भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग
Power System Planning & Appraisal-I Division

सेवा में / To

-As per enclosed list-

विषय: "ट्रांसमिशन पर राष्ट्रीय समिति" (एनसीटी) की 4th बैठक का कार्यवृत्त **।**

Subject: Minutes of the 5th Meeting of "National Committee on Transmission (NCT)"

महोदया / महोदय/Sir/Madam,

The 5th meeting of the "National Committee on Transmission" (NCT) was held through VC on 25.08.2021 and 02.09.2021 under the Chairmanship of Chairperson, CEA & Chairman, NCT. The minutes of the meeting is enclosed herewith.

भवदीय

Signature Not Verified
Digitally signed by ISHAN SHARAN
Date: 2021.09.29 10:26:44 IST

(ईशान शरण /Ishan Sharan)
मुख्य अभियन्ता एवं सदस्य सचिव/
Chief Engineer & Member Secretary (NCT)

Copy to:

(i) Joint Secretary (Trans), Ministry of Power, Shram Shakti Bhawan, New Delhi-110001.

List of addressees:

1.	Chairperson, Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	2.	Member (Power System), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.
3.	Member (Economic & Commercial), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	4.	Director (Trans), Ministry of Power Shram Shakti Bhawan, New Delhi-110001.
5.	Sh. Dilip Nigam, Scientist 'G', MNRE, Block no. 14, CGO Complex, Lodhi Road, New Delhi – 110003	6.	Chief Operating Officer, Central Transmission Utility POWERGRID, Saudamini, Plot No. 2, Sector-29, Gurgaon – 122 001.
7.	Sh. Rajnath Ram, Adviser (Energy), NITI Aayog, Parliament Street, New Delhi – 110 001.	8.	CMD, POSOCO, B-9, Qutub, Institutional Area, Katwaria Sarai, New Delhi – 110010
9.	Dr. Radheshyam Saha, Ex. Chief Engineer, Central Electricity Authority	10.	Shri Sushanta Kumar Ray Mohapatra, Ex. Chief Engineer, Central Electricity Authority

Minutes of the 5th meeting of National Committee on Transmission held on held on 25.08.2021 and 02.09.2021 through VC.

The list of participants is at **Annexure IA.**

1. Confirmation of the minutes of the 4th NCT meeting held on 20.01.2021 and 28.01.2021.

1.1. The two sittings of the 4th meeting of the "National Committee on Transmission" (NCT) were held on 20.01.2021 and 28.01.2021. Subsequently, the minutes of the meeting were issued vide CEA letter No. File No. CEA-PS-11-15(11)/1/2020-PSPA-I Division dated 22.03.2021.

1.2. Subsequently, CTU vide email dated 26 .03.2021 intimated that some issues deliberated in the meeting have not been included in the minutes of the meeting. Accordingly, Corrigendum to the Minutes of the 4th meeting of the National Committee on Transmission was issued vide CEA letter no CEA-PS-11-15(11)/1/2020-PSPA-I Div dated 13.04.2021.

1.3. Further, CTUIL vide email dated 23.07.2021 had conveyed the following observation on the Minutes of the Meeting and has requested for necessary modification in the minutes of the meeting:

In the minutes of the 4th NCT meeting under para 7.2.1, 5 nos. 400 kV bays were proposed to be implemented for RE generators at Bhadla-II PS (3 nos), Fatehgarh-II (1 no.), & Fatehgarh-III (1 no) (erstwhile Ramgarh-II) PS under ISTS. However, the same has been recorded as 6 nos. 400 kV bays [Bhadla-II PS (3 nos), Fatehgarh-II (2 no.) & Fatehgarh-III (1 no)] under the concluding para 7.2.11.

1.4. CTUIL stated the following:

i) MoP vide its OM dated 16th July' 2021 has already allocated the implementation of 2 no. of 400 kV bays at Fatehgarh-II PS through RTM route to PGCIL. NCT may approve the corrigendum proposed, regarding implementation of 400 kV bays at Fatehgarh-II (one bay only), based on which modification of MoP OM may be taken up.

ii) MoP vide Gazette notification dated 19.07.2021 has issued fresh notification of the "Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase-II- Part F" for implementation through TBCB route based on the change in the scope of works of the scheme as agreed in the 4th meeting of NCT. The scope of works interalia, includes Bikaner-II PS – Khetri 400 kV 2xD/c line (Twin HTLS* on M/c Tower) and Khetri- Bhiwadi 400 kV D/c line (Twin HTLS)* for which the ampacity of the lines has been specified as "*minimum capacity of 2200 MVA on each circuit at nominal voltage"*. This needs to be revised as *"minimum capacity of 2100 MVA on each circuit at nominal voltage"*. The scheme has already been awarded with ampacity of 2100 MVA. Accordingly, the same may be noted by 5th NCT.

iii) MoP vide Gazette notification dated 19.07.2021 has issued fresh notification of the "**Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra** for implementation through TBCB route based on the change in the future scope of works of the scheme as agreed in the 4th meeting of NCT. The implementation timeframe for the scheme has not been mentioned in the Gazette Notification. The implementation timeframe of 18 months from date of SPV acquisition has been incorporated in the bidding documents of the said scheme. The same may be noted by NCT.

