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भारत सरकार

**Government of India**

विद्युत मंत्रालय

**Ministry of Power**

केन्द्रीय विद्युत प्राधिकरण

**Central Electricity Authority**

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

**Power System Planning & Appraisal-I Division**

To

-As per list enclosed-


विषय: उत्तरी क्षेत्र की ट्रांसमिशन पर स्थायी समिति की तृतीय बैठक के विषय में

**Subject: 3rd meeting of Northern Region Standing Committee on Transmission (NRSCT) – Minutes of Meeting**

Sir/ Madam,

3<sup>rd</sup> meeting of Northern Region Standing Committee on Transmission was held on 24.05.2019 at 10:30 Hrs at NRPC, New Delhi. Minutes of meeting are available on CEA website: [www.cea.nic.in](http://www.cea.nic.in) (path to access – Home Page –Wing-Power System-PSPA-I- Standing Committee on Power System Planning- Northern region).

Yours faithfully,

  
(Goutam Roy) 17/7/2019  
Chief Engineer

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1.	Member Secretary, NRPC, 18-A ShajeedJeet 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, VidhyutBhawan, Near ISBT -Crossing, Saharanpur Road, Majra, Dehradun-248002. Uttrakhand
4.	Director (Technical), Punjab State Transmission Corporation Ltd. (PSTCL) Head Office The Mall Patiala -147001	5.	Member (Power) BBMB, Sectot-19 B Madhya Marg, Chandigarh-1 60019 (Fax-01 72-2549857	6.	Director (Operation) Delhi Transco Ltd. Shakti Sadan, Kotla Marg, New Delhi-110002 (Fax-01123234640)
7.	Director (PP&D) RVPN, 3 <sup>rd</sup> Floor, Room no 330, Vidhyut Bhawan, Janpath, Jaipur-302005.	8.	Director (Technical) HVPNL Shakti Bhawan, Sector-6 Panchkula-134109	9.	Director (Technical) HPSEB Ltd. VidutBhawan, Shimla -171004 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.	Director (Projects) POWERGRID Saudamini Plot no. 2, Sector - 29. Gurgaon-122 001 (Fax-0124-2571809)	14	CEO, POSOCO B-9, Qutab Institutional Area, Katwaria Sarai New Delhi – 110010	15	COO (CTU) POWERGRID, Saudamini, Plot no. 2, Sector -29, Gurgaon-122 001 (Fax-0124-2571809)

## Nominated members for NRSCT:

1.	Er Rajesh Gupta, Chief Engineer/ Tranmission Systems, BBMB, BBMB SLDC Complex, 66kV Subsatation , Industrial area Phase -I, Chandigarh-02	2.	Chief Engineer (PP&D), RVPN, 3rdFloor, Room No. 330, Vidyut Bhawan Janpath, Jaipur, Contact No. 0141- 2740794 (O) ce.ppm@rvpn.co.in	3.	Director (planning & Contract), Himfed Bhawan, Panjiri Shimla-171005 directorpc@hpptcl.in
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**Minutes of 3<sup>rd</sup> Meeting of Northern Region Standing Committee on Transmission held on 24.5.2019**

List of participants is enclosed as Annexure-I.

- 1.1 Confirmation of the Minutes of the 2<sup>nd</sup> meeting of Northern Region Standing Committee on Transmission held on 13.11.2018.**
- 1.2** CEA stated that the minutes of 2<sup>nd</sup> meeting of Northern Region Standing Committee on Transmission (NRSCT) held on 13.11.2018 were issued vide CEA letter no. CEA-PS-11-21(19)/3/2018-PSPA-I Division /I/3021/2018/1262-1277 dated 30.11.2018. Subsequently, HVPNL PTCUL and PSTCL has forwarded their observations on the minutes of meeting.
- 1.3** HVPNL vide their letter no. Ch – 18/HSS-152/Vol. – 21 dated 20.12.2018 had made observation regarding Point no.-2 i.e. Evolution of transmission scheme for integration of envisaged RE generation capacity in Solar & Wind Energy Zones and Transmission Schemes for Solar Energy Zones (REZS) in Rajasthan and requested to incorporate their concern in the minutes of 2<sup>nd</sup> meeting of NRSCT.

Accordingly, following is added under Para no. 2.9 of minutes of 2<sup>nd</sup> meeting of NRSCT:

*“HVPNL proposed that the cost of the transmission infrastructure created for evacuation of RE power may be taken as zero while calculating the PoC charges and Government of India may be requested to provide complete financial assistance for the said transmission infrastructure. HVPNL added that PoC mechanism is just a method of allocation of transmission charges of Inter State Transmission System (ISTS). This method is used to distribute the total yearly Transmission Charges/Monthly Transmission Charges YTC/MTC of the ISTS system amongst all the DICs. With creation of any new Interstate transmission asset the recoverable transmission cost from all the Designated ISTS Customers (DICs) shall increase, irrespective of model/mechanism/method employed for allocation amongst DICs.”*

- 1.4** CEA stated that in the previous Standing Committee meetings, it has already been clarified that Regional Standing Committee on Transmission is a technical forum for discussion and finalisation of transmission schemes. The above transmission scheme i.e “Evolution of transmission scheme for integration of envisaged RE generation capacity in Solar & Wind Energy Zones and Transmission Schemes for Solar Energy Zones (REZS) in Rajasthan” was technically agreed for evacuation of solar power from Bikaner/Bhadla/Fatehgarh Complexes. The apprehension of States with regard to impact on PoC of State Utilities with the proposed RE addition/potential SEZ was duly noted in the previous Standing Committee meetings. Also, CERC has already constituted a task force to review the PoC mechanism on request of various stake holders. Accordingly, constituents may take up the matter with appropriate forums viz. CERC. Further, as per the directive of ECT as well as the requirement of the CERC (Grant of Regulatory Approval for execution of Inter State Transmission Scheme to CTU) Regulations 2010, CTU is required to take Regulatory approval from CERC for implementation of the identified schemes.

Minutes of 3<sup>rd</sup> NRSCT held on 24.5.2019 at NRPC, new Delhi

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CTU stated that they have already filed petition with CERC seeking the regulatory approval on 09.01.2019.

- 1.5 PTCUL vide their letter 774/CE(C7R)/PTCUL/CEA dated 11.12.2018 has furnished some observation on para 4.2 of the minutes. Following mentioned under Par 4.2 of minutes of meeting:

4.2 ----- However, PTCUL observed that if power from SHP's of UJVNL is to be evacuated through 220 kV S/s Baramwari (ISTS network) then UJVNL will have to bear applicable PoC (ISTS) Charges.

The above line of the minutes is replaced with the following:

4.2 ----- *However, it is observed that if power from SHP's of UJVNL is to be evacuated through 220 kV S/s Baramwari (ISTS network) then UJVNL will have to bear applicable PoC (ISTS) Charges.*

- 1.6 PSTCL vide their letter no 710/P-I dated 6.12.2018 had requested to review the proposal of additional 1x1500 MVA (3<sup>rd</sup>) transformer at Moga 765/440kV S/s under the transmission scheme "Transmission Schemes for Solar Energy Zones (REZS) in Rajasthan". PSTCL had stated that the fault levels at Moga 400kV and 220kV have already exceeded the design limit and with the 3<sup>rd</sup> 1500 MVA (3x500 MVA) ICT, the fault level will further increase. PSTCL had suggested that 400kV Malkana S/s, which is under construction, may be considered for RE injection.

- 1.7 The request of PSTCL to review the proposal of additional 1x1500 MVA (3<sup>rd</sup>) transformer at Moga 765/440kV S/s under the transmission scheme "Transmission Schemes for Solar Energy Zones (REZS) in Rajasthan" was noted and it was agreed that the same would be deliberated as separate agenda point. The issue has been deliberated in detail at item no. 21 of the minutes.

- 1.8 Accordingly, the minutes of the 2<sup>nd</sup> NRSCT meeting along the modifications listed at 1.2, 1.4 and 1.6 were confirmed by the constituents.

## **2.0 Proposal for establishment of 765/400 kV Pooling Station at Kishtwar, J&K.**

- 2.1 CEA stated that Chenab Valley Power Projects Ltd. (CVPPL), (JV of NHPC, JKSPDC and PTC) vide their letter CVPP/P/2018/749 dated 30.01.2019 has informed that CVPPL is implementing three major HEPs viz Pakaldul (1000MW), Kiru (624 MW) and Kwar (540 MW) HEP in J&K. Works on various components of PakalDul HEP are in progress. Works of Kiru and KwarHEP are in advanced stage of tendering. The power from these projects was planned to be pooled to Kishtwar S/s, therefore CVPPL is planning for construction of dedicated transmission line from pothead yards of above HE Projects to Kishtwar Pooling Station. However, the land for 765/400 kV Pooling Station at Kishtwar is yet to be identified.
- 2.2 CEA further stated that the matter was also deliberated in 2<sup>nd</sup> meeting of NRSCT held on 13.11.2018, wherein CTU informed that CVPPL has applied for connectivity for Pakaldul HEP only and following was agreed in regard of the connectivity of Pakal Dul HEP (1000 MW):

1. Transmission system was agreed for providing connectivity to PakalDul HEP (1000

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MW):

- i) 400 kV D/c (Triple HTLS Conductor) line from PakalDul HEP–Kishtwar Switching station along with associated bays at both ends – under scope of generation developer
- ii) Establishment of 400 kV switching station at Kishtwar(GIS) by LILO one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) –under ISTS
- iii) GIS switchyard equipment, XLPE cables and other associated equipment may be designed for current carrying capacity of 4000 Amps - under scope of generation developer
- iv) 420 kV, 125 MVAR Bus Reactor at PakalDul HEP -under scope of generation developer
- v) 420 kV, 125 MVAR Bus Reactor at Kishtwar Switching Station - under ISTS
- vi) One and a half breaker switching scheme for 400kV Generation switchyard - under scope of generation developer

2.3 CVPPL informed that Connectivity to Pakal Dul HE Project (1000 MW) was already granted by CTU vide Intimation dated 17.01.2019. Further application for grant of Long term Access for Pakal Dul HE Project (1000 MW) has been submitted to CTU on 14.05.2019 and LTA Bank Guarantee @ Rs. 10,000.00 per MW i.e. One Crore was also submitted with CTU. CVPPL also informed that GoI approval for Kiru project is available and tendering activities are at advance stage. However, GoI approval for Kawar project is in process, after which tendering activities shall be undertaken. These projects Project (540 MW) are expected to be commissioned in year 2023-2024 which implies that approx. 2164 MW would be coming in the time frame of 2023-2024. In order to plan the implementation of dedicated line from Pakal Dul to Kishtwar Switching station, location of the Kishtwar Switching station need to be finalized at the earliest.

2.4 CEA stated that earlier 2 corridors were planned upto Kishtwar switching Station. One Corridor was planned to carry 1500 MW of power coming from HEPs in Himachal Pradesh and around 1300 MW of power from Kirthai I and Kirthai II projects in Jammu & Kashmir. Corridor 2 was planned for CVPPL projects (i.e. Pakaldul, Kiru & Kwar HEPs totaling to 2164 MW). As on date there is no certainty of implementation time frame of the projects located in HP, which were planned to be evacuated through corridor -1.

CEA suggested that, in view of limited space for laying the transmission line corridor in Chenab Valley, it would be better that CVPPL lay a dedicated Pakal Dul HEP–Kishtwar line which could be extended to Kawar and Kiru HEPs in phases. Suitable provisions in the dedicated line can be made so that power from Kirthai HEP could also be evacuated through the Pakal Dul HEP–Kishtwar line.

This would require 400 kV line with quad HTLS conductors instead of triple HTLS conductor, which has been planned earlier. Pakal Dul HEP–Kishtwar SS would be a dedicated line of CVPPL and power from other two projects of CVPPL i.e. Kiru and Kwar HEP would also be evacuated through the same line. Further, power from Kirthai –I & II could also be evacuated through the same corridor for which, CVPPL may enter into agreements for utilizing the same corridor with the developers of Kirthai HEPs (Kirthai is a project of state government of Jammu & Kashmir).

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- 2.5 CVPPL agreed with the suggestion given by CEA to use quad HTLS for PakalDul HEP–Kishtwar line instead of triple HTLS conductor which can be used for evacuation of power from CVPPL projects as well as projects of state government of Jammu & Kashmir at Kirthai.
- 2.6 Regarding signing the Transmission agreement and submitting the Bank Guarantee to CTU as per the CERC connectivity Regulation, CVPPL informed that CVPPL has already signed the transmission agreement with CTU in February 2019 and has submitted bank guarantee of Rs 50 crores (@ Rs 5 lacs/MW) for Pakaldul HEP to CTU.
- 2.7 CTU advised CVPPL to apply for connectivity to CTU for Kiru and Kwar HEP so that connectivity intimation may be issued for Kiru HEP & Kwar HEP to Kishtwar quad HTLS line through Pakaldul HEP.
- 2.8 POSOCO suggested that since Kiru and Kwar HEPs are in advanced stages of tendering, it may be mentioned to the developer of Kiru and Kwar HEP that GIS switchyard equipment, XLPE cables and other associated equipment may be designed for current carrying capacity of 4000 Amps.
- 2.9 After deliberations, following was agreed:
  - i) CVPPL to apply for connectivity to CTU for Kiru and Kwar HEP so that connectivity intimation of Kiru, Kwar can be issued through Kiru-Kwar-Pakaldul- Kishtwar 400 kV D/C quad HTLS dedicated line to be implemented by M/s CVPPL. M/s CVPPL to phase the implementation of the dedicated line as per the implementation timelines of the HEPs.
  - ii) Pakaldul, Kiru and Kwar HEP GIS switchyard equipment, XLPE cables and other associated equipment may be designed for current carrying capacity of 4000 Amps.
  - iii) A joint meeting among CEA, CVPPL, POWERGRID, JKPDD to be convened to finalise the location of Kishtwar (GIS) switching station and review the master plan of projects in Chenab Valley so as to plan the evacuation system for Chenab Valley project.

### **3.0 Approval of charging of 220kV and 400kV Intra-State Transmission Systems of RVPNL**

- 3.1 CEA stated that RVPNL vide their letter no RVPN/SE(P&P)/XEN-2(P7P)/AE-2/F/D1479 dated 10.1.2019 and RVPN/SE(P&P)/XEN-2(P7P)/AE-2/F/D1440 dated 18.1.2019 had requested for conveying in-principle approval of CEA for the following two nos. proposal of RRVPNL:
  - i) Establishment of 220/132/33 kV (1x160 MVA+1x40/50 MVA) GSS at Ranpur (Kota) through LILO of Kota –Badod 220kV line at Ranpur (3km) and LILO of KTPS –Morak 220kV S/c line at Ranpur (Kota) (3km).
  - ii) 400 kV Double Circuit Interconnection Line between bay 401 & 402 of Chhabra Super Critical Thermal Power Plant and bay 424 & 425 of Chhabra Thermal Power Plant along with 2 x 80 MVAR Bus Reactor.

RRVPNL also informed that the above transmission elements works had already been completed and they were ready for commissioning.

To discuss the above proposals, a meeting was held on 04.02.2019 in CEA, wherein, following was agreed:

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**(a) Establishment of 220/132/33 kV (1x160 MVA+1x40/50 MVA) GSS at Ranpur (Kota) through LILO of Kota –Badod 220kV line at Ranpur (3km) and LILO of KTPS –Morak 220kV S/c line at Ranpur (Kota) (3km).**

- i. Establishment of 220/132/33 kV (1x160 MVA + 1x40/50 MVA) GSS at Ranpur (Kota) through LILO of Kota –Badod 220kV line at Ranpur (3km) and LILO of KTPS –Modak 220kV S/c line at Ranpur (3km) was agreed in principle. The proposal would be formalized in the next meeting of Standing Committee on Transmission for Northern Region.
- ii. Accordingly, on MP side Bhanpur 220 kV substation is the inter-regional point and on Rajasthan side, Ranpur and Morak would become the inter-regional points. Bhanpur and Modak are existing inter-regional points, whereas Ranpur substation would be new inter-regional point. Therefore, necessary metering arrangement would be done at Ranpur 220 kV substation by RRVPNL/POSOCO/NRLDC/CTU.
- iii. MPPTCL to implement the 2<sup>nd</sup> main bus (220 kV) at the existing Bhanpura 220/132/ 33 kV substation.

**(b) 400 kV Double Circuit Interconnection Line between bay 401 & 402 of Chhabra Super Critical Thermal Power Plant and bay 424 & 425 of Chhabra Thermal Power Plant along with 2 x 80 MVAR Bus Reactor.**

- i. 400 kV Double Circuit Interconnection Line between Bay 401 & 402 of Chhabra Super Critical Thermal Power Plant and Bay 424 & 425 of Chhabra Thermal Power Plant along with 2 x 80 MVAR Bus Reactor was agreed in principle.
- ii. Interconnection Line between CSCTPP and CTPP has been made to cater to the contingency conditions and would remain open in normal condition.
- iii. The proposal would be formalized in the next meeting of Standing Committee on Transmission for Northern Region.

3.2 RVPN informed that above mentioned transmission elements for which in principle approval was given are already commissioned.

3.3 Members concurred the in-principle approval for the following elements of RRVPNL:

- i. Establishment of 220/132/33 kV (1x160 MVA+1x40/50 MVA) GSS at Ranpur (Kota) through LILO of Kota –Badod 220kV line at Ranpur (3km) and LILO of KTPS –Morak 220kV S/c line at Ranpur (Kota) (3km).
- ii. 400 kV Double Circuit Interconnection Line between bay 401 & 402 of Chhabra Super Critical Thermal Power Plant and bay 424 & 425 of Chhabra Thermal Power Plant along with 2 x 80 MVAR Bus Reactor.

**4.0 Commissioning of newly constructed/under construction intra-State transmission lines of Punjab State Transmission Corporation Limited (PSTCL):**

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- 4.1 CEA stated that PSTCL vide their letter no 690/P-I dated 22.11.18 & 723/P-I dated 11.12.2018 requested CEA to grant in-principle approval for the following under construction transmission lines of Punjab State Transmission Corporation Limited (PSTCL):
- a) Ludhiana (PG) (400kV) - Doraha, 220 kV S/C line - 27.819km conductor 0.4sq" (Zebra)
  - b) Moga (PG) (400 kV) - Mehal Kalan 220 kV D/C line - 52.9km conductor 0.4sq" (Zebra)
  - c) Goindwal Sahib - Bottianwala, 220 kV D/C line - 64.735km conductor 0.4sq" (Zebra)
  - d) Ludhiana (PG) (400 kV) – Sahnewal 220 kV (2nd Circuit) line - 6.5 km conductor 0.5sq" (Moose)
  - e) LILO of 2nd circuit of Jalandhar (PG) (400 kV) (Kartarpur)- Kotla Jangan 220 kV line at Kartarpur – 220 kV D/C (PSTCL).

- 4.2 To deliberate on the above, a meeting was held in CEA on 19.12.2018 with representatives from PSTCL, CTU and POSOCO wherein, 'in principle' approval for charging of following 220 kV lines was agreed subject to ratification from the constituents of NRSCT:

- a) Ludhiana (PG) (400kV) - Doraha, 220 kV S/C line
- b) Moga (PG) (400 kV) - Mehal Kalan 220 kV D/C line
- c) Goindwal Sahib - Bottianwala, 220 kV D/C line
- d) Ludhiana (PG) (400 kV) – Sahnewal 220 kV (2<sup>nd</sup> Circuit) line formed by passing at Lalton Kalan as mentioned above.
- e) LILO of 2<sup>nd</sup> circuit of Jalandhar (PG) (400 kV) (Kartarpur)- KotlaJangan 220 kV line at Kartarpur – 220 kV D/C

- 4.3 PSTCL informed that above mentioned transmission elements except element at point no. e (LILO of 2<sup>nd</sup> circuit of Jalandhar (PG) (400 kV) (Kartarpur)- KotlaJangan 220 kV line at Kartarpur – 220 kV D/C) have been commissioned.

- 4.3 Members concurred the in-principle approval for the above elements of PSTCL.

**5.0 PSTCL proposal regarding (i)Upgradation of 132kV Alawalpur S/s at 220kV along with LILO of one circuit of 220 kV BBMB Jalandhar- 220 kV Pong D/c line at Alawalpur 220 kV substation and (ii) Upgradation of 132kV Badhnikalan S/s at 220kV along with LILO of 220 kV Himmatpura- PGCIL Moga line at 220 kV Badhnikalan.**

- 5.1 CEA stated that PSTCL vide their letters dated 8.1.2019 & 16.1.2019 forwarded following two proposals to CEA seeking in-principle approval as these transmission elements works had been completed and they were ready for commissioning:

- i) Upgradation of 132kV Alawalpur S/s at 220kV along with LILO of one circuit of 220 kV BBMB Jalandhar- 220 kV Pong D/c line at Alawalpur 220 kV substation and
- ii) Upgradation of 132kV Badhnikalan S/s at 220kV along with LILO of 220 kV Himmatpura- PGCIL Moga line at 220 kV Badhnikalan.



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5.2 To deliberate on the above issue, a meeting was held in CEA on 4.2.2019, wherein, following was agreed:

- i) Upgradation of existing 132 kV Alawarpur S/s (132/66 KV: 1x25 MVA, 132/11 kV: (12.5+20) MVA) to 220kV (220/66 kV: 1x100 MVA, 66/11 kV: 2x20 MVA) along with LILO of one circuit of Jalandhar (BBMB) - Pong 220 kV D/c line at 220 kV Alawalpur substation was agreed in principle. The proposal would be formalized in the next meeting of Standing Committee on Transmission for Northern Region.
- ii) PSTCL to coordinate with RLDC and CTU for installation of energy meter at Alawalpur 220/66/11 kV substation.
- iii) Upgradation of existing 132/66/11 kV Badhnikalan substation (132/66 kV: 1x25 + 1x 20 MVA, 66/11 kV: 2x20 MVA) to 220/66/11 kV (220/66 KV: 1x100 MVA, 66/11 kV: 2x 20 MVA) along with LILO of Moga (PGCIL)- Himmatpura 220 kV line at 220 kV Badhnikalan substation was agreed in principle.
- iv) PSTCL to intimate all Intra - State transmission schemes which involve reconfiguration of ISTS elements, inter-connection with ISTS elements and all 400 kV Intra – State schemes which are already under implementation and has not been intimated earlier in Standing Committee on Power System Planning, as agenda in the next NRSCT meeting.
- v) PSTCL to include new/planned Intra - State transmission schemes which involve reconfiguration of ISTS elements, inter-connection with ISTS elements and all 220kV & above Intra – State schemes as an agenda for the next meeting of NRSCT.
- vi) The proposal would be formalized in the next meeting of Standing Committee on Transmission for Northern Region.

5.3 After deliberation, Members concurred the in-principle approval for the above transmission elements of PSTCL.

**6.0 2 nos. of 220kV bays at Mainpuri(PG) 400/220kVsubstation for providing connectivity to Railway Traction GSS:**

- 6.1. CEA stated that the issue of providing space for 2 nos. of bays for establishment of 220kV connectivity of Railway's 220/132kV GSS at Bhogan with Mainpuri(PG) 400/220kV substation was discussed in 40<sup>th</sup> meeting of SCPSPNR held on 22.6.2018. In the meeting, Powergrid confirmed the availability of space for two nos. 220 kV bays at Mainpuri 400/220 kV sub-station. However, UPPTCL informed that in Mainpuri area, to cater to the load of about 250-300 MW, they are also planning a new 220 kV substation, for which they require 2 no. of 220 kV bays at Mainpuri 400/220 kV substation. Therefore, it was decided that CEA, POWERGRID, UPPTCL and Railways would 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).
- 6.2. Accordingly, a site visit was carried out at Mainpuri 400/220 kV substation by representatives of CEA, Powergrid, UPPTCL and Railways on 8.2.2019 and the observations made are as follows:
  1. Distance from existing bays to the boundary wall is 80m which is sufficient to accommodate 4 nos. of 220kV bays and main entrance road.

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2. Main gate and existing road will be required to be shifted near the boundary for construction of the bays.
3. There are trees which will be required to be cut for construction of the bays
4. UPPTCL and Railways will have to decide the outgoing 220kV power line route as buildings in front of the substation are already constructed.
5. Layout shall be approved by Powergrid Engg Department/Competent Authority.

In view of above, it was noted that space for four number of bays may be made available by Powergrid at Mainpuri(PG) 400/220kV S/s for construction of 2 no of 220kV bays by Railways for providing connectivity to 220/132kV GSS at Bhogan and 2 no of 220kV bays by UPPTCL.

- 6.3. CTU clarified that bays for providing connectivity to Railway would be constructed by Railways.
- 6.4. UPPTCL requested that the 220kV for UPPTCL might be constructed under ISTS.
- 6.5. CEA advised UPPTCL to submit their proposal furnishing the details about time schedule and expected loading on the 220 kV transmission line so that the implementation of the bays could be taken up in matching time frame under ISTS and also requirement of 400/220 kV ICT augmentation, if any, for the UPPTCL 220kV transmission line.
- 6.6. CEA also advised Railways and UPPTCL to coordinate with each other regarding the routing of their transmission lines near Mainpuri (PG) 400/220kV S/s.
- 6.7. After deliberations, following was agreed:
  - i. Construction of 2 nos. of 220kV bays at Mainpuri(PG) 400/220kV substation for providing connectivity to Railway Traction GSS (under the scope of Railways)
  - ii. PGCIL to provide space at Mainpuri(PG) 400/220kV substation for construction of 2 nos. of 220kV bays by Railways
  - iii. UPPTCL to submit the proposal for implementation of 220kV transmission line from Mainpuri (PG) along with its time schedule and expected loading

## **7.0 Addition 1x500 MVA 400/220kV Transformer at Balachak**

- 7.1. CEA stated that during the 1<sup>st</sup> meeting of NRSCT held on 11.9.2018, the issue of augmentation of transformer capacity at Balachak by additional 1x500MVA, 400/220kV transformer was deliberated and CTU suggested that instead of augmentation of transformer capacity at 400/220kV Balachak S/s, PSTCL may shift the load to Makhu 400/220kV S/s after completion of its augmentation works at Makhu and PSTCL agreed for the same.

Subsequently, PSTCL vide their letter no 652/P-I/144 dated 14.11.18 has informed that they have carried out the studies with shifting load of Balachak at Makhu as well as additional 220kV links at 400kV Makhu S/s. However, no major change in the loadings of the transformers have been observed at Balachak. Therefore, PSTCL has proposed additional 1x500MVA, 400/220kV ICT at 400kV Balachak S/s of POWERGRID under ISTS to meet n-1 contingency.

