the observations/Comments received from RRVPNL, PTCUL, POWERGRID, HVPNL and PSTCL:

1. RRVPNL vide their letter RVPN/SE(P&P)/XEN-2(P&P)/AE-2/F/D825 dated 7.9.2017 has given observations on item no.27 and 37 of the minutes of 39<sup>th</sup> Meeting of SCPSPNR held on 29-30<sup>th</sup> May,2017

**Corrigendum-I #1:****27.0 Reactive Power Compensation Requirement Studies in Northern Region and High voltage at Kurukshetra**

In the minutes of 39<sup>th</sup> meeting of SCPSPNR following has been mentioned under Item No. 27.7:

.....However, RRVPNL mentioned that they would take up implementation of 220 kV reactors at Akal and Suratgarh in first phase. The second reactor as proposed at Bikaner and Barmer would be considered in the second phase. They would apply for PSDF funding for installation of these reactors.

The above sentences of the minutes under Item No. 27.7 are replaced as:

.....*However, RRVPNL mentioned that they would take up implementation of one 220 kV reactor each at Akal, Suratgarh, Bikaner and Barmer (already approved & under process) in first phase. The second reactor as proposed at Bikaner and Suratgarh would be considered in the second phase. They would apply for PSDF funding for installation of these reactors.*

**Corrigendum-I# 2**

In the minutes of 39<sup>th</sup> meeting of SCPSPNR following has been mentioned under Item No. 37.3:

37.3 POWERGRID stated that they would try to complete the 400kV bays at Bhinmal (May 2018) and Sikar(October 2018) in the matching time frame on best effort basis.

The above para of the minutes is replaced as:

*37.3 POWERGRID stated that they would try to complete the 400kV bays at Bhinmal (May 2018) and Sikar(October 2017) in the matching time frame on best effort basis.*

2. PTCUL vide their letter no 1596/Dir.(Projects)/PTCUL/CEA dated 17-08-2017 had given observations regarding Item no: Para 24.7(ii) and 43.3(ii) of the minutes of 39<sup>th</sup> meeting of SCPSPNR:

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**Corrigendum-I# 3**

In the minutes of 39<sup>th</sup> meeting of SCSPNR following has been mentioned under Para 24.7(ii) and 43.3(ii):

Srinagar (HEP)–Srinagar (PTCUL) 400kV D/c is neither required for affecting the connectivity of any project in Alaknanda basin nor for evacuation of power, hence should not be included under UITP.

Item no: 24.7(ii) and 43.3(ii) of the minute of the meeting of 39<sup>th</sup> SCSPNR may be read as:

*In view of delay in implementation of the envisaged projects in Alaknanda basin, Srinagar (HEP)–Srinagar (PTCUL) 400kV D/c line along with Srinagar 400/220kV Substation (part of UITP Scheme) at present is facilitating Uttarakhand to draw their share of free power from Vishnuprayag and Srinagar HEP.*

3. POWERGRID vide their letter C/CTU/N/02 dated 31.8.2017 has given observations on the item no 26 &27 of the minutes of 39<sup>th</sup> Meeting of SCSPNR held on 29-30<sup>th</sup> May,2017:

**Corrigendum-I# 4**

In the minutes of 39<sup>th</sup> meeting of SCSPNR following has been mentioned under Item no 26.11(ii)

(ii) Combination of AIS and GIS (mainly GIS ducts) shall be used for implementation as per the site conditions. Further, in the bypass arrangement, wherever possible, provision may be kept to bring back the system to original configuration, in case of contingency or system requirement.

Item no. 26.11(ii) of the minutes is modified as follows:

*(ii) Combination of AIS and GIS (mainly GIS ducts) shall be used and shifting/reorientation works inside substations may be carried out to accommodate the splitting/bypass arrangements for implementation as per the site conditions. Further, in the bypass arrangement, where ever possible, provision may be kept to bring back the system to original configuration, in case of contingency or system requirement.*

**Corrigendum-I# 5**

Under item no. 27, installation of 2x25 MVAR bus reactors at 220kV level was agreed at 400/220kV Maharani Bagh S/s alongwith the reactive compensation at other substations. It was also agreed that these reactors shall be provided by the owner of the substation. Since 220kV bus of 400/220kV Maharani Bagh S/s is operated and controlled by DTL, therefore 2x25 MVAR bus reactors at 220kV of bus are to be installed by DTL.

4. HVPNL vide their letter no, Ch-10/HSS-152/Vol-19 dated 30.8.2017 has given the observations on SI no. 2 of Item no:20 'Operational feedback' and Item no. 26 'Study to limit high Short Circuit level of various Substations in NR (Phase 2):

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**Corrigendum-I#6**

In the minutes of 39<sup>th</sup> meeting of SCSPNR following has been mentioned under SI no. 2 of Item no:20 'Operational feedback':

S. No	Corridor	Season/ Antecedent Conditions	Constraints	Deliberations in the 39 <sup>th</sup> meeting of SCSPNR
2	400kV Mahendragarh-Dhanonda D/C	All time	Remarks: High Loading was observed during to less/outage of generation at CLP Jhajjar (35% of time, generation was under outage & 30% of time under less generation.	The line is a 5 km quad line, but the switchgears at both the ends are of 2000A, therefore, upgradation of switchgear should be taken up by HVPNL. HVPNL was requested to carry out the upgradation works at the earliest. HVPNL informed that the average load of about 700 MW (each ckt) is continuously running on the said line. However, agreed for carrying out the equipment upgradation at both the sub-stations.