1.5. NCT approved the modifications proposed at 1.4(i) and noted the submission made by CTU at 1.4(ii) and (iii).

1.6. The minutes of the 4th NCT meeting issued vide CEA letter No. File No. CEA-PS-11-15(11)/1/2020-PSPA-I Division dated 22.03.2021 and corrigendum issued vide CEA letter no CEA-PS-11-15(11)/1/2020-PSPA-I Div dated 13.04.2021 (enclosed as **Annexure IB**) were confirmed alongwith para 1.5 above.

2. Amendments in the Terms of Reference of the National Committee on Transmission vide MoP OM dated 20.05.2021.

2.1. MoP vide OM no. 15/03/2017 (Trans) dated 04.11.2019 had constituted the National Committee on Transmission (attached as **Annexure IIA**). MoP vide its OM no 15/03/2018-Trans Pt(5) dated 20/05/2021 (attached as **Annexure IIB**) has issued the following amendments in the Terms of Reference and constitution of the NCT:

"

a) CMD, POSOCO will be a member of NCT

b) The following functions would be added to the Terms of Reference of NCT:

(i) To formulate the packages for the Transmission Schemes for their implementation and to recommend their mode of implementation i.e. Tariff Based Competitive Bidding (TBCB)/Regulated Tariff Mechanism (RTM), as per the existing Tariff Policy, to Ministry of Power

(ii) To examine the cost of the Transmission Schemes

(iii) To allocate the task of carrying out survey amongst CTU, RECTPCL and PFCCL by maintaining a roster. **"**

Further, NCT while considering the Transmission Planning shall also keep in mind the following aspects:

(i) Regional Power Committees (Transmission Planning) cannot decide on transfers across region.

(ii) Growth of Renewable Energy, being the national Mission, areas with high RE potential needs to be identified and connected to bulk power evacuation systems.

2.2. Subsequent to the issuance of the aforesaid amendments, in order to facilitate NCT in achieving the task of *"Examination of Cost of the Transmission Schemes",* Member (Power System), CEA vide letter no CEA-PS-11-16(11)1/2018 PSPA-I/I/15799 dated 02/06/2021 (attached as **Annexure IIC**) formulated the Cost Committee with the approval of Chairperson, CEA, and Chairman of the NCT. The composition of this Cost Committee is as follows:

1.	Chief Engineer (PSPA-I), CEA	Chairman
2.	Director (PSPA-I), CEA	Member & Convener
3.	Director (PSETD), CEA	Member
4.	Director (F&CA), CEA	Member
5.	Representative from CTUIL	Member
7.	Representative from Cost Engg. Dept, PGCIL	Member
8.	Representative from PFCCL	Member
9.	Representative from RECDPCL	Member
10.	Chief Engineer from STU/SEB/Electricity Department of concerned State in which transmission scheme lies	Member

2.3. The first meeting of this Cost Committee was held on 22.07.2021 wherein cost estimation of two schemes were done based on the Cost Matrix of March'2020 Price Level provided by POWERGRID alongwith inputs from other members. In line with amendments issued by MoP, the Transmission Schemes approved in the Regional Power Committees (Transmission Planning) has been proposed as transmission packages alongwith their estimated cost for approval of NCT. For cost estimation, methodology adopted by cost committee has been used by considering the approximate line lengths, as against the required details of the transmission route that can be obtained after the survey. NCT was requested to suggest way forward to be adopted to comply with the revised ToR.

2.4. Member (E&C), CEA, observed that allocation of survey works of the transmission schemes amongst CTU, RECTPCL and PFCCL on roster basis by NCT, would result in availability of adequate time for carrying out survey works. This would facilitate survey agency in carrying out detailed survey, which in turn would facilitate more realistic cost estimation of the transmission schemes. CTUIL clarified that the survey agency would carry out the preliminary route survey only whereas the detailed route survey would be carried out by the successful bidder.

2.5. NCT members observed that at present the role of Bid Process Co-ordinator (BPC) is being carried out by PFCCL and RECPDCL for schemes to be implemented through TBCB route. Further, all the transmission schemes to be implemented through RTM route are now being allocated to CTUIL, therefore, CTUIL may be allocated the task of carrying out survey for RTM projects.