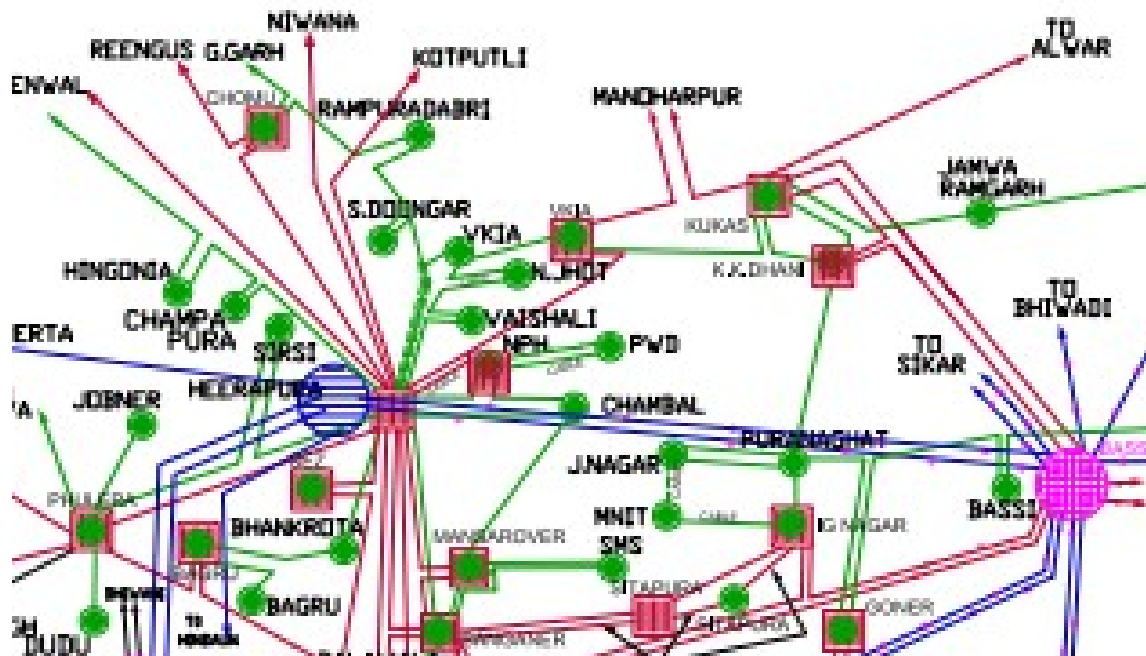
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- 7.2. CTU informed that at present, transformation capacity at Balachak is 1130 MVA (2x315+1x500). The proposed transformer will be the 4th transformer.
- 7.3. POSOCO informed that existing transformation capacity at Balachak does not meet (n-1) contingency criterion. Even transformers at Makhu 400/220 kV S/stn are almost fully loaded and PSTCL needs to explore the possibility of new 400/220 kV S/stn in this area.
- 7.4. PSTCL informed that at present, all the three existing transformers at Balachak 400/220 kV S/stn are loaded upto 80 % of their rated capacity. Under N-1 contingency, these ICTs would get overloaded. Therefore, an additional 1x500MVA, 400/220kV ICT shall be required at 400kV Balachak S/s of POWERGRID under ISTS to meet n-1 contingency.
- 7.5. CEA suggested PSTCL to study the loadings on the existing 220 kV lines from Balachak 400/220 kV S/stn with increase in transformation capacity at Balachak and take up necessary augmentation, if required.
- 7.6. CTU stated that limited space is available at Balachak 400/220 kV substation. In view of future provisions requirements, PSTCL proposal needs to be examined after ascertaining the space availability at Balachak 400/220 substation.
- 7.7. After deliberations, it was agreed that a site visit would be carried out by CTU and PSTCL at Balachak 400/220kV substation to explore the space availability for installation of 4th transformer and future bays. Members in principle agreed for the provision of 1x500 MVA ICT at Balachak 400/220 kV substation to be taken up under ISTS subject to space availability which would be ascertained through site visit. The site visit may be brought to notice of the members in the next NRSCT meeting.

#### **8.0 RVPNL proposal regarding Up-rating and refurbishment of existing 132kV lines using HTLS conductor with associated works in Jaipur EHV Network:**

- 8.1 CEA stated that RVPNL vide their letter RVPN/SE(P&P)/XEN-2(P&P)/AE-2/F/D1750 dated 19.3.2019 has proposed to strengthen the 132 kV network at 132 kV GSS Chambal, Vaishali Nagar, Jhotwara and VKIA by uprating and refurbishment using HTLS conductor of following 132 kV S/C lines:
  - i) 132 kV Heerapura-VKIA with LILO at Vaishali Nagar (Route length: 19.276 km).
  - ii) 132 kV VKIA-220 kV VKIA (Route length: 2.859 km).
  - iii) 132 kV Mansarover-Chambal (Route length: 3.775 km)

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8.2 RVPNL stated that while seeking the grant from PSDF, Power System Operation and Corporation Limited (PSDF-Secretariat) has raised observation that clearance of Standing Committee on Power System Planning (SCPSP) for up-rating of transmission line is required to release grant for the said lines. Accordingly, agenda has been put for the approval of the NRSCT. The brief of the reconductoring proposal is as given below:

- i) The peak line loadings observed during 2017-18 on some of the 132kV lines in Jaipur City are as follows:

S.No.	Name of line	Loading in MW
1.	132 kV Heerapura-VKIA S/c line	61.47
2.	132 kV Vaishali - Heerapura S/c line	86
3.	132 kV VKIA-Vaishali Nagar S/c line	43.5
4.	132 kV VKIA(132 kV GSS)- VKIA(220 kV GSS) S/C line	85
5.	132 kV Chambal-HeerapuraS/C line	77
6.	132 Chambal-MansaroverS/C line	85

The following overloading are observed:

- Total transformer capacity at 132kV GSS Chambal is 165 MVA and load is about 125 MVA. Feeding 132kV lines are overloaded
- Total transformer capacity at 132kV GSS VKIA is 175 MVA and load is about 150 MVA. Feeding 132kV lines are overloaded
- Total transformer capacity at 132kV GSS Vaishali Nagar is 100 MVA and load is about 75 MVA. Feeding 132kV lines are overloaded
- 132kV GIS at Jhotwara (new) with 100 MVA capacity and with LILO of VKIA-Vaishali Nagar 132kV S/c at Jhotwarahas been commissioned

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To utilize the existing transformer capacity at Vaishali, Chambal and VKIA 132kV GSS, it has been proposed to uprate the capacity of existing transmission lines.

- ii) With the reconductoring, the following would be achieved:
- HTLS conductors would give us the advantage of using the existing towers.
  - The ampacity of HTLS conductor is 800 A (183 MVA). Since, there will be an added advantage of higher ampacity of using HTLS conductor, therefore, the envisaged load growth would also be met.
  - Looking into the past problems in laying new transmission lines by utilizing the existing RoW, it is feasible that the existing towers be used by use of existing towers with HTLS conductor.
- iii) Load flow studies have been carried out by RVPNL for condition corresponding to 2021-22 for total system load of 14430 MW and from the load flow study with proposed transmission system, it is observed that load of 132 kV GSS VKIA, New Jhotwara, Vaishali Nagar and Chambal can be fed without any over loading on the line. The details of the existing transformation capacity and future augmentation at these 132 kV GSS is as given below:

S. No	Name of GSS	Transformer Details		Peak Load 2018-19	Augmentation approval
		Voltage Ratio	Capacity (in MVA)		
1	132 KV GSS Chambal	132/33 KV	40/50	39.72 MVA	40/50 MVA Transformer approved
		132/33 KV	40/50	53.22 MVA	
		132/11 KV	2x16/20	19.86 MVA	
		132/11 KV	1x10/12.5+ 1x16/20	19.86 MVA	
2	132 KV GSS Vaishali Nagar	132/33 KV	40/50	42.10 MVA	Looking at the load growth , transformer augmentation will be considered after uprating of the line
		132/33 KV	40/50	36.60 MVA	
3	132 KV GSS VKIA	132/33 KV	40/50	45.96 MVA	
		132/33 KV	40/50	43.08 MVA	
		132/33 KV	20/25	20.94 MVA	
		132/33 KV	20/25	24.42 MVA	
		132/11 KV	10/12.5	11.17 MVA	
		132/11 KV	10/12.5	10.38 MVA	

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4	132 KV GSS New Jhotwara	132/33 KV	40/50	29.38 MVA	
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8.3 Chairman NRSCT enquired about the need of discussing the re-conductoring proposals at 132 kV in the NRSCT.

Members deliberated on this aspect and it was agreed that intra-state proposals of 220 kV and above may only be brought for discussion in the NRSCT meeting. The proposal involving voltage level below 220 kV level may only brought for deliberation the NRSCT if it is inter-state in nature (involving two or more states) and involves interconnection with ISTS. The proposals below 220 kV level may be deliberated in the appropriate forum of RPC and approval may be granted by them.

8.4 After deliberations the proposal of RVPNL to strengthen the 132 kV network at 132 kV GSS Chambal, Vaishali Nagar, Jhotwara and VKIA by uprating and refurbishment using HTLS conductor of following 132 kV S/C lines was agreed:

- i) 132 kV Heerapura-VKIA with LILO at Vaishali Nagar (Route length: 19.276 km).
- ii) 132 kV VKIA-220 kV VKIA (Route length: 2.859 km).
- iii) 132 kV Mansarover-Chambal (Route length: 3.775 km)

8.5 Members also agreed that :

- i) Intra-state proposals of 220 kV and above may only be brought for discussion in the NRSCT meeting.
- ii) The proposal involving voltage level below 220 kV level may only brought for deliberation the NRSCT if it is inter-state in nature (involving two or more states) and involves interconnection with ISTS. The proposals below 220 kV level may be deliberated in the appropriate forum of RPC and approval may be granted by them.

## 9.0 Up-gradation and Strengthening of Delhi transmission system Phase-I

9.1 CEA stated that DTL had submitted the DPR to NLDC (Designated as Nodal Agency in accordance with Regulation 5 of CERC (PSDF) Regulations., 2014) for seeking the grant from PSDF for six 220kV D/C lines for re-conductoring with HTLS conductor of the total of 79.53 km with estimated cost of Rs. 116.51 crore. PSDF-proposal of DTL was examined by the 48th meeting of TESC held on 22.02.2019 and TESC has sought the recommendation of North Region Standing Committee on Transmission (NRSCT) on the proposal of DTL.

9.2 DTL stated that the re-conductoring of the following transmission lines has been proposed:

S.No.	Name of Transmission Line	Existing conductor	Route Length (KM)	Year of Commissioning	Reasons for replacement
1.	220kV Bawana-Rohini, ckt-I & II	Single ACSR Zebra	10.05	2005	Important links of DTL transmission

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2.	220 kVBawana-Shalimar Bagh, ckt-I & II	Single ACSR Zebra	10.752	1990	network and HTLS Reconductoring, necessary to avoid transmission power congestion for n-1 reliability
3.	220 kVMandola-Gopal Pur, ckt-I & II	Single ACSR Zebra	22.62	1975	
4.	220 kVMandola-Wazirabad, ckt-I, II, III & IV.	Single ACSR Zebra	29.06	1986	
5.	220 kV BTPS-SaritaViharckt-I & II	Single ACSR Zebra	2.8	1977	
6.	220 kV Maharani Bagh-Lodhi Road, ckt-I & II	Single ACSR Zebra	4.25	1995	
<b>Total Line length (KM)</b>			<b>79.53</b>		

9.3 The flows on these lines corresponding to peak load observed in 2018(7016 MW) & anticipated load of 8500 MW are as follows:

S. No.	Name of Transmission Line	Flows on each circuit corresponding to 7016 MW load	Flows on each circuit corresponding to 8500 MW load
1.	220kV Bawana-Rohini, ckt-I & II	159	184
2.	220 kV Bawana-Shalimar Bagh, ckt-I & II	102	187
3.	220 kV Mandola-Gopal Pur, ckt-I & II	173	204
4.	220 kV Mandola-Wazirabad, ckt-I, II, III & IV.	206	157
5.	220 kV BTPS-SaritaViharckt-I & II	190	180
6.	220 kV Maharani Bagh-Lodhi Road, ckt-I & II	83	183

9.4 CEA stated that 400/220 kV Gopalpur substation has already been agreed as a part of intra state system of DTL. Further Shalimar Bagh 400 kV substation is also planned as a part of intra-state system. With implementation of these new 400/220 kV substations the loading may get reduced.

9.5 DTL stated that re-conducting of the 220 kV transmission line would provide immediate solution to meet the summer peak demand of Delhi, as the same could be

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completed within few months' time. Therefore, the proposal may kindly be agreed.

- 9.6 The issue was deliberated and the following was agreed:
- i) The proposal of re-conductoring of the following 220kV lines of DTL with HTLS conductor was agreed:
    - a. 220 kV BTPS-Sarita Vihar ckt-I & II
    - b. 220 kV Maharani Bagh - Lodhi Road, ckt-I & II
  - ii) CEA and DTL may be deliberate the proposal of re-conductoring of following 220kV transmission lines of DTL:
    - a. Bawana-Rohini 220 kV D/C line
    - b. Bawana-Shalimarbagh 220 kV D/C line
    - c. Mandaula-Gopalpur 220 kV D/C line
    - d. Mandaula to Wazirabad 2 x D/C line

The recommendation of the meeting may be intimated in the next meeting of NRSCT.

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

- 10.1 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

Due to delay envisaged in implementation of above transmission system, 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>& 40<sup>th</sup> meeting of SCPSPNR. However, in the 40<sup>th</sup> meeting, 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).

- 10.2 A meeting was held in CEA on 22.1.2019, wherein, following was agreed:
- i. There is a requirement of interim arrangement during the period from September 2019 to March 2021 as first unit of M/s GMR BHHPL is expected to be



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- commissioned by September 2019, whereas it's planned evacuation system under implementation by HPPTCL is expected to be commissioned by March 2021.
- ii. HPPTCL agreed to expedite the completion of Bajoli Holi – Lahal P.S. 220 kV D/C line (completion schedule June 2020) required for implementation of interim arrangement for evacuation of power from Bajoli Holi of M/s GMR BHPPL. HPPTCL also agreed to expedite the completion of Lahal P.S. – Chamera P.S. 400 kV D/C line before or by March 2021.
  - iii. Special Protection System (SPS) to be implemented by M/s GMR BHPPL during interim arrangement period to back down/trip their generation to avoid overloading of 400/220 kV, 2 x 315 MVA ICTs at Chamera Pooling Station in the event of outage of one 315 MVA ICT.
  - iv. A joint survey by M/s GMR BHPPL and M/s GREENKO could be undertaken to ascertain hotspots, maximum operating temperature, bus bar rating, circuit breaker rating and other technical parameters for Budhil HEP - Chamera 220 kV S/C line and switchgear rating of Chamera III 220 kV switchyard. The joint survey to quantify the permissible power flow over Budhil HEP - Chamera 220 kV S/C line during interim arrangement.
  - v. M/s GMR (Bajoli Holi HEP developer) needs to arrive at mutual agreement with M/s GREENKO (Budhil HEP developer) for sharing of Budhil HEP - Chamera 220 kV S/C line and consent for the same need to be taken from Central Electricity Regulatory Commission (CERC).
- 10.3 HPPTCL informed that Lahal P.S–Budhil HEP 220 kV D/c line is expected to be completed by October 2019. Bajoli Holi-Lahal P.S 220 kV D/c is expected to be completed by June 2020 but HPPTCL is trying for early completion of the line. Further HPPTCL proposed to carry out second circuit stringing of existing Budhil HEP - Chamera 220 kV S/C line (S/c on D/c) (dedicated line of M/s GREENKO) for additional injection of power from upcoming small hydro projects at Lahal 220/33kV S/s.
- 10.4 CTU stated that already there is no margin for additional injection on 220 kV side at 400/220 kV, 2x315 MVA Chamera Pooling Station (PGCIL). The proposed interim arrangement for additional injection of power from Bajoli Holi HEP has been agreed only for a temporary time period with implementation of SPS. Also, keeping in view that Lahal Pooling Station–Chamera Pooling Station (PG) 400 kV D/c would be commissioned by March' 2021, there is no need of second circuit stringing of Budhil HEP - Chamera 220 kV S/C line.
- 10.5 CEA stated that HPPTCL has planned evacuation of power from small HEPs at Karian 220/33 kV substation and Lahal 220/33 kV substation. Till the commissioning of Lahal P.S. – Chamera P.S. 400 kV D/C line, the evacuation would be through Chamera 400/220 kV pooling station which has got limited capacity. Therefore, augmentation of transformation capacity at Chamera 400/220 kV pooling station needs to be taken up. In addition HPPTCL needs to quantify the injection from small HEPs so that the transmission system augmentation required for evacuation could be identified.
- 10.6 After deliberations, following was agreed:
- i) Powergrid to explore the possibility of transformation capacity augmentation at Chamera 400/220kV S/s.
  - ii) HPPTCL to submit the proposal for stringing of 2<sup>nd</sup> ckt of Budhil HEP - Chamera 220 kV S/C line on D/c tower in concurrence with the officials from M/s GREENKO.

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- iii) HPPTCL to quantify the injection from small HEPs at Lahal and Karian pooling stations to assess the transmission system augmentation required for evacuation.
- iv) HPPTCL to expedite the completion of Bajoli Holi – Lahal P.S. 220 kV D/C line, Lahal P.S. – Chamera P.S. 400 kV D/C line along with Lahal 400/220kV S/s.

**11.0 Additional intra-state transmission works proposed by HPPTCL to be included under “Himachal Pradesh Clean Energy Transmission Investment Program”**

**11.1** CEA stated that HPPTCL vide their letter no HPPTCL/Misc-Vol\_X/2018-12004 dated 01.01.2019 have submitted the proposal of additional intra-state transmission works to be included under “Himachal Pradesh Clean Energy Transmission Investment Program” which is being implemented under Multi-Tranche Financing Facility (MFF) of ADB.

Following transmission elements amounting to Rs. 141.14 Crore have been proposed by HPPTCL to be covered under “Himachal Pradesh Clean Energy Transmission Investment Program”:

**11.1.1 Providing 220/66 kV, 80/100 MVA transformer in the yard of 400/220 kV Gumma substation in Dist. Shimla.**

HPPTCL is constructing 400/220 kV, 2X315 MVA GIS sub-station at Pragatinagar (Gumma) in Distt. Shimla for evacuation of upcoming hydroelectric projects in Pabbar Valley. Construction of proposed 220/66 kV, 80/100 MVA substation in the yard of 400/220 kV Gumma substation shall provide an alternate source of power to Shimla District. HPSEBL shall implement LILO of existing Huli-Sainj 66 kV S/c line at proposed 220/66 kV Gumma sub-station and shall draw about 60 MW from the proposed substation. This would also result in improved voltage profile and reliability in Kotkhai/Sainj area. This transmission element has an estimated cost of Rs. 45.53 Crore.

**11.1.2 LILO of 2<sup>nd</sup> circuit of 220 kV Kunihar-Panchkula transmission line at 220 kV substation Baddi.**

This transmission scheme has already been deliberated and approved in the 40th Standing Committee meeting on Power System Planning in Northern region held on 22nd June, 2018. The estimated cost of this LILO as submitted by HPPTCL is Rs. 5.95 Crore.

**11.1.3 Creation of a joint Control and Operations Center for the transmission assets of HPPTCL/HPSEBL.**

The Joint Control and Operations Center shall monitor and control all the transmission assets at a central, more accessible location. This shall reduce system disruptions and fault time in addition to reduced manpower requirement. Its Scope includes Control Centre set up, interconnection with SLDC, FOTE equipment. The project has an estimated cost of Rs. 31.62 Crore.

**11.1.4 Augmentation of existing 220/132 kV Kangoo sub-station by 2X100 MVA and stringing of 2<sup>nd</sup> circuit of 220 kV S/c line on D/c towers from Dehar Power House of BBMB to Kangoo substation.**

HPPTCL has intimated that presently 220/132 kV Kangoo sub-station of HPSEBL is connected to Dehar Power House of BBMB through Dehar-Kangoo 220 kV S/c Transmission Line (on D/C Towers) and Dehar-Kangoo 132 kV S/C Transmission Line. Presently, there is a restriction on drawl of power from Dehar Power House

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and thus HPSEBL restricts the drawl to 140 MW only (around 60 MW on 220 kV and 60 MW on 132 kV). Due to the restriction on drawl of power, HPSEBL is not able to integrate 132 kV buses at 220/132 kV Kangoo sub-station. Therefore, the system is being operated in radial mode.

Further, HPPTCL has informed that joint meetings were convened with officials from BBMB, HPSEBL and HPPTCL to address the issue. During the discussions it was revealed that during the winter months when the demand of HP state is high on account of heating loads the demand of other neighbouring states such as Punjab, Haryana etc. is low. Thus, it was concluded that the integrated operation at Kangoo sub-station of HPSEBL may be allowed as sufficient power margins are available. Further, it was highlighted that integration at 220/132 kV Kangoo sub-station of HPSEBL shall also increase the security of grid as continuous load is available at Kangoo sub-station even during the night hours, thereby addressing the issues of voltage rise because of Ferranti effect. Accordingly, after deliberations it was decided that study shall be conducted by POSOCO for integrated operation of Kangoo sub-station. The results of the requisite Load Flow study conducted by POSOCO has been submitted by HPPTCL

In the load flow studies POSOCO has highlighted the issue of N-1 contingency in case of failure of 220 kV Kangoo-Dehar transmission line. Presently, there is S/C 220 kV transmission line (on Double Circuit towers) from Dehar to Kangoo. Also, POSOCO has desired to augment 220/132 kV Kangoo sub-station of HPSBEL to ensure reliable power while ensuring the contingency.

In view of above, stringing of 2nd circuit of Dehar-Kangoo transmission line and augmentation of existing 220/132 kV Kangoo sub-station by 2X100 MVA has been proposed to ensure N-1 contingency in the system. The estimated cost of the above mentioned transmission element as submitted by HPPTCL is Rs. 58.04 Crore.

**11.2** The matter was deliberated and following was agreed by the members:

- i) 220/66 kV, 80/100 MVA transformer in the yard of 400/220 kV Gumma substation in Dist. Shimla
- ii) LILO of 2<sup>nd</sup> circuit of 220 kV Kunihar-Panchkula transmission line at 220 kV substation Baddi.
- iii) The proposal regarding augmentation of existing 220/132 kV Kangoo sub-station by 2x100 MVA and stringing of 2<sup>nd</sup> circuit of 220 kV S/c line on D/c towers from Dehar Power House of BBMB to Kangoo substation was also agreed technically subject to ratification by the Power Sub Committee of BBMB.

**12.0 UPPTCL' agenda regarding strengthening of intra-State network for additional loads and reliability:**

**12.1** CEA stated that UPPTCL vide their letter no 3748-SE(TP&PSS)/SCM dated 24.1.2019 and 481/Dir(Comm&Plg)/UPPTCL/2019/CEA-SCM) dated 20.05.2019 has proposed the following intra-state works:

**12.1.1 Creation of 220/33 kV (3x60 MVA) GIS S/S Kidwainagar (Kanpur):**

- a) Creation of 220/33 kV (3x60 MVA) GIS S/s Kidwainagar (Kanpur)
- b) LILO of Bhauti Kanpur (400) PGCIL-Panki (220) 220 kV line (of PGCIL) on Monopole at 220 kV S/S Kidwainagar (Kanpur) – 06 km

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**12.1.2 Creation of 220/132/33 kV (2x160+2x40) MVA and 220/33 kV (2x60 ) MVA Deoband (Saharanpur) S/S**

- Creation of 220/132/33 kV (2x160+2x40) MVA and 220/33 kV (2x60 MVA) Deoband (Saharanpur) S/S
- 220 kV D/C line Saharanpur (400) PGCIL-Deoband (Saharanpur) with Moose conductor-30 km
- 220 kV Two Feeder bays at Saharanpur (400) PGCIL under ISTS.
- 220 kV DC line Shamli (400) GIS-Deoband (Saharanpur) with Moose conductor – 55 km

**12.1.3 Creation of 220/132/33 kV(2x160+2x40) MVA S/S Tundla (Firozabad)**

- Creation of 220/132/33 kV(2x160+2x40) MVA S/S Tundla (Firozabad)
- LILO of 220 kV SC line AgraPG(765)-Firozabad (400) (Proposed) 220kV S/S at Tundla(Firozabad)-01 km

**12.1.4 Creation of 220/132/33 kV (2x160+2x40) MVA S/S Kirawali(Agra)**

- Creation of 220/132/33 kV (2x160+2x40) MVA S/S Kirawali(Agra)
- LILO of Agra PG(765)-Sikandra(220) 220kV PGCIL Section of 220kV SC line Sikandra(220)-Bharatpur(Rajasthan) at 220kV S/S Kirawali(Agra)-13 km

**12.1.5 LILO of one ckt 400kV Quad DC line of Aaur(400) (WUPPTCL)-Indirapuram (WUPPTCL) at 400Kv S/S Noida Sec-123 on Monopole-10 km****12.1.6 Creation of 220/132/33kV S/s Farrukhabad :-**

- Creation of 220/132/33kV S/s Farrukhabad 2x160+2x40 MVA
- 220kV DC line Chhibramau (Kannauj)-Farrukhabad (220) – 30km (each on single Moose conductor)
- LILO of one ckt of 220kV DC line Mainpuri (400) PGCIL–Nibkarori at Farrukhabad (220)- 20km
- LILO of 132kV SC line Fatehgarh-Kayamganj at Farrukhabad (220) S/S

After deliberations, Members agreed with the proposals mentioned at S. No. 12.1.1-12.1.6 above.

**12.2 Modification in the transmission elements already approved in previous Standing Committee Meetings for Northern Region:****12.2.1 Evacuation of 2x660 MW Obra “C” TPS & Startup power.**

UPPTCL stated that in 38<sup>th</sup> SCM dated 30.05.2016 Obra “C” evacuation was approved. For providing startup power to Obra “C” some minor modifications are proposed:

S.No	Approved in 38 <sup>th</sup> SCM Dt 30.05.2016	Proposed As
01	GT 21/765Kv at Obra “C”	No Change
02	2x1500 MVA 765/400Kv ICT at Obra “C”	No Change
03	LILO of Anpara “D”-Unnao 765Kv SC line at Obra “C” -40km	LILO of Anpara “D”-Unnao 765Kv S/C line at Obra “C”- 15km & Shifting of 330 MVAR

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		line reactor from Anpara “D” to Obra “C” TPS
04	Obra “C”-Jaunpur 400Kv DC line-200km	LILO of One ckt of 400Kv D/C line Obra “B”-Obra “C” at Jaunpur(400)-190km
05	--	400Kv D/C line Obra “B”-Obra “C”-1.5km (For Startup Power)
06	Bus Reactor 330 MVAR, 765Kv at Obra “C”	No Change

### **12.2.2 Modification in connectivity of 220/33kV Noida Sec- 38A (Botanical garden) GIS 3x60 MVA:-**

UPPTCL stated that in 40<sup>th</sup> Standing Committee Meeting(SCM) of Northern Region held on 22.06.2018 at NRPC, New Delhi, Creation of 220/33kV S/s Botanical Garden GIS (3x60 MVA) and its connectivity has been approved. In the approved system, instead of LILO of Badarpur (TPS)- Noida Sec(20) 220kV SC line at 220kV S/s Noida Sector-38A, Botanical Garden (GIS), LILO of Ghazipur – Noida (Sec-20) 220kV SC line at Botanical Garden (GIS) was mentioned inadvertently. Therefore, following minor changes in connectivity may be noted by the members:-

S.N.	Approved in 40 <sup>th</sup> SCM dated 22.06.2018	Proposed As
1	Creation of 220/33kV Botanical Garden GIS (Noida) (3x60 MVA)	-No Change - (Substation completed & named as Noida Sector- 38A, Botanical Garden)
2	Noida Sec- 148 (400) – Botanical Garden (GIS) 220kV DC UPPTC Line – 27 km	-No Change – (Under Construction)
3	Elimination of T-off connection and constructing proper LILO of 220 kV Ghazipur – Badarpur (TPS) SC UPPTCL line at Noida (Sec- 20)	-No Change – (LILO work already completed)
4	LILO of Ghazipur – Noida (Sec-20) 220kV SC line (Section after ‘3’ above) at Botanical Garden (GIS) – 01km	LILO of Badarpur (TPS)- Noida Sec(20) 220kV SC line at 220kV S/s Noida Sector-38A, Botanical Garden (GIS) – 1.45km on Monopole (Work completed but SCM approval on modification awaited)

UPPTCL informed that location of 220 kV Noida Sector- 38A, Botanical Garden S/S is very near to Badarpur (TPS)-Noida Sec. 20 line.