The above item of the minutes is modified as follows:

S. No	Corridor	Season/ Antecedent Conditions	Constraints	Deliberations in the 39 <sup>th</sup> meeting of SCSPNR
2	400kV Mahendragarh-Dhanonda D/C	All time	Remarks: High Loading was observed during to less/outage of generation at CLP Jhajjar (35% of time, generation was under outage & 30% of time under less generation.	The line is a 5 km quad line, but the switchgears at both the ends are of 2000A, therefore, upgradation of switchgear should be taken up by HVPNL. HVPNL was requested to carry out the upgradation works at the earliest. HVPNL informed that the average load of about 700 MW (each ckt) is continuously running on the said line. However, HVPNL agreed for carrying out the equipment upgradation at Dhanonda sub-station and the funding for the same may be got explored from PSDF.

**Corrigendum-I#7**

In the minutes of 39<sup>th</sup> meeting of SCSPNR following has been mentioned at Para no. 26.11(b) (ii) 12ohm Series Line reactors in Mohindergarh–Dhanonda 400kV D/c line Ckt I & II at Dhanonda end (To be implemented by HVPNL / POWERGRID)

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Para no. 26.11(b) (ii) of the minutes is modified as follows:

*(ii) 12ohm Series Line reactors in Mohindergarh–Dhanonda 400kV D/c line Ckt I & II at Mohindergarh end (To be implemented under ISTS)*

5. PSTCL vide their letter dated 17.11.2017 has given the observation on item no 27.10 of the minutes of 39<sup>th</sup> meeting that the additional 125 MVAR bus reactor is not required at 400kV Nakodar in view of existing 80MVAR bus reactor at this substation and only 1no. of 220kV 25 MVAR bus reactor persists for this substation.

**Corrigendum-I#8**

*Installation of 125 MVAR bus reactor at 400kV Nakodar(Punjab) is deleted from Sl.No 8 of table for 400kV Bus reactor mentioned under item no 27.14(b) of the minutes of 39<sup>th</sup> meeting of SCPSNR.*

**Annexure-III****List of Major Hydro Projects Upstream of Shongtong HEP**

1. Jhangi Thopan and Thopan Powari (960 MW) : Allotment of Project is expected during Current Year and commissioning is expected by 2029-30
2. Tidong –II (90 MW) : Awarded to Gammon India and is expected by 2027-28
3. Khab (636 MW) : No Planning as of now.
4. Yangthang – Khab (261 MW): Allocated to Gammon India, however they have given a request to HP for surrendering the project.
5. Ropa (205 MW) : Bids were invited, however no response received
6. Chango Yangthang (140 MW): Allocated to Bhilwara Group, however they have given a request to HP for surrendering the project.
7. Lara Sumte (104 MW) and Sumte – Khatang (130 MW) : Bids were invited, however no response received
8. Killing Lara (40 MW), Mane-Nadang (70 MW) and Lara (60 MW) : Projects dropped for the time being



**Annexure-IV**

The updated Schemes under Intra State Green Energy Corridor-I planned for evacuation of Renewable energy addition in Rajasthan is as follows:

**(i) under implementation:**

S.No	Name of the Scheme	Route Length (in km)	Estimated Cost (excluding IDC) (in Rs. Lacs)	Estimated Cost (including IDC) (in Rs. Lacs)
1	400/220 kV, 2x500 MVA GSS at Jaisalmer-2 alongwith 1x125 MVAR, 400 kV Bus Type Reactor	—	15030.74	19379.76
2	400 kV D/C Jaisalmer (2)-Barmer line (Twin Moose)	130	10469	13498.12
3	400 kV D/C Barmer-Bhimnal(PGCIL) line (Twin Moose)	140	11204	13902.43
4	400 kV Terminal Bay Equipment at 400/220 kV GSS Barmer (for termination of 400 kV D/C Jaisalmer (2) - Barmer line at Barmer end)	—	2807.02	3619.21
			<b>0</b>	<b>0</b>

**(ii) Scheme in lieu of deferred transmission elements:**

S.no	Name of proposed transmission scheme	Estimated Cost (excluding IDC) in lakhs
<b>A.</b>	<b>Augmentation at various EHV substations</b>	
(i)	Augmentation at 400 kV GSS Akal (+ 3X500 MVA & (-) 3X315 MVA, 400/220 kV)	4617.75
(ii)	Augmentation at 220 kV GSS Bhadla (+ 40/50 MVA (-) 20/25 MVA, 132/33 kV)	180.73
(iii)	Additional 1X160 MVA transformer at 220/132 kV GSS Kanasar with HV& LV bays	729.63
<b>B</b>	<b>220 kV GSS Chhatargarh along with associated lines.</b>	
(i)	220/132 kV, 160 MVA GSS at Chhatargarh (Upgradation)	2691.95
(ii)	100 km 220 kV D/c line from 220 kV GSS Gajner to proposed 220 kV GSS Chhatargarh	4830.00
(iii)	77 km 132 kV D/c line from proposed 220 kV GSS Chhatargarh to existing 132 kV GSS Loonkarnsar	2280.20
<b>C</b>	<b>New sub-transmission system for evacuation of power from new solar and wind power plants in Western Rajasthan</b>	
(i)	75 km 220 kV D/c Akal-Jaisalmer 2 line	3599.00
(ii)	2 nos. 220 kV feeder bays at 400 kV GSS Jaisalmer-2	147.60
(iii)	LILO of one circuit of 400 kV D/c Akal-Jodhpur (new) line at 400 kV GSS Jaisalmer-2 (appx. 10 km)	2117.40
(iv)	1 no. 400 kV Quad Moose feeder bay at 400 kV GSS	685.90

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	Jaisalmer-2 with additional hardware for conversion of one 400 kV twin moose bay to quad moose bay	
	Grand Total	21880.19