### **12.2.3 Additional connectivity of 400/132/33kV UPPTCL S/s Noida Sec-123, Noida Sec-148 & Indirapuram :-**

UPPTCL stated that in 31<sup>st</sup> SCM on Power System Planning of Northern Region held on 02.01.2013, 400/132/33kV S/s Noida Sec-123 has been approved. Presently 400kV Noida Sec. 148, Noida Sec. 123 and Indirapuram S/s are fed radially. 400kV Noida Sec. 148 is fed from Gr. Noida (765kV) and 400kV Indirapuram is fed from Aaur 400kV. For quite some time it was being considered to provide alternate source to

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these 400 kV substations but due to congestion & ROW issue it was not possible. However, presently after survey, it is considered through monopole and multi-circuit towers. Hence to remove radial status and to improve reliability, following additional connectivity is proposed as below:

S.N.	Earlier approved in SCM	Additional proposed as
1	Establishment of 400/132kV GIS S/s at Noida-123 approved in 31 <sup>st</sup> SCM dated 02.01.2013	Creation of 400/132/33kV GIS S/s Noida-123, 4x200+4x100 MVA with <u>63 MVAR bus reactor</u>
2	Noida Sec 148 – Noida Sec 123 400kV DC monopole line (Quad)– 20 km approved in 31 <sup>st</sup> SCM dated 02.01.2013	-No change-
3	400kV DC Quad Aatur (400)-Indirapuram (400) line was approved in 26 <sup>th</sup> SCM (Work Completed)	LILO of one Ckt of existing 400kV DC Quad Aatur (400)-Indirapuram (400) UPPTCL line at Noida Sec-123 on monopole – 10km
4	Creation of 400/220 kV S/S Noida Sec-137 was approved with 2x500 MVA in 26 <sup>th</sup> SCM dated 13.10.2008 (now Noida Sec-148)	400/220/132 kV (2x500+2x160) MVA, 220/33 kV (2x100 MVA) S/S Noida Sec-148 substation with 63 MVAR bus reactor (work completed).
5		Noida Sec-123(400)-Noida Sec-115 132kV SC line - 10km
6		Noida Sec-123(400)-Noida Sec-66 132kV SC line – 10km (Quad)
7		Noida Sec-123(400)-Noida Sec 115 Extn. 132kV DC line – 13km
8		Noida Sec-123(400)-Noida Sec-63 132kV DC line on Multicircuit/Monopole – 4 km
9		132kV DC line on Multicircuit/Monopole from Noida 123 (400)- Noida Sec67-5km

#### **12.2.4 Additional 220kV downstream connectivity for Evacuation of 1x660MW Harduaganj TPS & other strengthening of system in the area:-**

UPPTCL stated that in 38<sup>th</sup>SCM dated 30.05.2016, evacuation system of 1x660 MW Harduaganj TPS has been approved. 220 kV lines emanating from Harduaganj TPS are as mention below :-

- 220 kV DC line Harduaganj TPS – Khurja
- 220 kV SC line Harduaganj TPS – Jahangirabad
- 220 kV SC line Harduaganj TPS – Rukhi
- 220 kV SC line Harduaganj TPS – Aligarh Boner
- 220 kV SC line Harduaganj TPS – Sikanrarao
- 220 kV SC line Harduaganj TPS – Atrauli
- 220 kV SC line Harduaganj TPS – Etah

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To remove the over loading of 220 kV downstream at Harduaganj TPS and for reliable supply of 220kV Khair UPPTCL substation, additional connectivity is proposed as below:-

S.N.	Approved in 38thSCM dated 30.05.2016	Proposed As
1	G.T 21/400kV at Harduaganj Extn.	-No change-
2	LILO of one ckt of Aligarh-Sikandrabad 400kV DC line (Isolux line) at Harduaganj TPS – 25 km	-No change-
3	400/220kV , 3x315 MVAICT at Harduaganj Extn.	-No change-
4	220kV Spare bays – 2 nos	-No change-
5	80 MVAR bus Reactor at Harduaganj TPS	-No change-
6		220kV DC line HarduaganjTPS – Khair (220) on single moose conductor on each ckt. – 35km

#### 12.2.5 125 MVAR bus reactor at 400/132kV Masauli(Prayagraj) S/s:

S.N.	Approved in 40 <sup>th</sup> SCSPNR	Proposed As
1	400/132kV, 2x200 MVA Masauli S/s	-No change-
2	LILO of one ckt of Meja _rewa road 400kV DC line (quad) at Masauli S/s	-No change-
3	----	125 MVAR bus Reactor at 400/132kV, 2x200 MVA Masauli S/s

#### 12.2.6 Augmentation at 400kV Sarnath (Varanasi) (from 1x315+2x500MVA to 3x315+1x500MVA)

UPPTCL stated that augmentation at 400kV Sarnath (Varanasi) from 2x315+1x500 to 1x315+2x500MVA was approved in 40<sup>th</sup> SCM dated 22.06.2018 and the approved augmentation was completed. Recently, new 500MVA transformer have got damaged and due to non-availability of spare 500 MVA transformer, UPPTCL has to re-install the removed 315MVA transformer, the works for which are in progress. UPPTCL intimated about the augmentation at 400kV Sarnath (Varanasi) from 1x315+2x500MVA to 3x315+1x500MVA.

**Members noted the modifications (given at 12.2.1 -12.2.6 above) intimated by UPPTCL in the transmission elements already approved in previous Meetings of SCSPNR/NRSCT.**

#### 12.3 Augmentation at 400kV Sohawal PG (from 2x315MVA to 3x315MVA):-

UPPTCL stated that in 40<sup>th</sup> meeting of SCSPNR dated 22.06.2018, UPPTCL had pointed out that to meet the growing demand around Tanda, Gonda, Behraich & Devipatan area, strengthening of 220 kV system was required and after deliberations,

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additional 220 kV system from Sohawal (400kV) (PG) substation and 220 kV system strengthening around Gonda, Behraich and Devipatan area was agreed.

UPPTCL further stated that with connectivity of 08 nos. 220 kV feeders at Sohawal 400/220kV S/s, it is anticipated that 2x315 MVA transformation capacity at Sohawal (PG) S/s may become N-1 noncompliant. Therefore, UPPTCL proposed for augmentation of transformation capacity from 2x315MVA to 3x315MVA at Sohawal (PG) 400/220kV S/s.

**After deliberations, it was decided that the proposal of augmentation at 400kV Sohawal PG (from 2x315MVA to 3x315MVA) would be deliberated in the next NRSCT.**

#### **12.4 Re-orientation of POWER GRID Owned 220kV Tanakpur line bay at 220kV C.B. Ganj S/s:-**

UPPTCL stated that presently, 220 kV C.B. Ganj and 220 kV Dohna S/s are mainly fed by 220 kV S/c from 400 kV Bareilly (UPPTCL) S/s. Bareilly (400)–Dohna, Bareilly (400)–C.B. Ganj 220kV lines often get highly loaded as also being pointed out by NRLDC. In order to remove the congestion, II<sup>nd</sup> 220kV Bareilly (400)–C.B. Ganj SC line (24 km) and II<sup>nd</sup> ckt. 220 kV Bareilly (400)–Dohna SC line (8 km) transmission work is being carried out by UPPTCL.

To terminate II<sup>nd</sup> 220kV Bareilly (400)–C.B. Ganj line at 220kV C.B. Ganj, reorientation of 220 kV bays at 220 kV C.B. Ganj S/S need to be done due to location of towers for additional ckt. In order to carry out this work, PGCIL bay 01 no. for C.B. Ganj S/S – Tankapur at 220kV C.B. Ganj is to be shifted in same switchyard. PGCIL connectivity of substations alongwith line length will remain same.

**After deliberations, following was agreed:**

- (i) 2<sup>nd</sup> circuit of 220kV Bareilly (400)–C.B. Ganj line
- (ii) 2<sup>nd</sup> circuit of 220Kv Bareilly (400)–Dohna line
- (iii) Shifting and reorientation of PGCIL bay (01 no.) for C.B. Ganj S/S – Tankapur at C.B. Ganj

#### **13.0 Augmentation of 400 kV substation at Nawada:**

- 13.1 CEA stated that Nawada 400 kV S/s was approved in 23<sup>rd</sup> meeting of Standing Committee on Power System Planning of Northern Region and the sub-station was commissioned with transformation capacity of 2 x 315 MVA. HVPNL vide their letter dated 09.04.2019 has informed that they have completed the work of augmentation of the transformation capacity at Nawada 400/220 kV S/s by adding third transformer of capacity 315 MVA, to increase the load growth and improved reliability. However, for giving charging permission for the 3<sup>rd</sup> transformer, NRLDC has sought the approval of the NRSCT.

To discuss the above issue, a meeting was held in CEA with representatives from CTU, HVPNL, POSOCO on 11.4.2019, wherein, the augmentation of transformation capacity at Nawada 400/220 kV S/s by adding third transformer of capacity 315 MVA was agreed in principle subject to ratification in the forthcoming meeting of NRSCT. HVPNL was also requested to intimate all Intra – State transmission schemes which involve reconfiguration of ISTS elements, inter-connection with ISTS elements and all 400 kV Intra-State schemes which are already under implementation/planned and has



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not been intimated earlier in NRSCT.

- 13.2 Members concurred the in-principle approval for the above transmission element of HVPNL. HVPNL informed that the 3rd ICT has already has been commissioned.
- 13.3 POSOCO raised the issue of switchgear upgradation from 2000 Amp to 3150 amps at Nawada 400/220 kV substation and Greater Noida 400/220 kV substation.
- 13.4 UPPTCL informed that switchgear upgradation works at Gr. Noida (400) S/S completed and CT, Isolator, Circuit breakers have been replaced.
- 13.5 CEA informed that in the meeting held in CEA on 11.04.2019, HVPNL has agreed to upgrade the switchgear rating of Nawada 400 kV substation. POSOCO stated that Nawada is part of 400 kV ring of Delhi with quad conductors. The 2000 amp switchgear rating at Nawada restricts the adequate utilization of the 400 kV ring network of Delhi.
- 13.6 HVPNL was requested to carry out the switchgear upgradation works at Nawada at the earliest. HVPNL agreed for the same and stated that they would also explore PSDF funding for the scheme.

#### **14.0 Transfer of Connectivity of Malana-II HEP**

- 14.1 CEA stated that CTU vide its email dated 12.03.2019 had forwarded Everest Power Private Limited (EPPL) letter dated 18.02.2019 (regarding transfer of connectivity of Malana-II HEP. In the letter, it was stated that evacuation of power from Malana-II HEP to Nalagarh through the ADHPL transmission line is an interim arrangement and Malana-II would shift to the 220kV Chhaur- Banala transmission line constructed by HPPTCL once it is completed. HPPTCL have informed that the line is nearing completion and would get commissioned in March, 2019 and have asked EPPL to apply for LTOA. Accordingly, EPPL requested CTU for connectivity through Chhaur – Banala transmission line of HPPTCL & requested to address issues related regarding POC charges, LTA/BPTA, transmission charges from Chhaur to Banala etc. In view of above, CTU has requested to convene a meeting with stakeholders including CEA, CTU, POSOCO, HPPTCL, HPSLDC, PSPCL, AD Hydro and EPPL so as to enable smooth transition.

To deliberate on the above issue, a meeting was held on 26.03.2019 in CEA, wherein, following was agreed:

- a) Shifting of the connectivity of Malana-II HEP from the interim arrangement i.e. LILO of one circuit of AD HEP – Nalagarh 220 kV D/c line (of M/s AD Hydro) at 220/132kV Chhaur substation to the final arrangement i.e. Chhaur–Banala 220 kV D/c line
- b) M/s EPPL to apply for connectivity to STU and NoC granted by STU to be submitted to CTU for revised LTA intimation to M/s EPPL.
- c) M/s AD Hydro, EPPL and HPPTCL to coordinate among themselves to minimize the shut down time for smooth switch over from interim arrangement to final arrangement.
- d) M/s AD Hydro, EPPL and HPPTCL to coordinate among themselves and with POSOCO to plan shut down timing to minimize generation loss during the shutdown.

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- 14.2** CEA further stated that subsequently, PSPCL vide their letter no 849/ISB-395 dated 29.4.2019 has forwarded certain observations on Para no 5 of minutes of the meeting held on 26.03.2019 in CEA.

Following is mentioned under Par-5 of the minutes:

*“PSPCL stated that with shifting of connectivity, PSPCL has to bear STU charges also. It was clarified that at present PSPCL is bearing the charges for transmission of power from Malana II to Nalagarh through M/s AD Hydro line i.e. AD HEP – Nalagarh 220 kV D/c line. So instead of these charges, they have to bear charges of Chhaur – Banala 220 kV D/c line.”*

PSPCL has requested to replace the above Para with the following:

*PSPCL stated that with the shifting of connectivity, STU charges shall also become applicable in addition to CTU charges and PSPCL stated that as recorded in the MoM of 31<sup>st</sup> meeting of Standing Committee on Power System Planning of Northern Region M/s EPPL would have to pay STU charges and M/s EPPL has also agreed to sort out all commercial issues with HPPTCL. PSPCL further stated that PSPCL should not be burdened with transmission charges over and above the charges as provided in PSA.*

- 14.3** Members deliberated on the technical details of the proposal of shifting on connectivity of Malana II HEP from interim arrangement ( LILO of one circuit of AD HEP – Nalagarh 220 kV D/c line (of M/s AD Hydro) at 220/132kV Chhaur substation) to the final arrangement i.e. Chhaur–Banala 220 kV D/c line and concurred the same. The commercial aspects were not deliberated.
- 14.4** Regarding the modification in the minutes of the meeting held on 26.03.2019 proposed by PSPCL, CEA clarified that the same related to commercial aspects and the matter needs sorted out mutually or at appropriate forum.

**15.0 Utilization of 2 nos. 220 kV Feeder Bays at 400 kV GSS Sikar (PGCIL) by RVPN:**

- 15.1** CEA stated that RVPN vide their letter RVPN/SECP&P)/XEN-2CP&P)/ AE-2/ F. /D-119 dated 2.5.2019 forwarded the proposal for utilization of 2 nos. 220 kV feeder Bays at 400 kV GSS Sikar (PGCIL) by LILO of 220 kV Sikar (220 kV GSS)-DhodS/C line at Sikar (PGCIL).

In the 34<sup>th</sup> meeting of SCSPNR held on 8<sup>th</sup> August 2014, augmentation of 1x500MVA, 400/220 kV transformer at Sikar(PG) was agreed. Construction of 2 nos. 220 kV feeder bays was also agreed subject to confirmation of its requirement by RVPN. Subsequently, RVPN had confirmed the requirement of 2 nos. 220 kV Feeder Bays at 400 kV GSS Sikar (PGCIL). RVPN had also confirmed that RVPN would lay 220 kV D/C line from 400 kV GSS Sikar to nearby 220 kV GSS after receiving technical feasibility from the field. However, due to severe problem of RoW, RVPN was unable to frame a suitable proposal for utilization of 2 nos. 220 kV line bays.

In the 2<sup>nd</sup> meeting of NRSCT, RVPN requested to allocate the 220 kV Bays for wind/solar developers or utilize for any other purpose as RVPN was unable to utilize the bays. M/s PGCIL vide letter dated 04.01.2019 had intimated that allocation of these bays to RE developers can be considered in future depending on stage-II connectivity applications received at Sikar. RVPN vide their letter dated 2.5.2019 has proposed to

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utilize 2 nos. 220 kV feeder bays at 400 kV GSS Sikar (PGCIL) by LILO of 220 kV Sikar (220 kV GSS)-Dhod S/C line at Sikar (PGCIL) by using the 2 km XLPE underground cable to avoid RoW problem. This proposal will provide an additional circuit between the 400 kV GSS Sikar (PGCIL) and 220 kV GSS Sikar (RVPN)

- 15.2** RVPNL stated that load flow studies have been carried out by them for condition corresponding to 2021-2022 for a total Rajasthan system load of 14430 MW. From the studies, it is observed that the loading on 220 kV Sikar (PGCIL)-Sikar (RVPN)D/c line reduces to 265 MW from 427 MW, after carrying out by LILO of 220 kV Sikar (220 kV GSS)-Dhod S/C line at Sikar (PG). This connectivity would also help to serve the anticipated load growth in that region.
- 15.3** After deliberations ,the following proposal was agreed by the members:
- i) LILO of 220 kV Sikar (220 kV GSS)-Dhod S/C line at Sikar (PG) - under the scope of RVPNL
  - ii) 2 nos. 220 kV bays at 400kV GSS Sikar (PG)- under ISTS ( already existing)

**16.0 Stringing of 2<sup>nd</sup> Circuit on 220 kV Khodri-Majri S/C line on D/C towers-reg.**

- 16.1** CEA stated that HPPTCL vide their letter no. HPPTCL/CEA-Vol\_IV/2019-700 dated 18.04.2019 has requested for approval of 2nd circuit on 220 kV Khodri-Majri S/C line on D/C towers. The stringing of 2nd circuit on 220 kV Khodri –Majri S/C line on D/C towers of HPPTCL which was deliberated in 7th meeting of NRPC held on 20<sup>th</sup> December, 2007 and PTCUL /UJVNL had informed that all issues regarding termination of 2<sup>nd</sup> circuit of 220 kV Khodri –Majri line at Khodri had been resolved. HPPTCL has intimated that HPPTCL is ready for to stringing of 2<sup>nd</sup>circuit on 220 kV Khodri-Majri D/C line and requested for CEA approval.
- 16.2** HPPTCL stated that the 2nd Circuit on 220 kV Khodri-Majri S/C line is required for reliability of power.
- 16.3** After deliberations, HPPTCL proposal of stringing of 2nd circuit on 220 kV Khodri-Majri S/C line on D/C towers was agreed by the members of NRSCT.

**17.0 LILO of Baghpat PG(400)-Muradnagar-II (400)220 kV, SC UPPTCL line at MadolaVihar 220 /33kV, 3x60 MVA UPPTCL substation.**

- 17.1** CEA stated that UPPTCL vide their letter no 380/Dir.(Comm. &Plg.)/UPPTCL /CEA/2019 dated 12.04.2019 informed that the following 220 kV downstream U.P network to Baghpat 400/220 kV, PGCIL substation was agreed in 40<sup>th</sup> meeting of SCSPNR held on 22.06.2018: -

- **LILO of Muradnagar-II (400)- Baghpat PG (400)220 kV SC UPPTCL existing line at 220 kV Baghpat substation U.P.**

(Baghpat PG (400)-Baghpat U.P 220 kV, SC line already exist and after above LILO, Baghpat PG (400)-Baghpat UP will be 220 kV, DC line).

The above LILO at Baghpat (220) substation work is under construction but delayed and temporarily held up due to some R.O.W. constraints. After above LILO, Baghpat (220) -Muradnagar –II (400 )220 KV, SC section is further to be LILOed at 220/33 KV, 3X60 MVA UPPTCL MandolaVihar (Ghaziabad) substation approved by UPPTCL as intra state network and which will soon be additionally connected with 400/220 kV,

Minutes of 3<sup>rd</sup> NRSCT held on 24.5.2019 at NRPC, new Delhi

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Ataur (Ghaziabad) 220kV substation.

Mandola Vihar substation and related LILO work is complete and is ready of energization. UPPTCL however is not getting energization code from NRLDC to connect Mandola Vihar substation by LILO of Baghpat (400)-Muradnagar-II (400)220 kV, existing SC line in the absence of NRSCT approval.

UPPTCL has requested approval of the following proposal as the agreed proposal is delayed due to R.O.W issues:

- i) LILO of Muradnagar –II (400)-Baghpat (400) PG 220 kV S/C UPPTCL line at 220 /33 KV MandolaVihar UPPTCL substation (MandolaVihar substation will initially draw 20-25 MVA load).
- ii) LILO of Baghpat (PG)-MandolaVihar 220 kV, S/C line section at 220 kV, Baghpat U.P substation. (shall be done later after clearance of R.O.W).

17.2 After deliberations, members agreed with UPPTCL proposal.

**18.0 Approval for charging of 10 MVA 220/11 kV Power Transformer Captive Bay at Salal Power Station (6 x 115 MW), NHPC**

18.1 CEA stated that NHPC vide their letter dated 29.03.2019 informed that constraints are observed in supply of auxiliary power to Salal Power Station (6 x 115 MW) of NHPC from 132/33 kV Jhajhhar Kotli substation (JKPDD) through 33kV D/C line. In order to improve the reliability of auxiliary power, NHPC had planned for installation of 220/11 kV transformer in the existing 220 kV yard of Salal HEP and the works have been completed for the same. However, for issue of charging code for energizing the transformer NRLDC has requested NHPC to submit the approval of NRSCT and updated connection agreement.

To deliberate on the issue a meeting was held on 18.04.2019 in CEA with representatives from POSOCO, CTU and NHPC and charging 10 MVA 220/11 kV Power Transformer Bay at Salal Power Station of NHPC for improving reliability of auxiliary power supply was agreed in-principle.

18.2 After deliberations, Members concurred the in-principle approval of 10 MVA, 220/11 kV Power Transformer Captive Bay at Salal Power Station (6 x 115 MW), NHPC. NHPC to comply with necessary procedural/regulatory requirement for implementation of the scheme, if any.

**19.0 Proposal for adding new Transmission element i.e. 400kV/22kV, 25MVA Station Transformer at existing 420kV GIS System of 1500MW Nathpa Jhakri Hydro Power Station**

19.1 CEA stated that SJVN vide their letter dated 10.04.2019 has requested for approval of 400kV/22kV, 25MVA Station Transformer at existing 420kV GIS System of 1500MW Nathpa Jhakri Hydro Power Station which is expected to be commissioned in the month of June, 2019.

19.2 SJVN informed that 1500 MW (6x250MW) Nathpa Jhakri Hydro Power Station was put to commercial operation in between Oct. 2003 to May, 2004. As per original sanction scheme, the Unit Auxiliary Consumption is drawn directly from each Generating Unit by tapping 15.75kV Bus Duct through 15.75kV/0.145kV, 630KVA Unit Auxiliary Transformer. The Service Station Supply is taken from HPSEB Ltd.

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(DISCOM) network through 22kV feeders from 220/66/22 Sub Station at Kotla & 66/22kV Sub Station at Nathpa. Over the years, HPSEB Ltd. had revised the schedule of tariff and though installation of own Service Station Transformer at 400kV Bus Bar at existing 420kV GIS System by NJHPS may not only more economical but the quality, reliability & availability of the power will increase manifold.

SJVN stated HETD division, CEA has technically approved SJVN proposal for installation of 25MVA, 400kV/22kV substation at 1500MVA NJHPS vide their letter no 10/3HE&TD-2008/488 dated 25.06.2009 and accordingly they have gone ahead with the implementation of the proposal.

- 19.3** HPPTCL stated that with installation of 400kV/22kV, 25MVA Station Transformer at NJHPS, the power flow in its 22 kV feeders from 220/66/22 Sub Station at Kotla & 66/22kV Sub Station at Nathpa would reduce, which would have a significant impact on their revenue as well as underutilization of the network created for the purpose.

SJVN stated that the HPPTCL supply for auxiliary power would also kept on standby mode as an alternative source.

- 19.4** POSOCO stated that any change in the grid need to be authorized by the planners of the system and any change at the connection point need to be reflected in the connection agreement. The generating stations, which would be establishing the 400 kV transformer and therefore would be able to draw power, even when generation is not available. The line availability for auxiliary powers drawl becomes important. This changed/modified part should be incorporated in connection agreement for further references and documentation

- 19.5** CTU stated that there is no change in evacuation system of the project nor any change in the connectivity that has been granted, therefore, change in the connection agreement was not required.

- 19.6** POSOCO suggested that any equipment changes/rating modification/new equipment/any other additional information should be incorporated in connection agreement and shared by modifying the connection agreement itself. In this way, planners and operators would also be aware of the changes in the system and would carry out respective studies accordingly.

- 19.7** CEA stated that documentation of changes in the transmission system is required. Documentation of these changes through connection agreement modification or addendum to the connection agreement or any other means needs to be further deliberated.

- 19.8** After deliberations, the proposal of SJVNL regarding installation of 400kV/22kV, 25MVA Station Transformer at existing 420kV GIS System of 1500MW Nathpa Jhakri Hydro Power Station Hydro Power Station was agreed. It was also agreed that the commercial issues between SJVNL and HPPTCL may be settled mutually.

**20.0 Transmission System for evacuation of Power from potential solar energy zones (20 GW) in Northern Region.**

- 20.1** CEA stated that Govt. of India had set a target for establishing 175 GW renewable capacity by 2022, which includes 100 GW Solar, 60 GW Wind generation capacity. MNRE vide its order dated 08.06.2018 had constituted a Sub-Committee to identify ISTS connectivity for renewable energy projects from potential solar energy zones (SEZs) and potential wind energy zones (WEZs) of about 50 GW and 16.5 GW respectively. SEZs and WEZs envisaged in 7 RE rich states (Tamil Nadu, Andhra

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Pradesh, Karnataka, Gujarat, Rajasthan, Maharashtra and Madhya Pradesh) were identified by SECI in association with MNRE in consultation with RE power developers.

To ease implementation of transmission infrastructure, it was proposed to bifurcate these requirements in two phases. A total of 20 GW solar & 9 GW wind projects has been planned in Phase-I (up to Dec'2020) and 30 GW solar & 7.5 GW wind has been planned for Phase-II (Dec' 2021). For Northern Region the same translates into a requirement of 10 GW solar in Phase-I (up to Dec'2020) and 10 GW solar in Phase-II (Dec'2021) totalling to 20 GW. The details of SEZs in Northern Region are given below:

State/District	Solar Energy Zones		
	Ph-1 (GW)	Ph-2 (GW)	Total
	2020	2021	
<b>Rajasthan</b>			
Jaisalmer (S: Ramgarh, Fatehgarh)	5	3	8
Jodhpur (S: Phalodi)	2	1	3
Bikaner (S: Kolayat/Pugal)	3	1	4
Barmer (S: Barmer)	0	5	5
<b>Subtotal</b>	<b>10</b>	<b>10</b>	<b>20</b>

MNRE has subsequently revised Solar Potential complexes details in Rajasthan for development by 2020/2021 in two phases, which is as under:

District	Taluk/Tehsil	Ph-1(GW) 2020	Ph-2(GW) 2021	Total
Jaisalmer	Kuchhri	-	4.00	4.00
	Fatehgarh	3.50	2.20	5.70
Jodhpur	Phalodi/Bhadla	3.55	1.75	5.30
Bikaner	Koyalat /Pugal	1.85	3.15	5.00
<b>Total</b>		<b>8.90</b>	<b>11.1</b>	<b>20</b>

**20.2** Out of total 20 GW REZ [Solar] in Rajasthan, transmission system for 8.9 GW in Bhadla (3.55 GW), Fatehgarh (3.5 GW), Bikaner (1.85 GW) complexes under Phase-I, was agreed in the 2nd meeting of Northern Region Standing Committee on Transmission (NRSCT) held on 13.11.2018.

**20.3** Out of 8.9 GW solar energy zones, new applications for 3.1 GW capacity is already granted at Bhadla, Fatehgarh and Bikaner complex. New Stage-II Connectivity applications have been agreed for grant for 1100 MW in above complexes. Further, additional Solar application for Stage-II Connectivity for 2190 MW quantum is also received in above complexes recently. LTA applications has been received for additional 600 MW Solar (Schedule-Dec'20/May'21) at Fatehgarh-II, which makes total new LTA applications for 3700 MW (3100MW granted+600MW new applications) in above complexes. The details of connectivity/LTA granted are as follows:

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Sl no.	Location	St-II granted/ (MW) connectivity	LTA granted (MW)
1	Bhadla	3380	3380
2	Bhadla-II	300 (agreed for grant)	-
3	Fatehgarh	2200	2200
4	Fatehgarh-II	2390* (agreed for grant)	600 (agreed for grant)
5	Bikaner	850 + 600 (agreed for grant)	850

**20.4** For the balance 11.1 GW Solar (Out of total 20 GW REZ [Solar]), joint study meetings amongst CEA, CTU and POSOCO were held on 24.04.2019 and 25.04.2019 in order to identify the broad transmission schemes to cater to the balance REZs in NR. Studies has been carried out for solar maximized scenario with solar generation dispatch in Rajasthan ISTS SEZ is considered as 100%, whereas Rajasthan wind generation dispatch is considered as 30% (Intra State is considered as 80%). All India Demand is considered as per the 19th EPS of CEA (2021-22). Based on the discussions & past trends, for solar maximized scenario, demand has been considered as about 90% of the peak demand of 19th EPS for various regions except for Northern region where it is considered as about 95% of the peak demand. In the studies, all India transmission network up to 220kV level has been simulated. This includes, existing and well as under construction transmission network incl. high capacity transmission corridors and Green Energy Corridors.

Considering envisaged RE (wind & solar) capacity addition and to achieve Load-generation balance, Thermal generation dispatch is reduced upto 55%, wherever required. At some of the locations, thermal generation is even needed to be backed down

**20.5** The transmission system proposed for integration of 11.1 GW solar potential in Rajasthan [Phase –II :11.1GW] from Ramgarh/Kuchheri (4 GW), Bikaner (3.15 GW), Bhadla (1.75GW) & Fatehgarh (2.2 GW) is summarized below:

- i) Establishment of 765/400/220kV 3x1500 MVA, 8x500 MVA pooling station at suitable location near Ramgarh/Kuchheri in Distt Jaisalmer (Ramgarh-II PS)
- ii) Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Sikar (Sikar-II Substation)
- iii) Establishment of 765/400kV, 2x1500MVA substation at suitable location near Kadarapur (Kadarapur-II substation)
- iv) Establishment of 400/220kV, 7x500MVA pooling station at suitable location near Bikaner (Bikaner-II PS)
- v) Augmentation with 765/400kV, 2x1500MVA transformer (5<sup>th</sup> & 6<sup>th</sup>) at Fatehgarh-II PS
- vi) Augmentation with 400/220kV, 4x500MVA transformer at Fatehgarh-II PS

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- vii) Augmentation with 765/400kV, 2x1500MVA transformer (4<sup>th</sup> & 5<sup>th</sup>) at Bhadla-II PS
- viii) Augmentation with 400/220kV, 4x500MVA transformer at Bhadla-II PS
- ix) Ramgarh-II PS –Fatehgarh-II PS 765 kV D/c Line
- x) Ramgarh-II PS – Jaisalmer-II (RVPN) 400 kV D/c Line (Twin HTLS)
- xi) Fatehgarh-II PS – Bhadla-II PS 765kV D/c line (2<sup>nd</sup>)
- xii) Bhadla-II PS – Sikar-II 765kV 2xD/c line
- xiii) Sikar-II – Kadarapur-II 765kV D/c line
- xiv) Sikar-II – Neemrana 400kV D/c line (Twin HTLS)
- xv) Sikar-II- Phagi 765kV D/c line
- xvi) LILO of 765kV Jhatikara – Agra S/c line at Kadarapur-II
- xvii) Kadarapur-II – Bareilly 765kV D/c line
- xviii) Kadarapur-II – Prithala 400kV D/c line (Twin HTLS)
- xix) Bikaner-II PS – Khetri 400kV 2xD/c line (Twin HTLS line on M/c tower)
- xx) Khetri - Bhiwadi 400kV D/c line (Twin HTLS)\*\*
- xxi) Bikaner-II PS – Bikaner (PG) 400kV D/c line (Twin AL59)
- xxii) Reversal of Polarity of  $\pm 500$ kV, 2500MW Balia – Bhiwadi HVDC line upto 2000MW power flow capacity from Bhiwadi to Balia for solar maximized time
- xxiii) 220kV line bays for interconnection of solar projects at Bikaner-II PS (11 nos.), Ramgarh-II PS (14 nos), Fatehgarh-II PS (7 nos) & Bhadla-II PS (6 nos)
- xxiv) Associated reactive compensation (Bus/Switchable line reactors)

**Estimated Cost: Rs 12,700 Cr**

*\*\*There is a space/ROW constraint at Bhiwadi S/s, accordingly other suitable arrangements may need to be explored.*

**20.6** RVPNL stated that, the intra-state EHV transmission in Western Rajasthan is sufficient to evacuate about 10 GW RE projects (7.4 GW already commissioned and 1.3 GW under implementation). In addition to this, 2 GW, 2.1 GW and 2.211 GW of RE capacity addition is expected in the year 2020-21, 2021-22 and 2022-23 respectively. For evacuation of this additional 6.3 GW RE capacity, 765/400 kV Jodhpur GSS (Hingola) along with its interconnections with Phagi 765/400 kV GSS has been planned.

**20.7** CEA stated that out of the total potential of 20 GW RE potential in Rajasthan, transmission system for 8.9 GW RE has already been planned under ISTS. Additional RE addition of 4.1 GW (3.1 GW Solar & 1 GW Wind) in time frame of 2021-22 is planned by Rajasthan in intra-state, which includes about 3 GW Solar located in Jaisalmer (2.1 GW), Jodhpur (0.7 GW) & Bikaner (0.2 GW) area . Therefore, after accounting for development of above Solar generation (3.0 GW) in Intra State network in similar pockets, transmission system for only 8.1 GW of RE potential is required to be planned under ISTS as compared to 11.1 GW system that has been proposed earlier.



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**20.8** After deliberations, it was decided that a joint study meeting would be convened in the 2nd/3rd week of June'2019 to further deliberate on the scheme. All the members were requested to send their comments on the transmission system proposed as well as the on load flow file based on which the transmission system for evacuation of power from 8.1 GW RE (solar) projects has been proposed.

**21.0** Transmission schemes referred back to Standing Committee on Transmission/CEA by the NRPC in their 44<sup>th</sup> meeting held on 19.03.2019.

**21.1** Transmission schemes for Solar Energy Zones (SEZs) in Rajasthan (8.9 GW)

**21.1.1** CTU stated that the transmission scheme for evacuation of 8.9 GW of RE power from Solar Energy Zones (SEZs) in Rajasthan has been referred back to Northern Region Standing Committee on Transmission by NRPC due to objections raised by Rajasthan and Punjab.

Rajasthan has stated the scheme was being setup for evacuating RE power in order to fulfill the RPOs of other states. As Rajasthan is already fulfilling its RPO obligations, there should be no financial implications of the scheme on Rajasthan. Rajasthan has further proposed that before approval of schemes in Standing Committee, distribution utilities needs may be taken into consideration.

Punjab had objected to the augmentation of 1x1500 MVA, 765/400 kV ICT (3<sup>rd</sup>) at Moga substation as it would further increase the fault level at Moga, which is already at higher side and with ISTS injection in west of Punjab (at Moga), their associated 220 kV network is strained. Punjab has further proposed that financial implications on PoC should be highlighted well in advance before finalizing or approving large schemes.

**21.1.2** CEA stated the transmission scheme for evacuation of 8.9 GW of RE power from Solar Energy Zones (SEZs) in Rajasthan was agreed technically in the 2<sup>nd</sup> NRSCT meeting held on 13.11.2018. CTU has already filed the petition for regulatory approval of the scheme. If any observation is there with respect to the technical details of the scheme the same could be deliberated in the meeting. Other issues related to financial implications may be taken up by the constituents with CERC/NRPC.

**21.1.3** PSTCL stated that they have requested to review the proposal of additional 1x1500 MVA (3<sup>rd</sup>) transformer at Moga 765/400kV S/s under the transmission scheme "Transmission Schemes for Solar Energy Zones (REZS) in Rajasthan" as the fault levels at Moga 400kV and 220kV have already exceeded the design limit and with the 3<sup>rd</sup> 1500 MVA (3x500 MVA) ICT, the fault level will further increase.

The observations made by PSTCL are as follows:

- a) As per their studies, in the paddy season, the loading 2x1500 MVA, 765/400kV transformers is only 17% and will further decrease with installation of additional transformer. Installation of third 1x1500 MVA, 765/400kV ICT at PGCIL Moga S/S may not be beneficial on account of power evacuation point of view as the MW flows through the ICTs at Moga remain unaffected because of its direct connectivity with Talwandi-Sabo TPS of 3x660 MW.
- b) In the light load conditions, Punjab's load reduces to about 3000-3500 MW especially in winters, problem of high bus voltages at 220/ 400/ 765kV buses arises.

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- c) Fault level at PGCIL Moga has already exceeded design limit . Under these circumstances, it may not be beneficial for the system to have more 1x1500 MVA, 765/400 kV ICT & 765 /400 kV lines to be terminated at Moga.
- d) CTU studies shows about 4000 MW of RE power injection from Bikaner to Moga through 765 kV D/C line and drawl of about 3000 MW through 3 nos. of 765/400 kV ICTs at Moga. Injection of such quantum of power at Moga (in western side of Punjab) is going to overload the associated 400 kV and 220 kV systems of Punjab.
- e) To control the short circuit level at Moga 220 kV and 400 kV level, bus splitting at 765 kV or 400 kV level may be considered and outlets may be planned from Moga so that their 220 kV system do not get overloaded.

**21.1.4** CEA stated that to deliberate on the issues raised by PSTCL vide their letter dated 6.12.2018, a meeting was held in CEA on 16.5.2019. In the meeting, the above issues raised by PSTCL were deliberated and following was decided:

- a) To address the issue of high short circuit level at Moga 400kV and 220 kV, bus splitting at Moga would be studied.
- b) To address the issue of overloading of 220 kV PSTCL network due to injection at Moga from RE generation in Rajasthan, addition outlets towards eastern Punjab or any other suitable option would be studied.
- c) Punjab would furnish the LGB (Load Generation Balance) scenarios for Punjab which could be studied.
- d) The All-India study file would be shared with PSTCL and PSTCL would check their network representation 220 kV and above in the file and suggest the necessary changes required to be done in the file.

CEA further stated that PSTCL has furnished five scenarios along with generation dispatch and load demand to be considered for studies vide their mail dated 22.05.2019.

**21.1.5** The issue was further deliberated and it was agreed that studies would be carried by CEA and CTU based on the inputs furnished by PSTCL, to evolve additional transmission schemes (inter-state as well as intra-state) in order to address the technical concerns raised by PSTCL. The same would be deliberated in a joint meeting of CEA, CTU and PSTCL to be held on 3<sup>rd</sup>/4<sup>th</sup> June 2019. The transmission scheme finalized in that meeting would also be included as agenda for the 45<sup>th</sup> NRPC meeting scheduled on 6<sup>th</sup> and 7<sup>th</sup> June 2019.

**21.1.6** Subsequently, a meeting was held on 3<sup>rd</sup> & 4<sup>th</sup> June 2019 (minutes enclosed as Annexure-II) at PSTCL office, Patiala and Chandigarh, among CEA, CTU and PSTCL wherein ,following was agreed:

- i) In order to resolve the issues of high short circuit levels of Moga(PG) 400kV bus, bus split arrangement will be required. The following splitting option resolves the issues of high short circuit level and high loading levels on 765/400kV transformers at Moga:

**400kV Bus Section-1**

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

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**400kV Bus Section-2**

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

ii) The above splitting arrangement would require relocation of the bays for bus section-1 for which existing buildings shall have to be relocated for space creation. Further, other options for interconnection of feeders of bus section-1 to 400kV main Bus (bus section-2) through GIS bus duct needs to be explored.

It was agreed in principle that the Bus Bar splitting at Moga would be done by suitable reengineering and it would become part of Bikaner- Moga 765 kV D/C line as a supplementary ISTS strengthening scheme. This Scheme shall remain associated with the transmission scheme of Bikaner-Moga 765 kV D/C line and would require to be completed in same time of the line. However, since Bikaner-Moga line is in advance stage of implementation, suitable operational measures in consultation with POSOCO shall need to be taken in forthcoming meeting.

iii) With the above proposed Moga bus split arrangement, 3rd 1x1500 MVA, 765/400kV transformer at Moga is not required as a part of the present scheme of Transmission system of Rajasthan Solar Energy Zones (8.9 GW).

**21.2 Augmentation of transformation capacity in Northern Region, 2 nos. of 400 kV line bays (GIS) at 400/220 kV Chamera substation and 2 nos. of 220 kV line bays at 400/220 kV Samba (Jatwal) substation.**

**21.2.1** CTU stated that the schemes viz 2 nos. of 400 kV line bays (GIS) at 400/220 kV Chamera substation and 2 nos. of 220 kV line bays at 400/220 kV Samba (Jatwal) substation has been referred back to Member (Power System), CEA in view of CE, PSPA-II letter dated 08.03.2019. In the CEA letter addressed to Member Secretary of RPCs it has been requested that if any issue related to transmission planning is brought to the notice of RPC Secretariat, the same may be referred to Member (Power System), CEA, so that it could be examined in context of coordinated planning by CEA.

**21.2.2** CEA clarified that the above letter has been issued for schemes which are directly brought to the RPC secretariat without deliberations in the Regional Standing Committee on Transmission. However, the scheme 2 nos. of 400 kV line bays (GIS) at 400/220 kV Chamera substation was deliberated and agreed in the 40th meeting of SCPSPNR held on 22.6.2018 and the scheme 2 nos. of 220 kV line bays at 400/220 kV Samba (Jatwal) substation was deliberated and agreed in the 2<sup>nd</sup> meeting of NRSCT held on 13.11.2018.

**21.3 Provision of 125 MVAR bus reactor each at Jalandhar and Patiala**

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**21.3.1** CTU stated that NRPC has approved the 125 MVAR bus reactors subject to final approval regarding AIS or GIS bay and their location from Standing Committee considering space constraints.

**21.3.1** The issue was deliberated and it was agreed that the 125 MVAR bus reactors would be implemented at Jalandhar and Patiala with AIS bays. To overcome the space constraints for implementing AIS bays under ISTS, necessary re-engineering would be carried out by POWERGRID at Jalandhar and Patiala 400/220 kV substations instead of providing GIS bays.

**22.0 Transmission system for Solar Energy Zones in Rajasthan (8.9 GW) - Provision of spare ICT/Reactors and 240 MVAR bus reactor at Phagi 765/400 substation of RVPN in the already agreed transmission scheme.**

22.1 The transmission system for evacuation of power from potential solar energy zones for 8.9 GW in Bhadla (3.55 GW), Fatehgarh (3.5 GW), Bikaner (1.85 GW) complexes under Phase-I, was agreed in the 2<sup>nd</sup> meeting of Northern Region Standing Committee on Transmission (NRSCT) held on 13.11.2018. Transmission schemes were formed, which were deliberated in the 2<sup>nd</sup> meeting of National Committee on Transmission (NCT) held on 04.12.2018 & 3<sup>rd</sup> ECT meeting held on 21.12.2018. The transmission scheme associated with potential RE projects in Northern Region along with recommendation of 2<sup>nd</sup> NCT and 3<sup>rd</sup> ECT regarding its implementation are as given below:

S. No.	Name of Scheme	ECT Recommendation
1	Transmission system associated with LTA application from Rajasthan SEZ Part-A	RTM (POWERGRID)
2	Construction of Ajmer (PG)-Phagi 765 kV D/C line along with associated bays for Rajasthan SEZ	TBCB
3	Scheme Transmission system associated with LTA applications from Rajasthan SEZ Part-B	TBCB
4	Transmission system associated with LTA applications from Rajasthan SEZ Part-C	TBCB
5	Transmission system associated with LTA applications from Rajasthan SEZ Part-D	TBCB
6	ICT Augmentation works at existing Moga (PG) ISTS S/S associated with LTA applications from SEZs in Rajasthan	RTM (POWERGRID)
7	ICT Augmentation works at Bhadla (PG) associated with 1630 MW LTA granted at Bhadla	RTM (POWERGRID)
8	ICT Augmentation works at existing Bhiwani (PG)IST S/S associated with LTA applications from SEZs in Rajasthan	RTM (POWERGRID)
9	Transmission system for providing connectivity to RE projects at Bikaner(PG)*	Proposed for potential basis based on the LTA applications of SECI
10	Transmission system for providing connectivity to RE projects in Fatehgarh-II*	
11	Transmission system for providing	

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connectivity to RE projects in Bhadla-II*
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\* The schemes to be taken up for implementation after receipt of connectivity/LTA applications from RE generation developers / LTA applications from SECI

22.2 CTU stated that in the 2<sup>nd</sup> meeting of NRSCT held on 13.11.2018, as part of the scheme, future scope/space provision was also agreed at new substations/pooling stations. Subsequently, in the 3<sup>rd</sup> meeting of Empowered Committee on Transmission (ECT) held on 21.12.18, the scheme was approved with few minor modifications in the future provisions at new substations/pooling stations. Accordingly, a comparative table on change in future provisions at new substations/pooling stations is listed as under:

Scope wrt future provisions	2 <sup>nd</sup> NR SCT	3 <sup>rd</sup> ECT
<b>Fatehgarh-II PS</b>		
i) 765/400 kV ICT along with bays	1 no	3 Nos.
ii) 400/220 kV ICT along with bays	11 Nos	10 Nos
iii) 220kV Line Bays	19 Nos	18 Nos
iv) 765kV Bus reactor along with Bays	NIL	1 no
v) 400kV Bus reactor along with Bays	NIL	1 no
<b>Bhadla-II PS</b>		
i) 765kV Line Bays	4 Nos	6 Nos
ii) 765kV Bus reactor along with Bays	NIL	1 no
iii) 400kV Bus reactor along with Bays	NIL	1 no
<b>Khetri S/s</b>		
i) 220kV Line Bays	6 Nos	7 Nos

Further, name of 765/400kV **Khatri** substation was proposed to be rectified as “**Khetri**” at relevant places.

The above change in future scope of works were noted by the members.

22.3 CTU stated that provision of spares was inadvertently missed out during the approval of above scheme. Accordingly, it is proposed to provide following spare ICTs and spare Reactors in the respective schemes:

S.NO	Approved in the 3 <sup>rd</sup> ECT meeting held on 21.12.2018	Corresponding Spare ICT / Reactors units to be additionally included
1	Establishment of 2x1500MVA, 765/400kV, Bhadla-II PS with 765kV (2x240MVAR) & 400kV (1x125 MVAR) bus reactor	<ul style="list-style-type: none"> <li>• 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit)</li> <li>• 1x80 MVAR, 765kV , 1-ph Reactor (spare unit)</li> </ul> <p><i>(for both 2x240MVar bus reactors and 2x240MVar line reactor on Bikaner – Bhadla-II 765kV D/c line (after LILO))</i></p>
2	Establishment of 3x1500MVA, 765/400kV, Fatehgarh-II PS with 765kV (2x240MVAR) & 400kV (1x125 MVAR) bus reactor	<ul style="list-style-type: none"> <li>• 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit)</li> <li>• 1x80 MVAR, 765 kV , 1-ph Reactor (spare unit)</li> </ul>
3	Establishment of 2x1500MVA, 765/400kV, Khetri PS with 765kV (2x240MVAR) & 400kV (1x125	<ul style="list-style-type: none"> <li>• 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit)</li> <li>• 1x80 MVAR, 765 kV , 1-ph Reactor (spare</li> </ul>

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	MVAR) bus reactor	unit) (for both 2x240MVA bus reactor and 2x240MVA line reactor on Bikaner – Khetri 765kV D/c line at Khetri end)
4	330MVA switchable line reactors at Bhadla-II end for each circuit of Ajmer–Bhadla-II 765kV D/c line (after LILO at Bhadla-II)	• 1x110 MVAR, 765kV , 1-ph Reactor (spare unit)
5	240MVA switchable line reactors at Jhatikara end for each circuit of Khetri–Jhatikara 765kV D/c line	• 1x80 MVAR, 765 kV, 1-ph Reactor (spare unit)
6	240MVA switchable line reactors at Bikaner end for each circuit of Khetri–Bikaner 765kV D/c line	• 1x80 MVAR, 765 kV, 1-ph Reactor (spare unit)

22.4 CEA stated that the transmission scheme “Construction of Ajmer (PG) –Phagi 765 kV D/C line along with associated bays for Rajasthan SEZ” is under the bidding process with RECTPCL as the BPC for the project. This project inter-alia includes construction of 2 nos. 765 kV bays at Phagi 765/400 kV substation of RVPNL for which space as well as technical inputs has to be provided by RVPNL. To deliberate on the issue of non-furnishing of technical inputs by RVPNL, a meeting was held in CEA on 10.05.2019. In the meeting RVPNL had stated that they have planned Jodhpur 765/400 kV GSS along with its interconnection with 765/400 kV Phagi GSS (existing) through a 765 kV D/c line. The line has been planned for evacuation of about 2500 MW of RE power from Jodhpur to load centers. Phagi 765/400 kV GSS is already connected to Kalisindh/Chhabra/Kawai generation complexes and with proposed Ajmer – Phagi 765 kV D/c line under ISTS, there would be evacuation constraints beyond Phagi 765/400 kV GSS. In view of that, RVPNL suggested to terminate Ajmer – Phagi 765 kV D/c line at alternate locations like Jhatikara/Khetri/Bhiwani/Alwar instead of the approved termination at Phagi GSS of RVPNL.

In the meeting held on 10.05.2019 the following was agreed:

- i) RVPNL to share the substation layout of 765/400 kV Phagi GSS with CTU. RVPNL and POWERGRID to carry out joint visit of Phagi 765/400 kV GSS to explore the possibility of establishing hybrid (AIS and GIS)/ GIS bays.
- ii) Joint studies involving RVPNL, CEA and CTU to be carry out considering the proposed addition of 6.3 GW of RE projects and their associated transmission system in Rajasthan. The details of 6.3 GW capacity addition would be furnished by RVPNL.
- iii) About 3 GW Solar RE capacity addition by Rajasthan to be considered as a part of 11.1 GW Solar RE capacity considered in Phase II for Rajasthan. The inter-state transmission system proposed for evacuation of 11.1 GW of RE capacity in Rajasthan, which has been already included as agenda for the Northern Region Standing Committee on Transmission scheduled on 24.05.2019, needs to be reviewed.

22.5 RVPNL stated that joint visit with POWERGRID has already been done. It would be possible to provide space for two nos. on 765 kV bays at Phagi 765/400 kV

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substation. One bays would be AIS and other bay would be GIS bay. But for the GIS bay one new complete DIA needs to implemented (two Main bay and Tie bay of the DIA).

- 22.6 CEA stated that this would require total 4 nos. of 765 kV bays (one AIS + three GIS (two Main bay and Tie bay of the DIA)) for termination of the Ajmer- Phagi 765 kV D/C line at Phagi. CTU stated that if both the ckts are terminated with GIS bays, there would reliability concern.
- 22.7 POSOCO stated that in case one of the GIS line bay is under maintenance, the same line would be in service through the TIE bay. In case of any problem in the 2nd line bays both the ckts would be out affecting reliability. Therefore, termination of two ckts of the Ajmer- Phagi 765 kV D/C line at Phagi 765/400 kV substation needs to be done in different DIA.
- 22.8 RVPN stated that no line reactors have been provided in the Ajmer- Phagi 765 kV D/C line. To take care of the high voltage conditions, 240 MVAR, 765 kV bus reactor at Phagi 765/400 kV substation as part of the ISTS scheme could be provided. This bus reactor could be terminated with GIS bay (2nd Main bay of the new DIA being created for termination of 765 kV D/C line from Ajmer).
- 22.9 The issue was deliberated and provision of 240 MVAR, 765 kV bus reactor with GIS bay was agreed as a part of the transmission scheme “Construction of Ajmer (PG) – Phagi 765 kV D/C line along with associated bays for Rajasthan SEZ”. The spare 1x80 MVAR reactor of the existing 240 MVAR bus reactor at Phagi would also be used for proposed 240 MVAR bus reactor under ISTS. RVPN agreed to provide the technical inputs for the 765 kV bays (one AIS + one complete GIS DIA (two Main bay and Tie bay of the DIA)) at Phagi 765/400 kV substation in coordination with CTU to RECTPCL (the BPC for the scheme).
- 22.10 Members technically agreed with the above changes proposed in the Transmission system for Solar Energy Zones in Rajasthan (8.9 GW). The detailed scope of works incorporating the above changes of the transmission scheme “Transmission system for Solar Energy Zones in Rajasthan (8.9 GW)” as is given under :

**1. Transmission system associated with LTA applications from Rajasthan SEZ Part-A(RTM):**

Sl. No.	Scope of the Transmission Scheme	Capacity /ckm
1.	Establishment of 3x1500MVA (765/400kV), Fatehgarh-II Pooling station at suitable location near Fatehgarh 400kV S/s in Jaisalmer Distt with 765kV (2x240MVAR) and 400kV (1x125 MVAR) bus reactor <u>Future provisions:</u> Space for 765/400kV ICT along with bays: 3 nos 400/220kV ICTs along with bays: 10 nos. 765kV line bays: 4 nos 400kV line bays: 6 nos. 220kV line bays: 18 nos 400kV bus reactor along with bays: 1no 765kV bus reactor along with bays: 1no	3x1500MVA, 765/400kV,  765kV ICT bay-3 400kV ICT bay-3 400kV line bay-2 765kV line bay-2 125 MVAr reactor-1 240 MVAr reactor-2 765kV reactor bay-2 400kV reactor bay-1 1x500 MVA, 765/400 kV,1-ph ICT (spare unit) 1x80 MVAR, 765 kV, 1- ph Reactor (spare unit)
2.	LILO of Fatehgarh (TBCB) – Bhadla (PG) D/c	10km

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	(765kV line op. at 400kV) line at Fatehgarh-2 so as to establish Fatehgarh (TBCB) – Fatehgarh -II 400kV D/c line (765kV line op. at 400kV) and Fatehgarh -II- Bhadla 400kV D/c line (765kV line op. at 400kV)*  Charging of Fatehgarh-II –Bhadla section at 765kV level	
3.	2 no of 765kV bays at Bhadla for charging of Fatehgarh-II –Bhadla section at 765kV level	765kV line bay-2
4.	Establishment of 765/400kV, 2x1500MVA (765/400kV) Bhadla-II Pooling station at suitable location near Phalodi/ Bhadla in Jodhpur with 765kV (2x240MVAR) and 400kV (1x125 MVAR) bus reactor  Future provisions: Space for 765/400kV ICT along with bays: 2 Nos 400/220kV ICTs along with bays: 9 nos. 765kV line bays: 6nos 400kV line bays: 6nos. 220kV line bays: 16 nos 400kV bus reactor along with bays: 1no 765kV bus reactor along with bays: 1no	2x1500MVA, 765/400kV,  765kV ICT bay-2 400kV ICT bay-2 400kV line bay-2 765kV line bay-4 125 MVAR reactor-1 240 MVAR reactor-2 765kV reactor bay-2 400kV reactor bay-1 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit) 1x80 MVAR, 765kV, 1-ph Reactor (spare unit) <i>(for both 2x240MVAR bus reactor and 2x240MVAR line reactor on Bikaner – Bhadla-II 765kV D/c line (after LILO))</i>
5.	Bhadla-II – Bhadla (PG) 400kV D/c Line (Twin HTLS)*	30km
6.	LILO of both ckts. 765kV Ajmer – Bikaner D/c line at Bhadla-II	270 route km
7.	1x240 MVAR Switchable line reactor at Bhadla-2 end for Bikaner-Bhadla-II 765kV line (after LILO)	240 MVAR reactor-2 765kV reactor bay-2
8.	1x330 MVAR Switchable line reactor at Bhadla-II end for Ajmer-Bhadla-II 765kV line (after LILO)	330 MVAR reactor-2 765kV reactor bay-2 1x110 MVAR, 765kV , 1-ph Reactor (spare unit)

\* with charging of Fatehgarh-II –Bhadla section at 765kV level, 2nos. of 400kV bays would be spared at Bhadla S/s, which could be utilized for Bhadla-II – Bhadla (PG) 400kV D/c line.

Note:

- a) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.



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- b) *POWERGRID and RVPN to provide space for 2 nos. of 765kV bays at Ajmer(PG) and Phagi (RVPN) respectively for termination of Ajmer (PG)–Phagi 765kV D/c line*

**Implementation time frame is September 2020 i.e. in a compress time schedule of 21 months: (18 months implementation + 3 months bidding)**

**2. Construction of Ajmer (PG)-Phagi 765 kV D/c line along with associated bays for Rajasthan SEZ.**

Sl. No.	Scope of the Transmission Scheme	Capacity /ckm
1.	Ajmer (PG)– Phagi 765kV D/c line	110km
2.	765kV bays at Ajmer(PG) and Phagi for Ajmer (PG)– Phagi 765kV D/c line	<ul style="list-style-type: none"> <li>• 765 kV line bay (AIS)- 3 (2 bays at Ajmer (PG) S/stn and 1 bay at Phagi (RVPN) S/stn)</li> </ul> 1 complete GIS DIA 765 kV (2 Main Bay and 1 Tie Bay) at Phagi (RVPN) S/stn.
	1X240MVA <sub>r</sub> , 765 kV Bus Reactor with GIS bay at Phagi 765/400 kV S/stn	1x240 MVA <sub>r</sub> , 765kV Reactor  765kV reactor Bay (GIS) -1 (2 <sup>nd</sup> Main bay of the new DIA being created for termination of 765 kV D/c line from Ajmer)

**Implementation time frame is September 2020 (21 months: 18 months implementation + 3 months bidding)**

**3. Transmission system associated with LTA applications from Rajasthan SEZ Part-B:**

Sl. No.	Scope of the Transmission Scheme	Capacity /ckm
1.	Fatehgarh-II – Bhadla -II 765kV D/c line	130km
2.	2 no of 765kV bays at both Fatehgarh-II & Bhadla -2 for Fatehgarh-II –Bhadla-II 765kV D/c line	765kV line bay-4
		<b>Total Rs (in Crore)</b>

Note:

- a. *The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.*

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- b. Developer of Fatehgarh-II and Bhadla –II to provide space for 2 nos of 765kV bays at Faetehgarh-II and Bhadla -II for termination of Fatehgarh-II – Bhadla -II 765kV D/c line

**Implementation time frame to be decided based on connectivity/LTA applications at Fatehgarh-II.**

**4. Transmission system associated with LTA applications from Rajasthan SEZ Part-C**

Sl. No.	Scope of the Transmission Scheme	Capacity /ckm
1.	Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Khetri with 765kV (2x240MVAR) and 400kV (1x125 MVAR) bus reactor <u>Future provisions:</u> Space for 765/400kV ICTs along with bays: 2 nos. 400/220Kv ICTs along with bays: 4 nos. 765kV line bays: 4nos 400kV line bays: 4nos. 220kV line bays: 7 nos	2x1500MVA, 765/400kV,  765kV ICT bay-2 400kV ICT bay-2 400kV line bay-2 765kV line bay-2 240 MVA <sub>r</sub> (765kV) Bus Reactor -2 125 MVA <sub>r</sub> (765kV) Bus Reactor -1 765 KV Reactor bay - 2 400 kV Reactor bay -1 1x500 MVA, 765/400 kV, 1-ph ICT (spare unit)  1x80 MVAR, 765 kV , 1- ph Reactor (spare unit) <i>(for both 1x240MVA<sub>r</sub> bus reactor and 2x240MVA<sub>r</sub> line reactor on Bikaner – Khetri 765kV D/c line at Khetri end)</i>
2.	Khetri – Sikar (PG) 400kV D/c line ( AL59)	70 km
3.	400kV line bays at Sikar (PG) for Khetri – Sikar (PG) 400kV D/c line (Twin AL59)	400kV line bay-2
4.	Khetri –Jhatikara 765kV D/c line	170 km
5.	765kV bays at Jhatikara for Khetri –Jhatikara 765kV D/c line	765kV line bay-2
6.	1x240 MVAR Switchable Line reactors for each circuit at Jhatikara end of Khetri – Jhatikara 765kV D/c line along with reactor bays	240 MVAR Line reactor -2 765 kV Reactor bay -2 1x80 MVAR, 765 kV , 1- ph Reactor (spare unit) <i>(For both 2x240MVA<sub>r</sub> line reactor on Khetri – Jhatikara 765kV D/c line</i>

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		at Jhatikara end)
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Note:

- The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.
- POWERGRID to provide space for 2 nos of 400kV bays at Sikar (PG) for termination of Khetri – Sikar (PG) 400kV D/c line
- POWERGRID to provide space for 2 nos of 765kV line bays & space for 2nos. of 240 MVAR Switchable Line reactors along with reactor bays at Jhatikara for termination Khetri –Jhatikara 765kV D/c line.

**Implementation time frame is December 2020 i.e in 24 months (19 months implementation + 5 months bidding time).**

### 5. Transmission system associated with LTA applications from Rajasthan SEZ Part-D

Sl. No.	Scope of the Transmission Scheme	Capacity /ckm
1.	Bikaner(PG) – Khetri S/s 765kV D/c line	220km
2.	765kV Bays at Bikaner(PG) & Khetri for Bikaner(PG) – Khetri S/s 765kV D/c line	765kV line bay-4
3.	1x240 MVAR Switchable line reactor for each circuit at each end of Bikaner – Khetri 765kV D/c line along with reactor bays	1x240 MVAR Line reactor -4 765 kV Reactor bay -4 1x80 MVAR, 765 kV, 1-ph Reactor (spare unit) (For 2x240MVAR line reactor on Bikaner – Khetri 765kV D/c line at Bikaner end)

Note:

- The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.
- Powergrid to provide space for 2 nos of 765kV bays & space for 2x240 MVAR switchable line reactors at Bikaner(PG) for termination of Bikaner(PG) – Khetri S/s 765kV D/c line
- Developer of Khetri S/s to provide space for 2 nos of 765kV bays at Khetri S/s & space for 2x240 MVAR switchable line reactors for termination of Bikaner(PG) – Khetri S/s 765kV D/c line

**Implementation time frame is December 2020 i.e in 24 months (19 months implementation + 5 months bidding time).**

### 6. ICT Augmentation works at Bhadla(PG) associated with 1630 MW LTA granted at Bhadla:

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Sl. No.	Scope of the Transmission Scheme	Capacity/Ckm
1.	Additional 3x500 MVA, 400/220kV 5 <sup>th</sup> , 6 <sup>th</sup> & 7 <sup>th</sup> ICT at Bhadla Pooling station.	3x500 MVA, 400/220kV 400 kV ICT bay-3 220 kV ICT bay-3

Implementation time frame is August 19/ September 19 i.e. in a compress time schedule of 8/ 9months

**7. ICT Augmentation works at existing Bhiwani (PG) ISTS S/S associated with LTA applications from SEZs in Rajasthan**

Sl. No.	Scope of the Transmission Scheme	Capacity /ckm
1.	Augmentation with 765/400kV , 1x1000MVA, transformer (3 <sup>rd</sup> ) at Bhiwani (PG) S/s	1x1500MVA, 765/400kV, 765kV ICT bay-1 400kV ICT bay-1

Implementation time frame is September 2020

**Transmission system for providing St-II connectivity/LTA to RE projects at Bikaner(PG), Fatehgarh-II & Bhadla –II:**

**8. Name of Scheme: Transmission system for providing connectivity to RE projects at Bikaner (PG):**

Sl. No.	Scope of the Transmission Scheme	Capacity/Ckm
	Creation of 220 kV level at Bikaner (PG) with transformation capacity of 2x500MVA, 400/220kV transformers 4 nos. of 220kV line bays	2x500 MVA, 400/220 kV 400 kV ICT bay-2 220 kV ICT bay-2 220kV line bays-4

**9. Name of Scheme: Transmission system for providing connectivity to RE projects in Fatehgarh-II:**

Sl. No.	Scope of the Transmission Scheme	Capacity/Ckm
1	Additional (4 <sup>th</sup> ) 765/400kV transformer at Fatehgarh-II	2. 1x1500MVA, 765/400kV 3. 5x500 MVA, 400/220 kV 4. 765 kV ICT bay-1 5. 400 kV ICT bay-6
2	Creation of 220kV level Fatehgarh -II in Jaisalmer Distt (Fatehgarh-II)  9 nos. of 220kV line bays	6. 220 kV ICT bay-5 7. 220kV line bays- 9

**10. Name of Scheme: Transmission system for providing connectivity to RE projects in Bhadla-II:**

Sl. No.	Scope of the Transmission Scheme	Capacity/Ckm

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1	Additional (3 <sup>rd</sup> ) 765/400kV transformer at Bhadla-II	1x1500MVA, 765/400kV 5x500 MVA, 400/220 kV 765 kV ICT bay-1 400 kV ICT bay-6
2	Creation of 220kV level at Bhadla-II  9 nos. of 220 kV line bays	220 kV ICT bay-5 220kV line bays- 9

**23.0 Construction of 132/33 kV s/s Padartha(Patanjali), Haridwar and LILO of 132kV Chilla – Nazibabad line at proposed 132/33 kV S/s Padartha(Patanjali), Haridwar.**

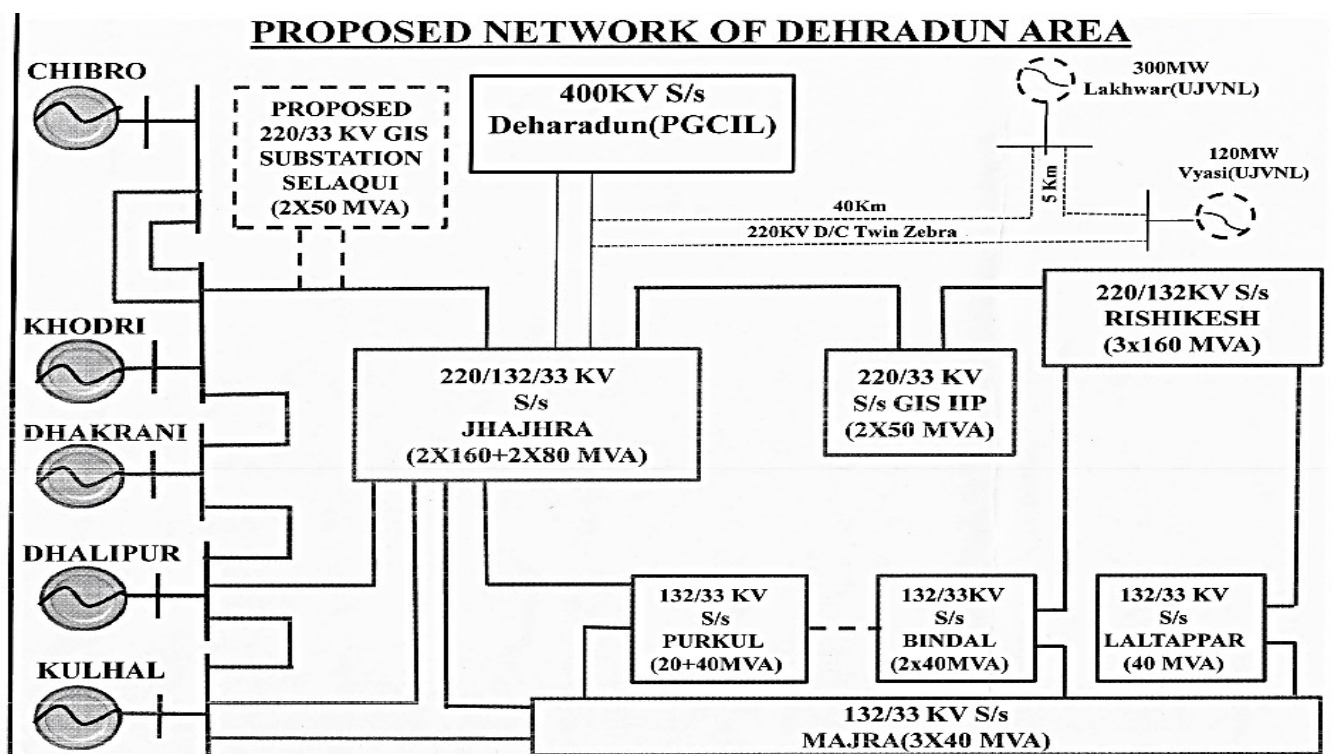
**23.1** CEA stated that PTCUL has planned to construct 132/33kV S/s Padartha for providing the load to Patanjali and its nearby area of Padartha in district Haridwar. This proposed S/s will be energized through LILO of 132 kV Chilla – Nazibabad line.

**23.2** UPPTCL stated that they have no objection to the proposal submitted by PTCUL.

**23.3** Members agreed with the proposal submitted by PTCUL. CEA advised UPPTCL and PTCUL to take care of metering provisions.

**24.0 Construction of LILO of 1<sup>st</sup>ckt. of 220 kV D/c Jhajhra(PTCUL) – Sherpur(PGCIL) line at under construction Vyasi HEPP, 120 MW UJVNL.**

**24.1** PTCUL stated that at present, Vyasi HEP (120 MW) of M/s UJVNL in Yamuna basin is under construction and for evacuation of its power, PTCUL has proposed to LILO 1<sup>st</sup> ckt. of 220 kV D/C Jhajhra (PTCUL) – Sherpur(PGCIL) line at Vyasi HEP. Lakhwar HEP (300 MW) is also proposed in Yamuna basin. For evacuation of its power, PTCUL has proposed to LILO one ckt. of 220 kV D/c Vyasi – Dehradun line at proposed Lakhwar HEP.



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24.2 CEA stated that as per the master plan of the Hydro projects in Yamuna basin, the transmission system for evacuation of power from Lakhwar HEP and Vyasi HEP are as follows:

- i. Lakhwar HEP(300 MW):
  - a) Lakhwar – Dehradun 220 kV D/c line
  - b) Mori - Nagaon- Lakhwar - Khodri 220 kV D/c Line
- ii. Vyasi HEP(120 MW):

LILO of 220 KV Lakhwar - Khodri Line at Vyasi

24.3 PTCUL stated that there is no certainty about the implementation of the projects at the upstream of Lakhwar HEP (UJVNL) except Natwar Mori HEP. Vyasi HEP(UJVNL) is likely to be commissioned by March 2020 and the time frame of implementation of Lakhwar HEP is June 2024. PTCUL is constructing Jhajhra (PTCUL) – Sherpur, Dehradun(PG) 220 kV D/C (twin zebra) line under intra-state, therefore, for evacuation of power from Vyasi HEP, PTCUL has proposed LILO of one ckt. of 220 kV D/c Jhajhra (PTCUL) – Sherpur(PGCIL) line at Vyasi HEP.

PTCUL further stated that for evacuation of power from Lakhwar HEP, PTCUL has planned to LILO Vyasi-Sherpur (Dehradun) 220kV S/c line (formed after LILO of 1<sup>st</sup> ckt. of 220 kV D/C Jhajhra (PTCUL) – Sherpur(PGCIL) line at Vyasi) at Lakhwar HEP.

CEA stated that in view of the above injections the adequacy of transformation capacity at 2x315 MVA, 400/220kV Dehradun (PG) S/s needs to be studied.

After deliberations, Members agreed with the proposal of LILO of one ckt. of Jhajhra (PTCUL) – Sherpur (PGCIL) 220 kV D/c line at Vyasi HEP under intra-state works (under the scope of PTCUL).

## **25.0 Creation of new 400 kV S/s, 2 x 500 MVA ICTs at Ropar in the premises of existing 220 kV Guru Gobind Singh Super Thermal Plant (GGSSTP) Ropar**

25.1 CEA stated that PSTCL vide their letter dated 26.12.2018 has proposed 2 x 500 MVA, 400/220 kV S/s at Ropar with the following connectivity: -

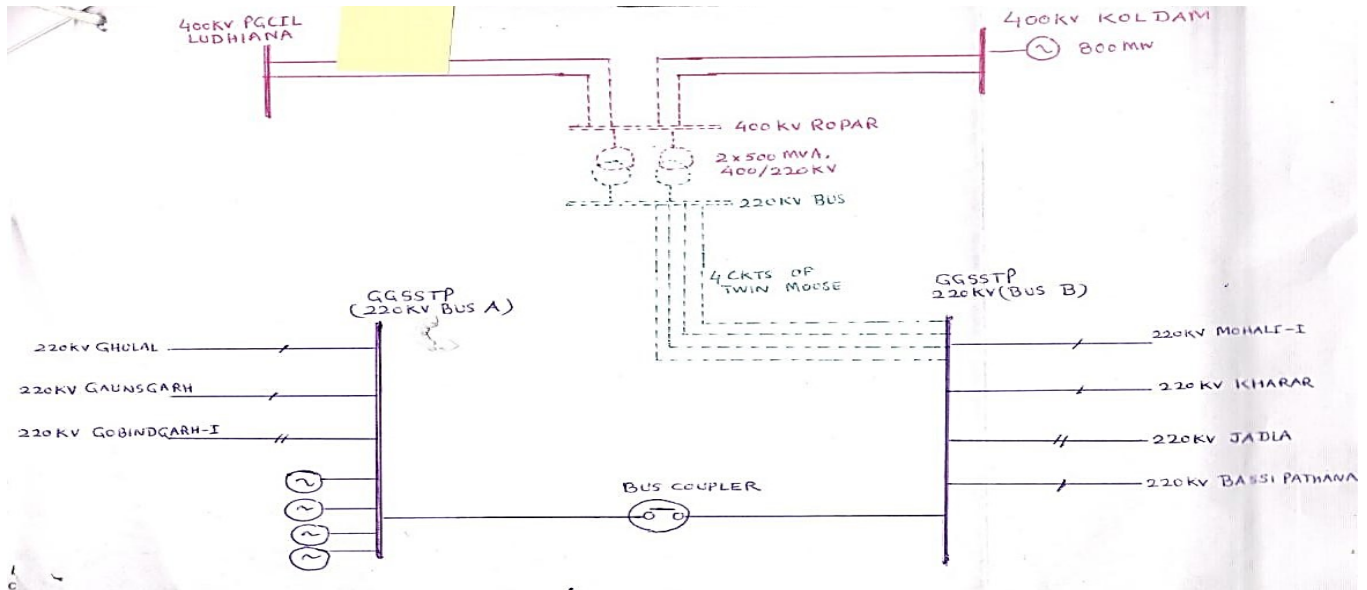
- a. Creation of 400 kV S/s Ropar with installed capacity of 2 x 500 MVA, 400/220 kV ICT's.
- b. LILO of both ckts of 400 kV Ludhina PGCIL – Koldam at proposed 400 kV S/s Ropar, LILO Length = 15 km (approx.).

25.2 PSTCL stated that maximum demand of Punjab was 12542 MW during paddy season 2018. The average load growth of Punjab is 6.5% as per data for the last ten years. Its anticipated load as projected by 19<sup>th</sup>EPS report is 14800 MW in the year 2022. Punjab has an installed generation capacity of 6672 MW (thermal + IPP = 1760 + 3920 MW and hydro = 993 MW). As the hydel generation is water dependent and thermal plants i.e. GNDTP Bathinda and GGSSTP Ropar have completed its life span, therefore, net generation of Punjab would be approx. 6000 MW. For catering the load during 2022, approx. 9050 MW Power (including Central Sector Share, BBMB share, Power Purchase etc.) shall be required from outside Punjab through ISTS system. At present, installed capacity of ISTS connected with Punjab is 8530 MVA. Therefore, some additional 400 kV grid with its connectivity with Northern Grid network shall be required in PSTCL.

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25.3 PSTCL, on the basis of system study carried out for 2022 loading conditions, has identified one new 400 kV grid with an initial installed capacity of 2 x 500 MVA, 400/220 kV ICTs has been planned with the following connectivity: -

- Creation of 400 kV S/s Ropar with installed capacity of 2 x 500 MVA, 400/220 kV ICT's.
- LILO of both ckts of 400 kV Ludhina PGCIL – Koldam at proposed 400 kV S/s Ropar, LILO Length = 15 km (approx.), Triple Conductor(Zebra)



25.4 PSTCL further stated that PSPCL has proposed to phase out the existing 6 x 210 MW units of GGSSTP Ropar and setting up new coal based plant of 2 x 800 MW coal based super critical plant at GGSSTP Ropar, whose first units of 1 x 800 MW, is likely to come by October 2024. The proposed 400 kV S/s at Ropar shall be required to cater to the load in that area. Further additional 400 kV connectivity shall be planned as per the requirement on the basis of load flow study corresponding to future loading conditions.

25.5 After deliberations, members agreed with the PSTCL proposal of establishment of 2 x 500 MVA, 400/220kV substation at Ropar through LILO of both ckts of 400 kV Ludhiana (PG) – Koldam D/c line at proposed 400 kV S/s Ropar.

## 26.0 Revision in scope of works of 400 kV Dhanansu:

26.1 PSTCL stated that their proposal of establishment of 400 kV S/s Dhanansu to cater to the load requirements of cycle valley in Ludhiana has already approved by PSERC. Due to reduced load requirements of cycle valley, the scope of work has been revised as given below: -

Name of work	Scope of work		Remarks
	Earlier Scope	New Revised Scope	
	Establishment of 400 KV AIS station along with auxiliary, control room building, Gantry structure,	Establishment of 400 KV AIS station along with auxiliary, control room building, Gantry structure,	(i) Scope of work has been revised as per revised loadings.

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400KV S/s Dhanansu (New)	extension provision etc. a) 2x500 MVA, 400/220KV ICT's. 400 KV Bays (4 Nos.) 220 KV Bays (10 Nos.)  b) LILO of 400 KV Rajpura (Thermal) - 400 KV Nakoder D/C line at 400 KV Dhanansu (2xDC on DC) 11.1 Km LILO length, conductor (Twin Moose)	extension provision etc. a) 2x315 MVA, 400/220KV ICTs 400 KV Bays (2Nos.) 220 KV Bays (6 Nos.)  b) LILO of one Ckt. of 400 KV Rajpura (Thermal) - 400 KV Nakoder DC line at 400 KV Dhanansu (1xDC on DC) 11.1Km LILO length, conductor (Twin Moose)	(ii) 1x315 MVA, 400/220 KV ICT as spared from 400 KV Nakoder shall be installed at 400 KV Dhanansu.  (iii) 2nd 1x315 MVA, 400/220 KV T/F shall also be a spared T/F from the existing 400 kV network of PSTCL, and shall be decided on the basis of study corresponding to 2022-2027 system conditions.
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In addition, the following connectivity of 400 kV S/s Dhanansu with 400 kV Northern Region system is also proposed:

**LILO of one ckt of 400 kV Jalandhar – Kurukshetra D/c line at 400 kV Dhanansu (line length = 40 Km appx.),**

The proposed 220 kV outlets from Dhanansu 400/220 kV substations are as given :

- 400 kV Dhanansu - 220 kV Kohara D/c line Appx. line length - 12 km (0.4sq")
- 400 kV Dhanansu - 220 kV Ikolaha D/c line Appx. line length - 10 km (0.4sq")
- 400 kV Doraha - 220 kV Doraha D/c line Appx. line length - 10 km (0.4sq")

From the system studies carried out by PSTCL, the loadings on the 400kV and 220kV lines are in order.

**26.2** CEA stated that PSTCL may consider either LILO of both circuits of 400 kV Jalandhar – Kurukshetra D/c line or LILO of both Ckt. of 400 KV Rajpura (Thermal) - 400 KV Nakoder DC line at the proposed Dhanansu 400/220 substation instead of the above 400 kV connectivity.

**26.3** After deliberations, following intra-state works proposed by PSTCL were agreed (under the scope of PSTCL):

**i)** Establishment of 2 x 315 MVA, 400/220 S/s at Dhanansu. One 315 MVA, 400/220 KV ICT spared from 400 KV Nakoder shall be installed at 400 KV Dhanansu. The 2<sup>nd</sup> 315 MVA, 400/220 KV ICT shall also be a spared ICT from the existing 400 kV network of PSTCL.

**ii)** LILO of both ckt of 400 kV Jalandhar – Kurukshetra D/c line at Dhanansu

**iii)** 220 kV outlets from Dhanansu 400/220 kV substation:

- Dhanansu - Kohara 220 kV D/c line Appx. line length - 12 km (0.4sq")
- Dhanansu - Ikolaha 220 kV D/c line Appx. line length - 10 km (0.4sq")

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- Doraha - Doraha 220 kV D/c line Appx. line length - 10 km (0.4sq")

## 27.0 New transmission lines of PSTCL:

27.1 PSTCL has informed about the following 220 kV lines which are under construction/ planned by PSTCL:

1. LILO of 220 kV Sunam- Mansa at 400 kV Patran (LILO length 40 km approx, conductor size 0.4” Sq.
2. LILO of 220 kV Himmatpura – Jagraon line at 220 kV Ajitwal, length: 2x1.404 km, conductor size 0.4”Sq.
3. LILO 220 kV RTP- Jamsher line at 220 kV Banga on multi circuit towers, length: 2x5.685 Km, conductor size 0.4”Sq.
4. 220 kV Gaunsgarh - Ladhawal D/c line, length: 17.163 Km, conductor size 0.4”Sq.
5. 220 kV line from 400 kV Nakodar- 220 kV Ladowal, D/c line, length: 70.144, conductor size 0.5”Sq.
6. 220 kV line from 400 kV Muktsar- 220 kV Kotkapura (Sandhwan), S/c on D/c line, length: 39.320 Km conductor size 0.4”Sq.
7. 220 kV line from 400 kV Makhu- 220 kV Algaon, D/c line, length: 2x50.445 Km, conductor size 0.4”Sq.
8. 220 kV line from 400 kV Makhu- 220 kV TaranTaran (Rashiana), D/c line, length: 2x46.169, conductor size 0.4” Sq.
9. 220 kV line from 220 kV Abohar- 220 kV Malout, S/c on D/c line, length: 39.994, conductor size 0.4”Sq.

27.2 Members noted the same.

## 28.0 Augmentation of 400/220 kVS/s Rajpura

PSTCL informed that presently the transformation capacity at Rajpura is 2 x 500 MVA. As per the peak load observed at this substation, it is (N-1) non-compliant. Therefore, additional 1x500 MVA, 400/220 kV I.C.T. has been planned at 400 KV Rajpura under intra state works.

**Members noted the same.**

## 29.0 Switchgear for Neemrana (PG)- Dhanonda (HVPNL) 400 kV D/c (HTLS) line at Dhanonda end:

29.1 CTU stated that Neemrana(PG) - Dhanonda(HVPNL) 400 kV D/c(HTLS) line has been executed by Gurgaon Palwal Transmission Limited (GPTL) under “Creation of new 400 kV GIS substation in Gurgaon area and Palwal area as a part of ISTS”. The switching scheme is One and half breaker scheme.

Neemrana (PG)-Dhanonda (HVPNL) 400 kV D/c is HTLS line and corresponding circuit breakers of complete diameter (DIA) at both the substation for the line are required to be rated atleast for 3150 Amps. The line bays switchgear rating at Neemrana (PG) end is 3150Amp. However, at Dhanonda end, only one main bay of corresponding DIA at Dhanonda(HVPNL) is rated at 3150 Amp and remaining two bays (tie bay and other main bay) are rated at 2000 Amp. This limitation in switch gear current carrying capability shall constrain HTLS line power carrying capability.

Accordingly, it is proposed to upgrade other two bays (tie bays and one main bay) of DIA of Neemrana (PG)-Dhanonda (HVPNL) 400 kV D/c(HTLS) at

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Dhanonda(HVPNL) end with 3150 Amps rating.

- 29.2** HVPNL stated that upgradation of rating of switchgear at Dhanonda from 2000 amps to 3150 Amps would require investment. Also, HVPNL is not facing any problem in operation with the current rating of switchgear at Dhanonda. Therefore, there is no justification for taking up the scheme of switchgear upgradation.
- 29.3** POSOCO stated that as per Transmission Planning Criteria, the thermal capacity of quad Moose line is 2211 MVA at 45° ambient temperature. However, as the isolators at 400 kV Dhanonda and Mohindergarh stations are rated at only 2 kA, the thermal capacity of 400 kV Mohindergarh -Dhanonda D/C gets limited to only 1384 MVA despite the actual thermal capacity being 2211 MVA at 45° ambient temperature.

Similar issue is also being faced in the recently commissioned 400 kV Dhanonda – Neemrana D/C twin HTLS line where the isolators are again rated at 2 kA, thereby limiting the power carrying capacity of the line well below the thermal limit.

These limitations have already caused constraints in real-time operation on many occasions. For e.g., on 7th May 2019, 400 kV Mohindergarh – Dhanonda ckt-II tripped on burning of isolator at Dhanonda end and subsequently ckt-I tripped on overload. After tripping of both these circuits, flow on 400 kV Mohindergarh-Bhiwani line reached to 960 MW each circuit and power order of HVDC Mundra-Mohindergarh bipole had to be reduced immediately from 2000 MW to 1200 MW to bring the loading of 400 kV Mohindergarh-Bhiwani D/C (twin conductor lines) within permissible limits. Other tripping/outage of 400 kV Mohindergarh-Dhanonda D/C during the last 03 years on account of switchgear/isolator issues are enclosed at Annexe-I.

- 29.4** As per Studies carried out by them, the following is observed:
- i) The loading of 400 kV M'garh – Dhanonda lines needs to be maintained below 700 MW (each ckt) for safety of switchgear/isolators at Mohindergarh and Dhanonda Stations to take care of N-1 contingency of one circuit of 400 kV Mohindergarh – Dhanonda D/C.
  - ii) Power order of Mundra – Mohindergarh HVDC and Champa – Kurukshetra HVDCs needs to be kept below their maximum value to ensure safety of switchgear at 400 kV Dhanonda and Mohindergarh substation. These HVDCs are important inter-regional (WR-NR) links and any restriction on power order of these HVDCs will result in curtailment of TTC/ATC of the WR-NR corridor/Import of NR.
- 29.5** The issue was deliberated and it was observed that grid is an interconnected network and inadequate utilization of any corridor on account of switchgear ratings will result in inefficient operation and will limit the transfer capacity of not only that corridor but of other parallel corridors too. The upgradation of switchgear will also allow Haryana to draw more power from HVDC Mundra - Mohindergarh bipole in case of low or nil generation at CLP Jhajjar. Therefore, Haryana will also benefit from timely upgradation of switchgears as full utilization of HVDC Mundra – Mohindergarh and strengthened inter-state network will help the state under different generation scenarios.
- 29.6** POSOCO further informed that, in addition to above-mentioned stations, the rating of the switchgear at Dadri, Greater Noida and Nawada are also not in line with the thermal capacity of respective lines emanating from these stations and therefore, the switchgear at these stations shall also be upgraded on priority as also discussed previously in various standing committee meetings.

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29.7 After deliberations, member agreed with proposal of switchgear upgradation works at Dadri, Greater Noida, Mohindergarh, Dhanonda and Nawada. Switchgear upgradation at G, Noida has already been taken up by UPPTCL. Nawada switchgear upgradation works have already been agreed by HVPNL. HVPNL was requested to take up the upgradation works at Dhanonda and Nawada at the earliest. HVPNL agreed for the same and stated that they would also explore PSDF funding for the scheme.

### 30.0 Scheme to control Fault level in Northern Region(Phase-II)

30.1 CTU stated that the scheme to control Fault level in Northern Region(Phase-II) was discussed and agreed in the 39<sup>th</sup> Meeting of Standing Committee on Power System Planning of Northern Region held on 29th-30th May, 2017. Subsequently, implementation of the scheme has been entrusted to POWERGRID in 2<sup>nd</sup> & 3<sup>rd</sup> ECT held on 06/08/2018 & 21/12/2018 respectively. The scope of works as agreed is given below:

#### a) At Kanpur:

- i. 12Ω Series Line Reactors in Kanpur(old)–Kanpur(New) 400kV D/c line at Kanpur(old) end and
- ii. Fatehpur–Kanpur(old) 400kV D/c & Kanpur(old)–Panki 400kV lines to be disconnected at Kanpur (old) and connecting them directly to form Fatehpur – Panki 400kV D/c line.

#### b) At Bhiwani, Hissar and Mohindergarh:

- i. 12Ω Series Bus Reactor at Bhiwani(PG) Substation
- ii. Mohindergarh–Bhiwani(PG) 400kV D/c (one of the two D/c lines) & Bhiwani(PG)–Hissar(PG) 400kV D/c line to be disconnected from Bhiwani(PG) end and directly connected to form Mohindergarh–Hissar 400kV D/c line
- iii. The remaining Bhiwani(PG) – Hissar(PG) 400kV D/c line (one circuit via Bhiwani BBMB) & Hissar(PG) – Moga (one circuit via Fatehabad) 400kV line to be disconnected at Hissar end and directly connected to form Bhiwani(PG) – Moga 400kV line (As a result one circuit shall be as Bhiwani(PG) – Fatehabad – Moga and other circuit shall be as Bhiwani(PG) – Bhiwani(BBMB) - Moga)

30.2 CTU further stated that considering implementation complexities for by-passing at Bhiwani(PG) S/s and Hissar(PG) S/s, following minor modifications/clarifications are proposed for by-pass arrangements at these substations:

- i) Out of two 400kV D/c lines between Mohindergarh & Bhiwani, one 400 kV D/c line is owned by Adani and other is under implementation by POWERGRID. It is proposed that Mohindergarh–Bhiwani (PG) 400kV D/c line of POWERGRID and Bhiwani (PG)-Hissar (PG) 400kV D/c line to be by-passed at Bhiwani (PG) end so as to form direct Mohindergarh–Hissar 400kV D/c line of POWERGRID.
- ii) Remaining Bhiwani (PG)–Hissar (PG) 400kV D/c line (one circuit via Bhiwani (BBMB)) and Hissar (PG)–Moga (One circuit via Fatehabad) 400kV line is to be by-passed at Hissar end so as to form Bhiwani (PG)–Moga 400kV D/c direct line with following arrangement:
  - One Circuit of Bhiwani(PG) – Moga(PG) 400 kV line (via Hissar)
  - One Circuit of Bhiwani(PG) – Bhiwani(BBMB) – Fatehabad – Moga(PG) 400 kV line (via Hissar)

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- iii) Considering line length of 275 km & Lightning Arrestors are rated 390kV at both Bhiwani (PG) and Moga (PG), replacement of circuit breakers with PIR for both ends of Bhiwani – Hissar(bypass)-Moga 400 kV S/c line is proposed.
- iv) Existing line reactor of 50 MVAR for Moga – Hissar 400 kV S/c line at Hissar end is retained at existing location after by-pass of Moga-Hissar 400kV S/c and Moga-Bhiwani 400kV S/c at Hissar to form Moga-Hissar(bypass)-Bhiwani line.
- v) It was observed that terminating position of Bawana and Hissar lines are inadvertently shown interchanged. The same has been corrected & revised schematic of Bhiwani S/s is given at Exhibit-I. Schematic of the proposed arrangement is shown in the Exhibit-I.

**30.3** Simulation studies indicate that the fault level is within designed limits considering above modification & same are given below:

Revised Scope of POWERGRID is summarized given below:

**a) At Kanpur:**

- i. 12Ω Series Line Reactors in Kanpur(old)–Kanpur(New) 400kV D/c line at Kanpur(old) end and
- ii. Fatehpur–Kanpur(old) 400kV D/c & Kanpur(old)–Panki 400kV lines to be disconnected at Kanpur (old) and connecting them directly to form Fatehpur – Panki 400kV D/c line.

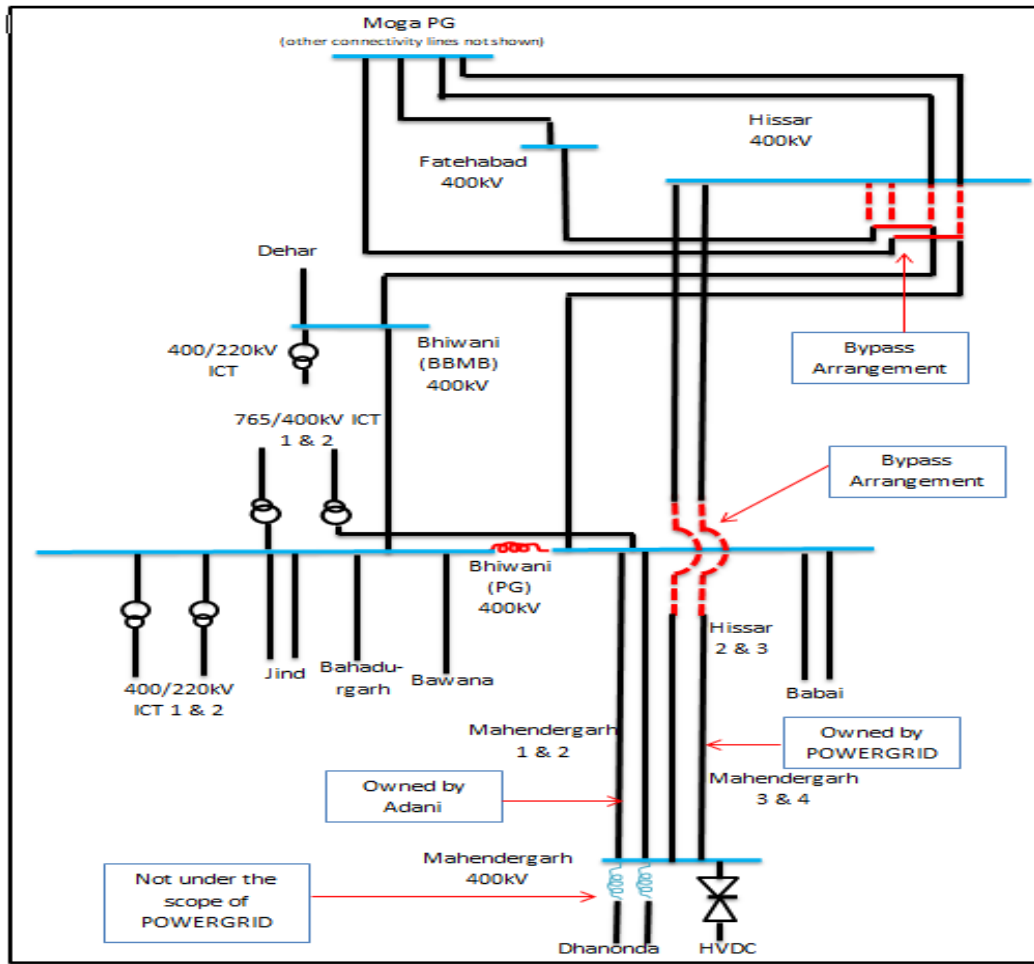
**b) At Bhiwani, Hissar and Mohindergarh:**

- i. 12Ω Series Bus Reactor at Bhiwani(PG) Substation
- ii. Mohindergarh–Bhiwani (PG) 400kV D/c line of POWERGRID and Bhiwani (PG)-Hissar (PG) 400kV D/c line to be by-passed at Bhiwani (PG) end so as to form direct Mohindergarh–Hissar 400kV D/c line of POWERGRID.
- iii. Remaining Bhiwani (PG)–Hissar (PG) 400kV D/c line (one circuit via Bhiwani (BBMB)) and Hissar (PG)–Moga (One circuit via Fatehbad) 400kV line is to be by-passed at Hissar end so as to form Bhiwani (PG)–Moga 400kV D/c direct line with following arrangement:
  - One Circuit of Bhiwani(PG) – Moga(PG) 400 kV line (via Hissar)
  - One Circuit of Bhiwani(PG) – Bhiwani(BBMB) – Fatehabad – Moga(PG) 400 kV line (via Hissar).

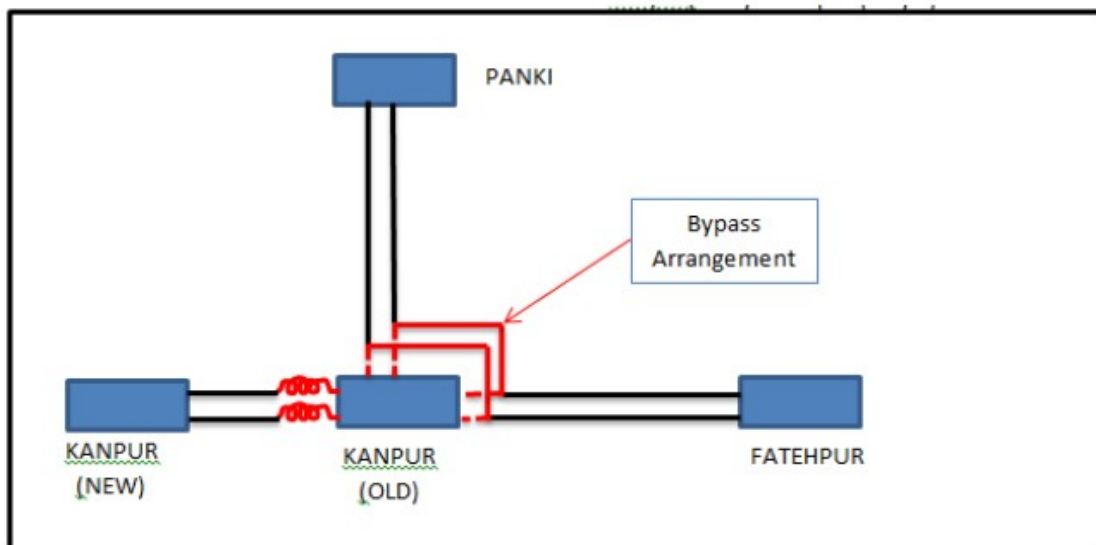
**Note:**

- *Considering line length of 275 km & Lightning Arrestors are rated 390kV at both Bhiwani (PG) and Moga (PG), circuit breakers is to be replaced of with PIR for both ends of Bhiwani – Hissar(bypass)-Moga 400 kV S/c line.*
- *Existing line reactor of 50 MVAR for Moga – Hissar 400 kV S/c line at Hissar end is to be retained at existing location after by-pass of Moga-Hissar 400kV S/c and Moga-Bhiwani 400kV S/c at Hissar to form Moga-Hissar(bypass)-Bhiwani line.*

Exhibit-I



Schematic of Bhiwani



Schematic of Kanpur

Members agreed with the above modifications in the Scheme to control Fault level in Northern Region(Phase-II)

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**31.0 Establishment of 400/220kV Substations in NCT of Delhi during 12<sup>th</sup> Plan Period - Change of Scope of 400/220 kV Tughlakabad & Dwarka Substations between POWERGRID & DTL**

**31.1** CTU stated that establishment of 400/220kV Tughlakhabad & Dwarka S/s were agreed during 34<sup>th</sup>& 35<sup>th</sup> Standing Committee on Power System Planning in Northern Region held on 08/08/2014& 03/11/2014 respectively with following scope as part of setting up of 400KV Inter State Grid Sub-Stations in Delhi.

**400/220kV Tughlakhabad S/s**

1. Creation of 4x500MVA, 400/220 kV GIS substation at Tughlakabad
2. LILO of both circuits of Bamnauli – Samaypur 400kV D/c line at Tughlakabad with Twin HTLS conductor.
3. 9 nos. of 400 kV bays (4 incomer, 4 ICT, 1 B/C) with provision for future expansion
4. 23 nos. 220 kV bays (220 kV split bus with 12 bays on each side = 2 incomer, 6 feeder bay, 1 B/C, 1 B/S (only one), 2 ICT)

**400 kV Papankalan 1 S/s (Dwarka S/s)**

1. Creation of 400/220 kV, 4x 500 MVA Papankalan I S/s (now Dwarka) by LILO of one circuit of Bamnauli –Jatikalán at Papankalan I.  
*The 400 KV Papankalan I S/S to be created by upgrading the existing 220kV Papankalan S/S to 400 kV and due to scarce ROW, the existing route of the 220 kV Papankalan I- Bamnauli D/c to be converted to Multi Circuit tower.*
2. 7 nos. of 400 kV bays (2 incomer, 4 ICT, 1 B/C) with provision for future expansion
3. 23 nos 220 kV bays (220 kV split bus with 12 bays on each side = 2 incomer, 6feeder bay, 1 B/C, 1 B/S (only one), 2 ICT)

**31.2** Subsequently, the matter was discussed during meeting held on 11/04/2017 between POWERGRID and DTL and it was decided in-principle that 220 kV (GIS)for Tughlakabad & Dwarka shall be owned by DTL (except for 4 nos. ICT bays). The same is also discussed and agreed in 42<sup>nd</sup> NRPC meeting held on 27-28<sup>th</sup> June, 2019. Accordingly, the revised scope of work under ISTS is given below:

**Revised Scope of Wok under ISTS – Tughlakabad S/s**

1. Creation of 4x500MVA, 400/220 kV GIS substation at Tughlakabad
2. LILO of both circuits of Bamnauli – Samaypur 400kV D/c line at Tughlakabad with Twin HTLS conductor.

**400 kV bays**

Line bays	: 4 nos. (with provision for future expansion)
500 MVA, 400/220 kV ICTs	: 4 Nos.
125MVAR Bus Reactor	: 1 No.

**220 kV bays**

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Transformer bay : 4 Nos.

**Revised Scope of Wok under ISTS – Dwarka S/s**

1. Establishment of 4x500MVA, 400/220kV GIS at Dwarka-I(earlier named as Papankalan-I)
2. LILO of one circuit of Bamnauli - Jattikalan 400kV line at Dwarka-I

**400 kV bays**

Line bays : 2 nos. (with provision for future expansion)

500 MVA, 400/220 kV ICTs : 4 Nos.

125MVAR Bus Reactor : 1 No.

**220 kV bays**

Transformer bay : 4 Nos.

**Members noted the same.****32.0 LTA/Connectivity for hydro projects in Uttarakhand:**

CTU stated that connectivity/LTA have been granted to various Generation projects in Uttarakhand associated with UITP scheme(deemed ISTS) and the transmission system under implementation by PTCUL were discussed during 2<sup>nd</sup>NRSCT meeting held on 13/11/2018 & 17th meeting of Connectivity/LTA meeting of Northern Region held on 26/11/2018. As per discussion held during these meetings, Connectivity/LTA intimationsto Generators have been issued/revised, details of which is given below:

**TABLE 1**

S. No.	Applicant	Application Date (Connectivity /LTA)	Connectivity/LTA grant Date	Revised Connectivity /LTA Grant Date(Subsequent to 17 <sup>th</sup> LTA meeting)
i.	Lanco Mandakini Hydro Energy Pvt. Ltd. (Phata Byung HEP)	Aug'15/ May'08	Connectivity: Oct'17. LTA : July'09, Later revised in Oct'17	Connectivity: 20/12/2018 LTA : 20/12/2018
ii.	L&T Uttaranchal Hydropower Ltd. (Singoli Bhatwari HEP)	May'15/ April' 17	Connectivity: Apr'16, revised in Oct'17. LTA put on hold due to non-concurrence from PTCUL	Connectivity: 20/12/2018 & 02/01/2019 LTA : 20/12/2018
iii.	NTPC Ltd. (Tapovan Vishnugad HEP)	Oct'15/ Jan'07	Connectivity: Aug'16 LTA : July'09, later revised in	Connectivity: 20/12/2018 LTA : 20/12/2018

Minutes of 3<sup>rd</sup> NRSCT held on 24.5.2019 at NRPC, new Delhi

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			Oct'17	
iv.	THDC Ltd. (Vishnugad Pipalkoti HEP)	July'14/ Not applied	Connectivity: Aug'16 LTA Application : Not Received	Connectivity: 20/12/2018 LTA Application : Not Received
v.	SJVN Ltd. (Naitwar Mori HEP)	Apr'16 / Nov'17	Connectivity: Oct.'17 LTA proposal in present agenda.	Connectivity: 20/12/2018 & 17/01/2019 LTA : 20/12/2018 & 04/01/2019
vi.	SJVN Ltd. (Devsari HEP)	Apr'16	Connectivity: Oct'17 LTA Application: Not Received.	Connectivity: 26/12/2018 LTA Application: Not Received

As per the intimations issued Tripartite Transmission Agreement in respect of Connectivity & Tripartite LTA Agreement in respect of LTA need to be signed, however these agreements are yet to be signed by Generators/PTCUL/beneficiary. Subsequently, PTCUL has filed petition No. 106/MP/2019 before CERC.

PTCUL stated that as the matter is under consideration of CERC, the same need not be discussed in NRSCT forum.

Members noted the same.

### 33.0 Down Stream network by State utilities from ISTS Station:

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

S. No.	Substation	Downstream network bays	Commissioning status of S/s Transformer	Planned 220kV system and Implementation Status	Status
1	400/220kV, 3x315 MVA Samba	2 nos. bays utilized under ISTS. Balance 4 nos to be utilized	Commissioned	<ul style="list-style-type: none"> <li>LILO of 220 kV Bishnha–Hiranagar D/c line. Target completion -Nov, 2019.</li> <li>220kV D/c Samba (PG) – Samba (JKPDD) approved in 1<sup>st</sup> NRSCT.</li> </ul> <b>PDD, J&amp;K to update.</b>	No update received



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S. No.	Substation	Downstream network bays	Commissioning status of S/s Transformer	Planned system /Implementation Status	220kV and Status
2	400/220kV, 2x315 MVA New Wanpoh	6 Nos. of 220 kV bays to be utilized	Commissioned	<ul style="list-style-type: none"> <li>220 kV New Wanpoh -Mirbazar D/c line. Target completion – March, 2019.</li> <li>220 kV Alusteng - New Wanpoh Line. Target completion – March, 2019.</li> </ul> <b>PDD, J&amp;K to update.</b>	No update received
3	400/220kV, 2x315 MVA Parbati Pooling Station (Banala)	2 Nos. of 220 kV bays to be utilized.	Commissioned	<ul style="list-style-type: none"> <li>220 kV Charor-Banala D/c line (18 km). Target completion – Dec'18.</li> </ul>	220 kV Charor-Banala D/c line Target completion- 31.07.2019
4	400/220kV, 2x500 MVA Kurukshetra (GIS)	8 nos. of 220 kV bays to be utilized	Commissioned	<ul style="list-style-type: none"> <li>LILO of one circuit of Kaul-Pehowa 220 kV D/c line at Bhadson (Kurukshetra).</li> <li>LILO of one circuit of Kaul- Bastara 220 kV D/c line Bhadson(Kurukshetra). Target completion – 31.12.2018.</li> <li>220kV D/c Bhadson (Kurukshetra) – Salempur with HTLS conductor equivalent to twin moose. Target completion - 31.03.2020.</li> </ul>	<ul style="list-style-type: none"> <li>LILO of one circuit of Kaul-Pehowa 220 kV D/c line at Bhadson (Kurukshetra). (37 km) <b>Commissioned on 07.03.2019</b></li> <li>LILO of one circuit of Kaul- Bastara 220 kV D/c line Bhadson(Kurukshetra). (29.9 km) Target completion – 11.10.2019</li> <li>220kV D/c Bhadson (Kurukshetra) – Salempur with HTLS conductor equivalent to twin moose. (7 km) Target completion - 30.04.2020.</li> </ul>
5	400/220kV, 2x500	5 nos. of 220 kV	Commissioned	<ul style="list-style-type: none"> <li>Bagpat(PG) Modipuram-II</li> </ul>	05 nos. bays utilized as under :-

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S. No.	Substation	Downstream network bays	Commissioning status of S/s Transformer	Planned system /Implementation Status	220kV and Status
	MVA Bagpat GIS	Downstream lines to Baraut, Shamli, Muradnagar and Bagpat commissioned. Balance 3 Nos. of 220 kV bays to be utilized.		220kV D/c line. Target completion Jan'20. <ul style="list-style-type: none"> <li>LILO of 220kV S/c Muradnagar II Baghat (PG) at Baghat SS.</li> </ul> Target completion Mar'19	<ul style="list-style-type: none"> <li>Moradnagar New (400) – 01 no. Bay This line will be liloed at 220 kV Mandola Vihar s/s as approved by SCM and <b>target completion–01 Month.</b></li> <li>Further, this line will also be liloed at Baghat (UP) 220 kV with s/s and <b>target completion – Dec' 19.</b></li> <li>Baraut 220 kV – 02 nos. Bays</li> <li>Shamli 220 kV – 01 no. Bay</li> <li>Baghat 220 kV – 01 no. Bay</li> </ul> <b>Balance :-</b> <ul style="list-style-type: none"> <li>Baghat (PG) – Modipuram-II 220 kV DC line.</li> </ul> <b>Target Completion – Dec' 20</b>
6	400/220 kV, 2x315 MVA Saharanpur	2 nos. 220 kV downstream lines commissioned. (Saharanpur (UP) and Nanauta) Balance 4 Nos. of 220 kV bays to be utilized	Commissioned	<ul style="list-style-type: none"> <li>LILO of Khara-Shamli 220 kV S/C line at SRN(PG).</li> <li>220 kV SRN(PG)-Sarasawa D/C Line.</li> <li>LILO of SRN-Nanauta 220 kV S/C line at SRN(PG).</li> </ul>	06 nos. bays already utilized as under :- <ul style="list-style-type: none"> <li>LILO of Khara-Shamli 220 kV Sc line at SRN (PG) – 02 nos. bays utilized.</li> <li>220 kV SRN (PG) – Sarasawa DC line – 02 nos. bays utilized.</li> <li>LILO of SRN – Nanauta 220 kV SC line at SRN (PG) – 02 nos. bays utilized.</li> </ul>
7	400/220kV, 2x315	Out of 6 bays,	Commissioned	<ul style="list-style-type: none"> <li>220 kV Dehradun-</li> </ul>	

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S. No.	Substation	Downstream network bays	Commissioning status of S/s Transformer	Planned 220kV system and Implementation Status	Status
	MVA Dehradun	only two bays used. Balance 4 bays to be utilised.		Jhajra line. Target completion: Nov, 2021 <b>PTCUL to update.</b>	
8	400/220 kV, 2x315 MVA Sohawal	4 Nos 220 kV bays utilized. 2 Nos 220 kV bays to be utilized.	Commissioned	<ul style="list-style-type: none"> <li>220 kV D/C Sohawal (PG) – New Tanda line.</li> </ul> Target completion- Dec, 2018.	06 nos. bays already utilized as under :- <ul style="list-style-type: none"> <li>220 kV DC Sohawal (PG) –Tanda new line - 02 nos. bays utilized (bays under deposit).</li> <li>Sohawal (PG) – Barabanki 220 kV DC line -02 nos. bays utilized.</li> <li>Sohawal (PG) – Sohawal 220 kV DC line - 02 nos. bays utilized.</li> </ul> <b>Balance :-</b> <ul style="list-style-type: none"> <li>Sohawal (PG) – Gonda – Behraich 220 kV DC line (U/C) - 02 nos. bays to be utilized- (Bays under deposit yet not constructed).</li> </ul> <b>Target Completion – Nov' 19</b>
9	Shahjahanpur, 2x315 MVA 400/220 kV	Partially utilized. Balance 5 Nos. of 220 kV bays to be utilized.	Commissioned	<ul style="list-style-type: none"> <li>220 kV D/C Shahjahanpur (PG) - Azizpur D/C line.</li> <li>220 kV D/C Shahjahanpur (PG) - GolaLakhimpur line.</li> </ul> Target completion - Sept, 2019.	01 no. bay utilized as under :- <ul style="list-style-type: none"> <li>Hardoi 220 kV line – 01 no. bay</li> </ul> <b>Balance :-</b> <ul style="list-style-type: none"> <li>220 DC Shahjahanpur (PG) – Azizpur (Shahjahanpur) DC line (U/C) – 02 nos. bays to be utilized.</li> </ul> <b>Target Completion :- Apr' 20</b> <ul style="list-style-type: none"> <li>220 kV DC</li> </ul>

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S. No.	Substation	Downstream network bays	Commissioning status of S/s Transformer	Planned system /Implementation Status	220kV and Status
					Shahjahanpur (PG) – Gola Lakhimpur line (U/C) - 02 nos. bays to be utilized. <b>Target Completion :- Nov' 20</b> • More 220 kV downstream s/s are being planned to utilize 220 kV bays.
10	02 nos. bays at Moga	Partially utilized. Balance 2 nos. of 220kV bays to be utilized.	Commissioned	• Moga–Mehalkalan 220 kV D/c line. Target completion - Dec' 18. <b>PSTCL to update.</b>	
11	Hamirpur 400/220 kV 2x 315 MVA Sub-station (Augmentation by 3x105 MVA ICT)	04 nos. 220 kV downstream lines commissioned under ISTS. Balance two bays to be utilised by HPSEBL	Sep' 18	• 220 kV D/C Hamirpur-Dehan line. Target completion - Apr, 2020.	• 220 kV D/C Hamirpur-Dehan (Patti) line. <b>Target completion - 31.12.2020.</b>
12	Kaithal 400/220 kV 1x 315 MVA Sub-station	July 2017 (Shifting of transformer from Ballabhgarh)	Commissioned	• 220 kV Kaithal(PG)-Neemwala D/c line. Target completion - 31.01.2020.	• 220 kV Kaithal(PG)-Neemwala D/c line. (29.165 km) Target completion - 06.01.2020. • 220 kV substation Neemwala Target completion - 05.04.2020
14	Bhiwani 400/220kV S/s	6 nos. of 220kV bays	Commissioned	• 220kV Bhiwani (PG) - Isherwal (HVPNL) D/c line. (51km)	• 220kV Bhiwani (PG) - Isherwal (HVPNL) D/c line. (51km) Target completion - 31.12.2020.

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S. No.	Substation	Downstream network bays	Commissioning status of S/s Transformer	Planned system /Implementation Status	220kV and Status
				Target completion - 31.06.2020.	<ul style="list-style-type: none"> <li>220kV Bhiwani (PG) - Bhiwani (HVPNL) D/c line. (20km) Target completion - 31.12.2020</li> </ul>
15	Jind 400/220kV S/s	6 nos. of 220kV bays	Commissioned	<ul style="list-style-type: none"> <li>LILO of both circuits of 220kV D/c Narwana – Mund line at Jind (PG). Target completion - 31.06.2020.</li> </ul>	<ul style="list-style-type: none"> <li>LILO of both circuits of 220kV D/c Narwana – Mund line at Jind (PG). (42km) Target completion - 31.12.2020.</li> </ul>
16	400/220kV Tughlakabad GIS (6 no of bays utilized out of 8 no of 220kV bays)	4x 500	Commissioned	RK Puram – Tughlakabad (UG Cable) 220kv D/c line. Target completion – 2020-21	<p>RK Puram – Tughlakabad (UG Cable) 220kv D/c line.- Purchase Requisition is under preparation (Target completion -2022-23)</p> <p>Tuglakhabad-Masjid Moth D/C (UG 220kV) - Under tendering stage (Completion Target-2021-22).</p>
17	400/220kV Kala Amb GIS (TBCB) (6 nos. of 220kV bays)	7x105	Commissioned (Jul'17)	HPSEBL has planned one no. of 220kV D/c line from Kala Amb 400/220kV S/s to 220/132kV Kala Amb S/s. Details for remaining 4 nos. of line bays may be provided.	<p>HPPTCL has planned 220/132 kV substation near the 400/220 kV substation of PGCIL and 2 nos 220 kV bays shall be utilised by 30.04.2021.</p> <p>Balance 4 bays to be utilized by 31.12.2022</p>

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

Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States in 40 <sup>th</sup> SCSPNR	Status
1	400/220kV Dwarka-I GIS	4x 500	Sep'19	DTL to update.	1. 220kV Dwarka-Budella (UG Cable) D/C- under

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Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States in 40 <sup>th</sup> SCSPNR	Status
	(8 nos. of 220kV bays)				Execution- Completion Target- 2019-20. 2. 220kV PPK-III-Naraina D/C LILO at Dwarka- is under execution by PGCIL Completion Target- 2019-20. 3. 220kV Dwarka-PPK-I & 220kV Dwarka-PPK-II (UG Cable) D/C- Purchase Requisition under preparation-completion Target- 2021-22.
2	220/66kV Chandigarh GIS (8 nos. of 66kV bays)	2x 160	Feb'19	<b>Chandigarh to update.</b>	No update received
3	400/220kV Jauljivi GIS (6 nos. of 220kV bays)	2x315	Dec'20 19	<ul style="list-style-type: none"> <li>• 220kV Almora- Jauljibi line.</li> <li>• 220kV Brammah- Jauljibi line</li> </ul> <b>PTCUL to update.</b>	No update received
4	400/220kV Sohna Road Sub-station (TBCB) (8 nos. of 220kV bays)	2x500	May'19	<ul style="list-style-type: none"> <li>• LILO of both circuits of 220kV D/c Sector-69 - RojKaMeo line at 400kV Sohna Road.</li> <li>• LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road.</li> </ul>	i. LILO of both circuits of 220kV D/c Sector-69 - RojKaMeo line at 400kV Sohna Road. (1.3 km) Target completion- 31.05.2020  ii. LILO of both circuits of 220kV D/c Badshahpur-Sec77 line at 400kV Sohna Road with 0.4 Sq inch AL-59 conductor (0.5 km) Target completion- 31.05.2020

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Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States in 40 <sup>th</sup> SCSPNR	Status
					iii. Augmentation of balance conductor of 220 kV Badshahpur-Sohana road line after the LILO of work placed at Sr. no (ii) above from 0.4 Sq inch ACSR conductor to 0.4 Sq inch AL-59 conductor Target completion- 31.05.2020
5	400/220kV Prithla Substation (TBCB) (8 nos. of 220kV bays)	2x500	May'19	<ul style="list-style-type: none"> <li>LILO of existing 220kV Palwal-Rangala Rajpur D/c line at Prithla. Target completion - March 2020.</li> <li>220 kV D/c Prithla (400) -Sector-78, Faridabad S/s. Target completion - July 2020.</li> </ul>	<ul style="list-style-type: none"> <li>LILO of existing 220kV Palwal-Rangala Rajpur D/c line at Prithla (5.27 km). Target completion - 08.02.2020.</li> <li>220 kV D/c Prithla (400) - Sector-78, Faridabad S/s. (32.247 km) Target completion - 31.12.2020.</li> </ul>
6	400/220kV Kadarapur Substation (TBCB) (8 nos. of 220kV bays)	2x500	May'19	M/s Sterlite has been asked to change the orientation of LILO in order to ensure the proper emanation of 220 kV line.	<ul style="list-style-type: none"> <li>LILO of both circuits of 220 kV Pali- Sector 56 D/c line on M/c &amp; D/c towers with 0.4 Sq inch AL-59 conductor at 400 kV substation Kadarapur (13 km) along with augmentation of existing conductor from 220 kV sector-56 to LILO point with 0.4 Sq inch Al-59</li> </ul>

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Sl. No.	Name of Substation	MVA Capacity	Expected Schedule	Downstream connectivity furnished by States in 40 <sup>th</sup> SCSPNR	Status
					<p>conductor (5.5 km) Target completion- 31.12.2020</p> <ul style="list-style-type: none"> <li>LILO of both circuits of 220 kV sector 65-Pali D/c line on M/c and D/c towers with 0.4 Sq inch AL-59 conductor at 400 kV substation Kadarapur (6 km) along with augmentation of balance 0.4 Sq inch ACSR conductor of 220 kV Kadarapur-Sector 65 D/c line with 0.4 Sq inch AL-59 conductor (8.5 km) Target Completion- 31.12.2020</li> </ul>

#### 34.0 Operational Feedback (NR Region):

S. No	Corridor	Season/ Antecedent Conditions	Description of the constraints	Remarks
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 800-1400MW for most of the time. 400kV Gr. Noida-Nawada is being opened on no. of occasions to control loading of 400kV Dadri-Gr. Noida as described in Section 2.2.	<p><b>Remarks:</b> Switchgear changes at Dadri, Gr. Noida and Nawada need to be carried out so that any undue event/disturbance due to high line loadings may be avoided (detailed in section 7.(i)). However, as per information available with NRLDC, NTPC Dadri is replacing old switchgears by new switchgears of same ratings in Jan'19. Thus, issue of lower switchgear ratings would still persist. In a meeting held in CEA</p>



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				with representatives from CTU, HVPNL, POSOCO on 11.4.2019 regarding Augmentation of 400 kV substation at Nawada, HVPNL agreed to replace the switchgear at Nawada. UPPTCL stated that all Switchgear upgradation works at Gr. Noida (400) S/S completed and CT, Isolator, Circuit breakers replaced.
2	400kV Anpara-Obra	all times	High MW loading. Lines from Anpara TPS are twin moose line for which thermal limit is ~850MW. Loading of Anpara-Obra increases in case of N-1 contingency of already heavily loaded Anpara-Sarnath 1 & 2 or Anpara-Mau. In an incident on 14.10.2018, complete outage of 400kV Obra substation had taken place, which resulted in outage of all elements at station for several weeks.	Commissioning of already planned 765kV Anpara D – Unnao S/C needs to be expedited.  UPPTCL stated that this 765 kV line expected by Aug-Sept' 19.  Anpara-Unnao 765 kV line outage linked SPS scheme already installed at Anpara, Unnao ends and NRLDC acceptance awaited.
	400kV Anpara-Sarnath D/C 400kV Anpara-Mau line 765kV Anpara C-Unnao line	all times	High MW loadings on these lines and under N-1 contingency of any of line, loading on 400kV lines from Anpara increases substantially.	Commissioning of already planned 765kV Anpara D – Unnao S/C needs to be expedited. UPPTCL stated that This 765 kV line expected by Aug-Sept' 19.  Anpara-Unnao 765 kV line outage linked SPS scheme already installed at Anpara, Unnao ends and NRLDC acceptance awaited.
	<b>400kV Anta-Kota line</b>	All times	400kV Anta-Kota (twin moose) conductor was synchronised on 09.07.2018. It remains heavily loaded as all remaining 400kV lines connected at Anta are transferring power to Anta.	400kV Anta-Kota and Kota-Chhabra lines were charged as 400kV Anta-Chhabra through tie bay at 400kV Anta on suggestion of NRLDC to reduce loading of 400kV Anta-Kota.Rajasthan

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			<p>Loading of this line remains in range of 800-900MW (close to thermal limits) under high generation in Chhabra-Kawai-Kalisindh complex. Under N-1 contingency of 765kV Anta-Phagi D/C line loading on 400kV Anta-Kota would cross thermal limits. This is described in detail in section 7.</p>	<p>SLDC had incorporated the same from 26<sup>th</sup> Nov'18 for few days and after that main bays at Anta station were again closed. It can be observed from the graph that the flow on Chhabra-Kota was in the range of 300-500 MW whereas, it was 600-900 MW on Anta-Kota. In 154<sup>th</sup> OCC meeting, Rajasthan SLDC representative informed during that time loading of 400kV Kawai-Chhabra was high (~500-600MW) especially under low generation at Chhabra, therefore, they had again closed main bays at Anta.</p>
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S. No	ICT/Constraint	Season/ Antecedent Conditions	Description of the constraints	Remarks
1	400/220kV Rajpura	Most time	Rajpura has 2*500MVA ICTs. Due to closure of Bhatinda TPS & 2 units of Ropar TPS, power flow through Rajpura ICTs has increased. Moreover, one 500MVA ICT at Dhurihas remained under outage for most time. Thus, loading on Rajpura ICT remained above N-1 contingency limits even in comparatively lower demand season in Punjab.	PSTCL would expedite the new already planned 3 <sup>rd</sup> ICT at Rajpura.
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. It has	Capacity enhancement of 2 <sup>nd</sup> ICT (315MVA to 500MVA) has been completed on 02.01.2019 by UP which has helped to relieve N-1 non-compliance issue at

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			N-1 compliance issues throughout the year.	Azamgarh. Although in summer/monsoon months the loading may still be above N-1 contingency limit. UPPTCL stated that New Azamgarh-II 220/132/33 kV, 2x160, 2x40 MVA S/S is already completed with 132,33 kV downstream. Considerable load from Azamgarh & Jaunpur 220 kV S/S is being shifted soon to this new 220 kV substation being directly fed from Sarnath (400) S/S. It will considerably reduce loadings on Azamgarh (400) substation ICTs and outgoing 220 kV lines.
	765/400kV Phagi	Most time (Nov & Dec)	Two ICTs of 1500MVA capacity each at 765/400kV Phagi S/s and not N-1 compliant beyond ~1960MW. Since commissioning of 400kV Phagi-Heerapura D/C & 400kV Phagi-Ajmer D/C and significant generation addition (~1000MW) at Chhabra Super Critical, loading of 765/400kV ICTs at Phagi has increased. On few occasions due to high loading of ICTs at Phagi, 400kV lines are also being opened to control loading.	3 <sup>rd</sup> planned ICT of 1500MVA capacity at Phagi should be expedited. No update received from RVPNL
	Reliability issues due to prolonged outage of ICT at 400/220kV Dhuri S/s		3*500MVA ICTs have been commissioned at Dhuri. 500MVA ICT-2 at Dhuri was out since 19.8.17 and revived on 29.10.18. However, ICT-3 at	As per Punjab SLDC, when three ICTs were in service at Dhuri, one ICT had been kept at different bus (split-operation) so as to reduce fault level at 220kV side as suggested by their protection department.

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			Dhuri has again got out since 08.12.18. Effectively there has been only two out of three ICTs in service at Dhuri for most time since last one and half year.	
	Reliability issues due to prolonged outage of ICT at 400/220kV Akal S/s		Nearly 1980 MW of Renewable Energy (RE) generation (mostly wind) has been commissioned around 400/220kV Akal S/s and normally during high wind period 800-1000 MW power is evacuated through Akal ICTs with N-1 non-compliance issues at Akal. 500MVA ICT-4 and 315MVA ICT-2 at Akal are out since 05.08.18 and 22.08.18 due to fire. Therefore, only two 315MVA ICT are available for evacuation of wind power from Akal. In 150th and 151st OCC meeting, Rajasthan SLDC reported that renewable curtailment had to be done.	Requirement for capacity enhancement of ICTs at Akal considering already planned network in nearby area needs to be studied and planned because N-1 violations are observed every year (especially during high wind) and need to be attended to avoid any renewable curtailments in future. No update received from RVPNL.
3	Single ICTs at following 400kV & above Nodes:		<ul style="list-style-type: none"> <li>• 400kV Rajwest (RVPN)</li> <li>• 400kV Chhabra (RVPN)</li> <li>• 400kV Kalisindh (RVPN)</li> </ul>	In the last meeting, RRVPNL stated that they are planning to establish a new GSS either at a new location or additional 765/400kV ICT at Anta. No update received from

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			• 400kV Dehar	RVPNL
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### **35.0 Connectivity for Thermal/Hydro Projects, Stage-I/Stage-II for RE Projects and LTA**

The details of Connectivity, Stage-I Connectivity, Stage-II Connectivity & LTA granted/agreed for grant to various IPPs from 16<sup>th</sup> to 22<sup>nd</sup> LTA/Connectivity meeting of NR during November, 2018 to April, 2019 as furnished by CTU is enclosed at Annexure- III.

Members noted the same.

**Meeting ended with the thanks to chair.**

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## Annexure-I

3<sup>rd</sup> Meeting of Northern Region Standing Committee on Transmission held on 24<sup>th</sup> May, 2019 at NRPC Katwaria Sarai, New Delhi

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

List of participants is enclosed at Annexure-I

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

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

400kV Bus Section-1

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

400kV Bus Section-2

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

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

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

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



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

Additional ICT at Balachak = 500 MVA

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

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

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

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

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

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

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

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



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

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

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

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

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

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

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



### 400/220kV S/s at Dhansanu

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

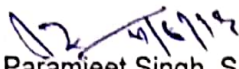
The entire study and the viewpoint as emerged above was presented to the management of PSTCL and PSPCL on 04.06.19 at PSPCL guest house, Sector-10, Chandigarh and the above viewpoint was agreed upon in principal. The management was of considered opinion that the entire scheme of green corridor and the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

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

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

#### PSTCL

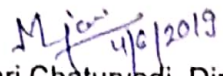
  
Sh. Sanjeev Gupta, CE/TS

  
Sh. Paramjeet Singh, SE/Planning

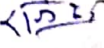
  
Sh. Kamal Krishan, ASE/Planning

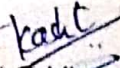
#### CEA

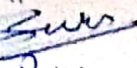
  
Sh. Awdhesh Kr. Yadav, Director (PSP&A-I)

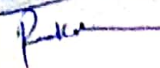
  
Ms. Manjari Chaturvedi, Director (PSP&A-I)


#### CTU/POWERGRID

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

Sh. Kashish Bhambhani, DGM(Smart Grid) 

Sh. Sandeep Kumawat, Chief Manager(Smart Grid) 

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

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

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List of participants

PSTCL

- Sh. Sanjeev Gupta, Chief Engineer (TS)  
Sh. Paramjeet Singh, Supdt. Engineer(Planning)  
Sh. Kamal Krishan, ASE/Planning

CEA

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

CTU/POWERGRID

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

Additional Participants on 4.6.19:

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

### Connectivity for Thermal/Hydro Projects, Stage-I/Stage-II for RE Projects and LTA

The details of Connectivity, Stage-I Connectivity, Stage-II Connectivity & LTA granted/agreed for grant to various IPPs from 16<sup>th</sup> to 22<sup>nd</sup> LTA/Connectivity meeting of NR during November, 2018 to April, 2019.

#### I. Connectivity Applications from Thermal/Hydro Generators

The details of Connectivity granted to various IPPs are as below:

**TABLE I**

Sl. No.	Application No. & Date (Online/Physical)	Applicant	Location	Connectivity Sought (MW)	Connectivity Agreed/ Granted From	Nature of Applicant	Transmission system for Connectivity
1.	1200001689 (31/08/2018)/ (14/09/2018)	Chenab Valley Power Projects [P] Ltd. (PakalDul HEP Project)	Kishtwar, J&K	1000	01/02/2024	Hydro	<ul style="list-style-type: none"> <li>i) 400 kV D/c (Triple HTLS Conductor) line from PakalDul HEP – Kishtwar GIS Pooling station along with associated bays at both ends – under scope of generation developer</li> <li>ii) Establishment of 400 kV GIS Pooling station at Kishtwar by LILO one circuit of Kishenpur – Dulhasti 400kV D/c (Quad) line (Single Circuit Strung) – under ISTS</li> <li>iii) GIS switchyard equipment and XLPE cables and other associated equipment provided may be designed for carrying 4000 Amps current - under scope of generation developer</li> </ul>

Sl. No.	Application No. & Date (Online/Physical)	Applicant	Location	Connectivity Sought (MW)	Connectivity Agreed/ Granted From	Nature of Applicant	Transmission system for Connectivity
							iv) 420 kV, 125 MVAR Bus Reactor at PakalDul HEP – under scope of generation developer v) 420 kV, 125 MVAR Bus Reactor at Kishtwar (GIS) Pooling Station– under ISTS vi) One and half breaker switching scheme for 400 kV Generation switchyard – under scope of generation developer.
2.	120000525 (08/11/2016)/ (18/11/2016)	SJVN Limited (Luhri HEP St-I)	Shimla, Kullu, Himachal Pradesh	210	31/05/2024	Hydro	<b>Under the scope of Developer</b> Luhri Stage-I – 400/220kV Nange GIS Pooling Station 220kV D/c line along with associated bays at both ends <sup>\$</sup>
3.	1200001205 (10/08/2018)/ (23/08/2018)	SJVN Limited (Luhri HEP St-II)	Shimla, Kullu, Himachal Pradesh	172	31/03/2026	Hydro	<b>Under the scope of Developer</b> Luhri Stage-II – 400/220kV Nange GIS Pooling Station 220kV D/c line along with associated bays at both ends <sup>\$</sup>
4.	1200001720 (12/10/2018)/ (22/10/2018)	SJVN Limited (Sunni Dam HEP)	Shimla & Mandi, Himachal Pradesh	382	31/03/2025	Hydro	<b>Under the scope of Developer</b> Luhri Stage-III – 400/220kV Nange GIS Pooling Station 220kV D/c (High Capacity) line along with associated bays at both ends <sup>\$</sup>

Sl. No.	Application No. & Date (Online/Physical)	Applicant	Location	Connectivity Sought (MW)	Connectivity Agreed/ Granted From	Nature of Applicant	Transmission system for Connectivity
5.	1200001879 (Stage-I) & 1200001884 (Stage-II)	NTPC Limited	NTPC Auraiya ISGS	20	22/10/2019	Solar	It was agreed to grant Connectivity to NTPC considering it as a renewable generating station to be developed by a generating company intending to get connected to the existing connection point with ISTS (NTPC Auraiya generation plant switchyard) through the electrical system of principal generating station.

**Note:**

§In addition to dedicated transmission system, following common transmission system is also required for evacuation of power from Luhri HEP St-I, St-II and Sunni Dam HEP of SJVNL

- Establishment of 1x500 MVA, 400/220kV Nange GIS Pooling Station (Tentatively Identified near Luhri Stage-II HEP)
- Nange GIS Pooling Station - Koldam 400kV D/c line along with associated bays at both ends
- 125 MVAR Bus Reactor at Nange GIS Pooling Station.

**II. Stage-I Connectivity Applications**

The details of Stage-I Connectivity granted to various IPPs is given below:



**TABLE 2**

<b>Sl. No.</b>	<b>Application No.</b>	<b>Applicant</b>	<b>Location</b>	<b>Date of Application</b>	<b>Connectivity Sought (MW)</b>	<b>Nature of Applicant</b>	<b>Proposed location for Connectivity</b>	<b>Dedicated Tr. System</b>
1.	1200001920	Mahoba Solar (UP) Pvt. Ltd.	Jaisalmer, Rajasthan	25-Feb-19	500	Generator (Hybrid)	Fatehgarh-II PS (New)	Mahoba Solar (UP) Pvt. Ltd. Generation Switchyard – Fatehgarh-II PS (New) 220 kV D/C line
2.	1200001926	Acme Solar Holdings Limited	Jodhpur, Rajasthan	28-Feb-19	300	Generator (Solar)	Bhadla-II PS (New)	ACME Bhadla I Solar Power Plant – Bhadla –II (New) PS 220 kV D/C line
3.	1200001947	ReNew Solar Energy (Jharkhand Four) Private Limited	Jaisalmer, Rajasthan	2-Mar-19	300	Generator (Solar)	Fatehgarh-II PS (New)	<ul style="list-style-type: none"><li>• Construction of 220kV S/c lines from Jaisalmer I Project&amp;Jaisalmer II Project upto common point.</li><li>• Common point of Jaisalmer I Project&amp;Jaisalmer II Project - Fatehgarh-II 220kV D/c line</li></ul>
4.	1200001971	ReNew Solar Energy (Jharkhand Four) Private Limited	Jaisalmer, Rajasthan	15-Mar-19	300	Generator (Solar)	Fatehgarh-II PS (New)	

<b>Sl. No.</b>	<b>Application No.</b>	<b>Applicant</b>	<b>Location</b>	<b>Date of Application</b>	<b>Connectivity Sought (MW)</b>	<b>Nature of Applicant</b>	<b>Proposed location for Connectivity</b>	<b>Dedicated Tr. System</b>
5.	1200001951	SBSR Power Cleantech Eleven Private Limited	Bikaner, Rajasthan	8-Mar-19	300	Generator (Solar)	Bikaner	SBSR Eleven Solar Power Plant – Bikaner 220 kV S/C line
6.	1200001955	Acme Solar Holdings Limited	Jaisalmer, Rajasthan	7-Mar-19	300 (sought at 400kV)	Generator (Solar)	Fatehgarh-II PS (New)	Acme Fatehgarh VI Solar Power Plant – Fatehgarh-II PS (new) 220kV S/C line
7.	1200002008	Eden Renewable Cite Private Limited	Jaisalmer, Rajasthan	28-Mar-19	300	Generator (Solar)	Fatehgarh-II PS (New)	EDEN Cite ISTS Raj Power Plant – Fatehgarh-II PS (new) 220kV S/C line
8.	1200002002	Azure India Power Pvt. Ltd.	Bikaner, Rajasthan	28-Mar-19	500	Generator (Solar)	Bikaner	Azure Bikaner 2 Power Plant – Bikaner 220 kV D/C line

**TABLE 3**

Sl. No.	Application No.	Applicant	Location	Date of Application	Connectivity Sought (MW)	Nature of Applicant	Proposed primary location for Connectivity	Dedicated Tr. System	Proposed Alternative location for Connectivity / Tr. System under ISTS	Dedicated Tr. System for alternative connectivity
1.	1200001700	Acme Solar Holdings Limited	Jaisalmer, Rajasthan	12.09.2018	300	Generator (Solar)	Fatehgarh (400kV Pooling Station along with Fatehgarh-Bhadla 765kV D/c line to be operated at 400kV : under implementation by Transmission Licensee)	<ul style="list-style-type: none"> <li>Pooling of power from ACME – V (1200001688) &amp; VI (1200001700) (Fatehgarh) Solar Power Plants at Common Pooling Station of ACME–V &amp; VI (Fatehgarh) Solar Power Plants</li> </ul>	<ul style="list-style-type: none"> <li>Fatehgarh-II (New)</li> <li>Establishment of 400kV Pooling station at Fatehgarh-II (New)</li> <li>Fatehgarh – Fatehgarh-II (New) 400kV D/c (Quad)</li> </ul>	<ul style="list-style-type: none"> <li>Pooling of power from ACME– V (1200001688) &amp; VI (1200001700) (Fatehgarh) Solar Power Plants at Common Pooling Station of ACME–V &amp; VI (Fatehgarh) Solar Power Plants.</li> </ul>

								<ul style="list-style-type: none"> <li>• Common pooling Station of ACME -V (Fatehgarh) &amp; ACME - VI (Fatehgarh) Solar Power Plants - Fatehgarh 400kV S/c line (with minimum capacity of 900 MW at nominal Voltage)</li> </ul>		<ul style="list-style-type: none"> <li>• Common pooling Station of ACME -V &amp; ACME - VI (Fatehgarh) Solar Power Plants - Fatehgarh - II (New) 400kV S/c line (with minimum capacity of 900 MW at nominal Voltage)</li> </ul>
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### III. Stage-II Connectivity Applications

The details of Stage-II Connectivity granted to various IPPs is given below:

**TABLE 4**

Sl. No.	Application No.	Applicant	Location	Date of Application	Quantum of Stage-I Sought/Granted (MW)	Stage-II Connectivity Sought (MW)/date	Quantum won in SECI/State bids (MW)	Proposed location for Grant of Stage-II Connectivity	Dedicated Tr. System
1.	1200001797	Adani Renewable Energy Park Rajasthan Ltd (SPPD)	Jaisalmer, Rajasthan	30/11/18	500 (Stage-I :1200001123) Granted Stage-I connectivity in July'18 at 400kV Fatehgarh PS and alternate location at 765/400/220kV Bhadla PS	500/31.12.2020	Land & Auditor Certificate basis	Fatehgarh-II PS (New)*	<ul style="list-style-type: none"> <li>Adani Renewable 500 MW Solar Project – Fatehgarh-II 400kV S/c line (with minimum capacity of 900 MW at nominal Voltage)</li> <li>Bay at Fatehgarh-II shall be under the scope of ISTS (as per AREPRL email dated 05/01/2019).</li> </ul> <p>In principally agreed.</p>
2.	1200001989	ReNew Solar Energy (Jharkhand Four) Private Limited	Jaisalmer, Rajasthan	19-Mar-19	300 (1200001971)	300 (31/03/21)	300 MSEDCL	Fatehgarh-II PS (New)*	<ul style="list-style-type: none"> <li>Construction 220kV S/c lines from Jaisalmer I Project&amp;Jaisalmer II Project upto common point.</li> <li>Common point of Jaisalmer I Project&amp;Jaisalmer II Project - Fatehgarh-II 220kV D/c line</li> </ul>
3.	1200001967	Renew Solar Energy (Jharkhand	Jaisalmer, Rajasthan	11-Mar-19	300 (1200001947)	300 (20/11/2020)	300 SECI-III(ISTS)	Fatehgarh-II PS (New)*	

Sl. No.	Application No.	Applicant	Location	Date of Application	Quantum of Stage-I Sought/Granted (MW)	Stage-II Connectivity Sought (MW)/date	Quantum won in SECI/State bids (MW)	Proposed location for Grant of Stage-II Connectivity	Dedicated Tr. System
		Four) Private Limited							
4.	1200001999	ACME Solar Holdings Limited	Jodhpur, Rajasthan	20-Mar-19	300 (1200001926)	300 (15/01/21) (Sought at 400kV)	300 MSEDCL	Bhadla-II PS (New)**	ACME Bhadla I Solar Power Plant – Bhadla-II(New) PS 220kV S/c line
5.	1200002013	Azure Power India Private Limited	Bikaner, Rajasthan	29-Mar-19	500 (120002002)	300 (05/12/2020)	300 SECI-III(ISTS)	Bikaner <sup>\$</sup>	Azure Bikaner 2 Power Plant – Bikaner 220 kV S/c line
6.	1200001941	Mahoba Solar (Up) Private Limited	Jaisalmer, Rajasthan	7-Mar-19	500 (1200001920)	390 (30/11/2020)	390 SECI-Hybrid (4no. LOA-100+100+100+90)	Fatehgarh-II PS (New)*	Mahoba Solar(UP) Private Limited Power Project – Fatehgarh-II(New) PS 220 kV D/c line
7.	1200001980	SBSR Power Cleantech Eleven Private Limited	Bikaner, Rajasthan	18-Mar-19	300 (1200001951)	300 (31/10/2020)	300 SECI-III(ISTS)	Bikaner <sup>\$</sup>	SBSR Eleven Solar Power Project – Bikaner 220 kV S/c line

Sl. No.	Application No.	Applicant	Location	Date of Application	Quantum of Stage-I Sought/Granted (MW)	Stage-II Connectivity Sought (MW)/date	Quantum won in SECI/State bids (MW)	Proposed location for Grant of Stage-II Connectivity	Dedicated Tr. System
8.	1200002009	Eden Renewable Cite Private Limited	Jaisalmer, Rajasthan	28-Mar-19	300 (1200002008)	300 (30/10/2020)	300 SECI-III(ISTS)	Fatehgarh-II PS (New)*	EDEN Cite ISTS Raj Power Plant – Fatehgarh-II(New) PS 220kV S/C line

1. @ For effecting the Connectivity at Fatehgarh-II(new) S/s, following ISTS elements may be required:

- i. Establishment of 1x1500MVA (765/400kV), Fatehgarh-II Pooling station at suitable location near Fatehgarh 400kV S/s in JaisalmerDistt.
- ii. LILO of Fatehgarh (TBCB) – Bhadla (PG)<sup>@@</sup> D/c (765kV line op.at 400kV) line at Fatehgarh-II so as to establish Fatehgarh (TBCB) – Fatehgarh-II 400kV D/c line (765kV line op. at 400 kV) and Fatehgarh-II - Bhadla 400kV D/c line (765kV line op. at 765 kV) Fatehgarh PS – Bhadla(PG) 765 kV D/c line(to be operated at 400 kV) along with Fatehgarh S/s is being implemented through TBCB by Fatehgarh Bhadla Transmission Limited(FBTL)

2. \* For effecting the Connectivity at Fatehgarh-II PS (New) S/s, following ISTS elements may be required:

- i. Establishment of 1x1500MVA, 765/400kV, Fatehgarh-II Pooling station at suitable location near Fatehgarh.
- ii. Establishment of 1x500 MVA, 400/220kV ICT at Fatehgarh-II Pooling station
- iii. LILO of Fatehgarh (TBCB) – Bhadla (PG) 765kV D/c line (to be operated at 400kV) at Fatehgarh-II so as to establish Fatehgarh (TBCB) – Fatehgarh-II 400kV D/c line (765kV line operated at 400 kV) and Fatehgarh-II - Bhadla 765kV D/c line or Fatehgarh-II – Bhadla-II 765 kV D/c line

Fatehgarh PS(TBCB) – Bhadla(PG) 765 kV D/c line(to be operated at 400 kV) along with Fatehgarh S/s is being implemented through TBCB by Fatehgarh Bhadla Transmission Limited (FBTL)

3. \*\* For effecting the Connectivity at Bhadla-II(New) S/s, one of the following ISTS elements may be required:

- i. Establishment of 1x1500MVA, 765/400kV, Bhadla-II Pooling station
- ii. Establishment of 1x500 MVA, 400/220kV ICT at Bhadla-II Pooling station
- iii. Bhadla PS – Bhadla-II(New) 400kV D/c or
- iv. LILO of Ajmer – Bikaner 765 kV D/c at Bhadla-II S/s(New) or
- v. Bhadla-II – Fatehgarh-II 765kV D/c line & LILO of Fatehgarh (TBCB) – Bhadla (PG) 765kV D/c line (to be operated at 400kV) at Fatehgarh-II so as to establish Fatehgarh (TBCB) – Fatehgarh-II 400kV D/c line (765kV line operated at 400 kV) and Fatehgarh-II - Bhadla 765kV D/c line

4. § For effecting the Connectivity at Bikaner S/s, 1x500MVA, 400/220kV ICT at Bikaner S/s may be required

#### IV. LTA Applications of RE Generators:

The details of Stage-II Connectivity granted to various IPPs is given below:

**TABLE 5**

Sl. No	Application No./Date (Online)/ (Physical)	Applicant	Connectivity/ Injection Point	Drawl Point	LTA (MW)/ Start & End Date (Sought)	Transmission System
1.	1200001737 (23/10/18)/ (26/10/18)	ACME Solar Holdings Limited	Fatehgarh, Rajasthan, NR	Target Basis - Haryana in NR	300 (Start : 26/10/20 End : 25/10/45)	As enclosed at Appendix-I
2.	1200001742 (23/10/18)/ (26/10/18)/	ACME Solar Holdings Limited	Fatehgarh, Rajasthan, NR	Target Basis - Haryana in NR (100MW)	300 (Start : 26/10/20 End : 25/10/45)	As enclosed at Appendix-I
3.	1200001664 (27/08/18)/ (29/08/18)	Acme Solar Holdings Limited	Fatehgarh	Delhi/NR (Target)	300 (Start : 19/10/20 End : 18/10/45)	As enclosed at Appendix-I



<b>Sl. No</b>	<b>Application No./Date (Online)/ (Physical)</b>	<b>Applicant</b>	<b>Connectivity/ Injection Point</b>	<b>Drawl Point</b>	<b>LTA (MW)/ Start &amp; End Date (Sought)</b>	<b>Transmission System</b>
4.	1200001669 (29/08/18)/ (29/08/18)	Acme Solar Holdings Limited	Fatehgarh	Delhi/NR (Target)	300 (Start : 19/10/20 End : 18/10/45)	As enclosed at Appendix-I
5.	1200001645 (23/08/18)/ (24/08/18)	Mahindra Susten Private Limited	Bhadla	Chhattisgarh, WR (Target)	250 (Start : 01/09/20 End : 01/09/45)	As enclosed at Appendix-II
6.	1200001651 (22/08/18)/ (30/08/18)/	Azure Power India Private Limited	Bhadla	WR (Target)	50 (Start : 15/10/20 End : 15/10/45)	As enclosed at Appendix-II
7.	1200001653 (22/08/18) /(23/08/18)	Acme Solar Holdings Limited	Bhadla	Maharashtra, WR (Target)	250 (Start : 16/09/19 End : 15/09/44)	As enclosed at Appendix-II
8.	1200001663 (24/08/18)/ (24/08/18)	Hero Solar Energy Private Limited	Bhadla	Jharkhand/ER (Target)	250 (Start : 02/09/20 End : 30/11/45)	As enclosed at Appendix-II
9.	1200001640 (21/08/18)/ (23/08/18)	Renew Solar Power Private Limited	Bikaner	WR (Target)	250 (Start : 26/10/19 End : 25/10/44)	As enclosed at Appendix-III
10.	1200001650 (22/08/18)/ (30/08/18)	Azure Power India Private Limited	Bikaner	ER (Target)	300 (Start : 15/10/20 End : 15/10/45)	As enclosed at Appendix-III
11.	1200001655 (22/08/18)/ (30/08/18)	Azure Power India Private Limited	Bikaner	100 (NR) 200 (ER) Target	300 (Start : 15/10/20 End : 15/10/45)	As enclosed at Appendix-III

Sl. No	Application No./Date (Online)/ (Physical)	Applicant	Connectivity/ Injection Point	Drawl Point	LTA (MW)/ Start & End Date (Sought)	Transmission System
12.	1200001792 (29/11/18)/ (03/12/18 & 05/12/2018)	Mahoba Solar (UP) Pvt. Ltd.	Bhadla, Rajasthan, NR	WR (Target) Entity- MSEDCL	200 MW (Start : 27/08/19 End : 27/08/44)	As enclosed at Appendix-II
13.	1200001991 (20/03/2019)/ (20/03/2019)	ReNew Solar Energy (Jharkhand Four) Pvt. Ltd.	Fatehgarh-II PS (New) Rajasthan, NR	WR (Target)	300 (Start :30/06/2021 End : 30/06/2046)	As enclosed at Appendix-IV
14.	1200002014 (29/03/2019)/ (01/04/2019)/	ReNew Solar Energy (Jharkhand Four) Pvt. Ltd	Fatehgarh-II PS (New) Rajasthan, NR	ER (Target)	300 (Start :03/12/2020 End : 03/12/2045)	As enclosed at Appendix-IV

#### V. LTA applications of Conventional Generators

TABLE 6

Sl. No	Application No./Date (Online)/ (Physical)	Applicant	Connectivity/ Injection Point	Drawl Point	LTA (MW)/ Start & End Date (Grant)	Transmission System
	1200000954 (01/01/18/ 08/01/18)	NTPC Ltd	Tanda, Uttar Pradesh, NR	UPCL(Uttarakhand)- 35.94 MW HPPC(Haryana)- 41.76 MW	356.78 <b>Unit-I (178.39 MW)</b>	(i) 1 <sup>st</sup> Unit (178.39 MW LTA with proportionate quantum of NR beneficiaries w.e.f. 01/07/2019 or availability of following UPPTCL

Sl. No	Application No./Date (Online)/ (Physical)	Applicant	Connectivity/ Injection Point	Drawl Point	LTA (MW)/ Start & End Date (Grant)	Transmission System
				RUNL(Rajasthan) – 83.35 MW PDD(J&K) – 65.75 MW EDC(Chandigarh)- 4.91 MW Unallocated Quota- 125.07 MW	(Start : 01/07/19 End : 30/06/44) <b>Unit-II(178.39 MW)</b> (Start : 01/01/20 End : 30/06/44)	<p><u>Transmission system, whichever is later</u> :</p> <p>i) LILO of Azamgarh–Sultanpur 400 kV S/c line at Tanda TPS by UPPTCL</p> <p>ii) 400/220 kV, 2x315 MVA ICTs at Tanda TPS by NTPC</p> <p>iii) Tanda (NTPC)-Tanda (New) (UPPTCL) 220 kV D/c line including 220 kV bays Tanda (NTPC) by UPPTCL</p> <p><b>(ii)</b> <u>2nd Unit [balance 178.39 MW (cumulative 356.78 MW LTA) w.e.f. 01/01/2020 or availability of following UPPTCL transmission system, whichever is later]:</u></p> <p>As per UPPTCL, implementation of Tanda- Gonda- Shahjahanpur 400 kV D/C Quad line may take time and there may be mismatch w.r.t. commissioning of 2<sup>nd</sup> Unit of NTPC project. Accordingly, following alternate transmission system till availability of Tanda- Gonda-</p>

Sl. No	Application No./Date (Online)/ (Physical)	Applicant	Connectivity/ Injection Point	Drawl Point	LTA (MW)/ Start & End Date (Grant)	Transmission System
						<p>Shahjahanpur 400 kV D/C Quad line was agreed:</p> <ul style="list-style-type: none"> <li>i) Establishment of 400/220/132 kV, (2x500 + 2x200) MVA GIS substation at Basti</li> <li>ii) Construction of Tanda TPS–Basti 400 kV D/c quad line</li> <li>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: <ul style="list-style-type: none"> <li>a) Tanda TPS–Gonda 400 kV S/c Quad line.</li> <li>b) Tanda TPS–Basti 400 kV S/C Quad line.</li> <li>c) Gonda–Basti 400 kV S/c Quad line.</li> </ul> </li> </ul>
	1200001785(19/12/2018)/27/12/2018)	GreenkoBudhil Hydro Power	Himachal Pradesh, NR	Uttarakhand (NR)- 61.6 MW	61.6 MW	Existing Transmission System

<b>Sl. No</b>	<b>Application No./Date (Online)/ (Physical)</b>	<b>Applicant</b>	<b>Connectivity/ Injection Point</b>	<b>Drawl Point</b>	<b>LTA (MW)/ Start &amp; End Date (Grant)</b>	<b>Transmission System</b>
		Pvt. Ltd.		Firm	(Start :01/02/19 End : 31/03/26)	

**Transmission system for LTA applications at Fatehgarh S/S**

**A. Tr. System in Rajasthan for LTA applications at Fatehgarh (TBCB) - Proposed**

- 1) Establishment of 765/400kV, 3X1500MVA, pooling station at suitable location near Fatehgarh in Jaisalmer Distt (Fatehgarh-II PS)
- 2) Establishment of 765/400kV, 2x1500MVA pooling station at suitable location near Phalodi/Bhadla in Jodhpur (Bhadla-II PS)
- 3) Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Khetri
- 4) LILO of both circuits of Fatehgarh (TBCB) – Bhadla (PG) 765 kV D/c line (operating at 400kV) at Fatehgarh-II PS so as establish Fatehgarh (TBCB)-Fatehgarh-II 765kV D/c line (to be op. at 400kV) and Fatehgarh-II- Bhadla (PG) 765kV D/c line
- 5) Charging of Fatehgarh-IIPS–Bhadla section at 765kV level
- 6) LILO of both ckts of 765kV Ajmer – Bikaner D/c line at Bhadla-II PS
- 7) Fatehgarh-II PS – Bhadla -IIPS 765kV D/c line
- 8) Bhadla-II PS – Bhadla (PG) 400kV D/c Line (Twin HTLS)
- 9) Bikaner(PG) – Khetri S/s 765kV D/c line
- 10) Khetri – Jhatikara 765kV D/c line
- 11) Khetri – Sikar (PG) 400kV D/c line (twin AL59)
- 12) Augmentation with 765/400kV, 1x1500MVA transformer (3<sup>rd</sup>) at Moga S/s
- 13) Augmentation with 1x1000MVA,765/400kV transformer (3<sup>rd</sup>) at Bhiwani (PG)
- 14) Ajmer (PG)– Phagi 765kV D/c line
- 15) 1x125 MVar (420kV), 2x240 MVar (765kV) Bus Reactor each at Fatehgarh-II PS, Bhadla-II PS &Khetri Substation
- 16) 1x240 MVAR Switchable Line reactors for each circuit at Jhatikara end of Khetri – Jhatikara 765kV D/c line
- 17) 1x240 MVar Switchable line reactor for each circuit at each end of Bikaner – Khetri 765kV D/c line
- 18) 1x330 MVar Switchable line reactor for each circuit at Bhadla-IIPS end for Ajmer-Bhadla-IIPS 765kV line (after LILO)
- 19) 1x240 MVar Switchable line reactor for each circuit at Bhadla-IIPS end for Bikaner-Bhadla-II PS 765kV line (after LILO)

**Transmission system for LTA applications at Bhadla S/S**

**B. Tr. System in Rajasthan for LTA application at Bhadla (PG) - Proposed**

- 1) Establishment of 765/400kV, 3x1500MVA pooling station at suitable location near Phalodi/Bhadla in Jodhpur (Bhadla-2 PS)
- 2) Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Khetri
- 3) Augmentation of transformation capacity at Bhadla (PG) by 400/220kV, 2x500MVA (6<sup>th</sup> & 7<sup>th</sup>) transformers
- 4) LILO of both ckts of 765kV Ajmer – Bikaner D/c line at Bhadla-2 PS
- 5) Bhadla-2 PS – Bhadla (PG) 400kV D/c Line (Twin HTLS)
- 6) Bikaner(PG) – Khetri S/s 765kV D/c line
- 7) Khetri S/s – Jhatikara 765kV D/c line
- 8) Khetri – Sikar (PG) 400kV D/c line (twin HTLS)
- 9) Augmentation with 765/400kV, 1x1500MVA transformer (3<sup>rd</sup>) at Moga S/s
- 10) Augmentation with 765/400kV, 1x1000MVA transformer (3<sup>rd</sup>) at Bhiwani (PG)
- 11) Ajmer (PG)– Phagi 765kV D/c line
- 12) 1x125 MVar (420kV), 2x240 MVar(765kV) Bus Reactor each at Bhadla-2 PS &Khetri Substation
- 13) 1x330 MVar Switchable Line reactors for each circuit at each end of Ajmer – Jhatikara 765kV D/c line
- 14) 1x240 MVar Switchable line reactor for each circuit at each end of Bikaner – Khetri 765kV D/c line
- 15) 1x330 MVar Switchable line reactor for each circuit at Bhadla-2 PS end for Ajmer-Bhadla-2 PS 765kV line (after LILO)
- 16) 1x240 MVar Switchable line reactor for each circuit at Bhadla-2 PS end for Bikaner-Bhadla-2 PS 765kV line (after LILO)

In addition to the above, augmentation of transformation capacity at Bhadla (PG) by 400/220kV, 1x500MVA (5<sup>th</sup>) transformer agreed in 1<sup>st</sup> NRSCT held on 11/09/2018 shall also be a part of LTA system.

**Transmission system for LTA applications at Bikaner S/S**

**C. Tr. System in Rajasthan for LTA applications at Bikaner(PG)**

- 1) Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Khetri
- 2) Bikaner(PG) – Khetri S/s 765kV D/c line
- 3) Khetri S/s – Jhatikara 765kV D/c line
- 4) Khetri – Sikar (PG) 400kV D/c line (twin AL59)
- 5) Augmentation with 765/400kV, 1x1500MVA transformer (3<sup>rd</sup>) at Moga S/s
- 6) 1x125 MVar (420kV), 2x240 MVar (765kV) Bus Reactor at Khetri Substation
- 7) 1x240 MVar Switchable line reactor for each circuit at each end of Bikaner – Khetri 765kV D/c line
- 8) 1x240 MVAR Switchable Line reactors for each circuit at Jhatikara end of Khetri – Jhatikara 765kV D/c line



**Transmission system for LTA applications at Fatehgarh-II S/S**

**Transmission System for LTA**

- 1) Establishment of 765/400kV, 2X1500MVA, pooling station at suitable location near Fatehgarh in JaisalmerDist(Fatehgarh-II PS)
- 2) Establishment of 400/220kV, 1X500MVA, ICT at Fatehgarh-II Pooling station
- 3) Establishment of 765/400kV, 2x1500MVA pooling station at suitable location near Phalodi/Bhadla in Jodhpur (Bhadla-II PS)
- 4) Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Khetri
- 5) LILO of both circuits of Fatehgarh (TBCB) – Bhadla (PG) 765 kV D/c line (operating at 400kV) at Fatehgarh-II PS so as establish Fatehgarh (TBCB)-Fatehgarh-II 765kV D/c line (to be op. at 400kV) and Fatehgarh-II- Bhadla (PG) 765kV D/c line
- 6) Charging of Fatehgarh-II PS–Bhadla section at 765kV level
- 7) LILO of both ckts of 765kV Ajmer – Bikaner D/c line at Bhadla-II PS
- 8) Fatehgarh-II PS – Bhadla -II PS 765kV D/c line
- 9) Bhadla-II PS – Bhadla (PG) 400kV D/c Line (Twin HTLS)
- 10) Bikaner(PG) – Khetri S/s 765kV D/c line
- 11) Khetri – Jhatikara 765kV D/c line
- 12) Khetri – Sikar (PG) 400kV D/c line (twin AL59)
- 13) Augmentation with 765/400kV, 1x1500MVA transformer (3<sup>rd</sup>) at Moga S/s
- 14) Augmentation with 1x1000MVA,765/400kV transformer (3<sup>rd</sup>) at Bhiwani (PG)
- 15) Ajmer (PG)– Phagi 765kV D/c line
- 16) 1x125 MVar (420kV), 2x240 MVar (765kV) Bus Reactor each at Fatehgarh-II PS, Bhadla-II PS &Khetri Substation
- 17) 1x240 MVAR Switchable Line reactors for each circuit at Jhatikara end of Khetri – Jhatikara 765kV D/c line
- 18) 1x240 MVar Switchable line reactor for each circuit at each end of Bikaner – Khetri 765kV D/c line
- 19) 1x330 MVar Switchable line reactor for each circuit at Bhadla-IIPS end for Ajmer-Bhadla-IIPS 765kV line (after LILO)
- 20) 1x240 MVar Switchable line reactor for each circuit at Bhadla-IIPS end for Bikaner-Bhadla-II PS 765kV line (after LILO)