2.6. CTUIL opined that since RTM projects mainly involves works pertaining to Augmentation/Technical Upgradation at existing S/stn/lines, as such there was no need of carrying out survey works for projects being awarded under RTM. Accordingly, the roster needs to be maintained only for schemes to be implemented through TBCB route.

2.7. Regarding readiness of CTUIL to carry out the survey of the transmission schemes, CTUIL stated that it would be able to carry out the survey of the transmission schemes as stipulated in the amendments issued to the ToR of the NCT. As CTUIL is currently not functioning as Bid Process Coordinator, CTUIL would hand over the survey report to the respective BPCs (PFCCL, RECPDCL). As far as recovery of expenses done for carrying out survey is concerned, the same may be reimbursed by the BPC or provision for

recovery of the same can be kept in the Fees and Charges for CTUIL Regulations to be framed by CERC.

2.8. NCT members observed that as there would be three agencies involved in carrying out the survey of TBCB schemes, there was a need to evolve Standard Specifications for carrying out the survey work. It was agreed that CTUIL in coordination with BPC's (RECPDCL & PFCCL) and CEA would prepare standard specifications for survey of transmission schemes being implemented through TBCB route.

2.9. Expert Member (NCT), Shri S. K. Ray Mohapatra observed that the Cost Committee constituted vide CEA letter dated 02/06/2021 inte ralia comprises of representative from Cost Engineering Department of PGCIL. Since PGCIL is one of the transmission licensees, to avoid any conflict of interest, co-opting of representative from EPTA to the cost committee may also be considered.

2.10. Director, MoP stated that the Cost Committee needs to be a non-partisan body and there would be conflict of interest if any transmission licensee is included in the Cost Committee. Director (PSPA-I), CEA, stated that inclusion of PGCIL as a member of cost committee was done as the Cost Matrix for cost estimation is made available by PGCIL. Cost Matrix is the basic input for cost estimation of the transmission schemes. CTUIL stated that they were also dependent on PGCIL for the cost data required for estimation of cost of transmission schemes.

2.11. Shri Dilip Nigam, Adviser, MNRE, suggested that as far as availability of Reference Cost Matrix from PGCIL is concerned, the same could be formally sought from PGCIL by Ministry of Power. Director, MoP agreed to the same and requested CEA to formally write to MoP so that necessary direction could be issued to PGCIL.

2.12. Member (E & C), CEA, stated that there is a need to collect the per unit cost data of sub-station equipments, per km cost of transmission lines at various voltage levels from different STU's, Private transmission licensees, PGCIL and some derived cost could be arrived at by the Cost Committee for estimation purpose. Member (Power System), CEA, stated that the cost data collection was attempted in the past but large variations were observed in the data furnished by Private Transmission Licensees, PGCIL and STUs.

2.13. After detailed deliberations on the Amendments in the ToR of NCT the following was agreed:

i) To examine the cost of the transmission schemes:
   - The cost estimation of the transmission scheme that is put for recommendation of the NCT, would be done by CEA and CTUIL based on the methodology followed by the Cost Committee. At this stage, no survey report of the scheme is available, therefore, cost estimation would be done using the available parameters/inputs.
   - After availability of the survey report, cost estimation would again be done by cost committee and put up for concurrence by NCT**.**

- PGCIL, being a transmission licensee, would not be a member of the cost committee. However, PGCIL would continue to provide cost inputs to cost committee. MoP to issue necessary directions to PGCIL for providing reference Cost Matrix data for cost estimation of transmission schemes on yearly basis.
- Accordingly, CEA to reconstitute the cost committee.

ii) To allocate the task of carrying out survey:

- CEA in coordination with BPC's (RECPDCL & PFCCL) and CTUIL would prepare standard specifications for carrying out survey of transmission schemes being implemented through TBCB route.
- List of the transmission schemes recommended for implementation through TBCB route by NCT and their subsequent approval by Ministry of Power, to be maintained, for facilitating allocation of survey works.
- NCT will allocate the surveying agency (CTUIL/RECPDCL/PFCCL) for the transmission schemes to be implemented through TBCB route.
- CTUIL may take necessary directions from MoP regarding recovery of expenses for carrying out survey works.

3. Status of earlier schemes recommended by NCT.

A. Status of schemes recommended in the 4th NCT meeting is enclosed as Annexure-IIIA

B. Summary of the bidding status of transmission schemes currently under bidding by BPCs as given below:

Sl. No.	BPC	No. of projects under bidding	Bidding on hold	Bidding yet to start	Total
1	RECPDCL	3	1	6	10
2	PFCCL	6	2	1	9

As per the details furnished by BPC's (PFCCL & RECPDCL), the current status of transmission schemes which are under bidding is attached as **Annexure-IIIB.**

4. Evaluation of the functioning of the National Grid on quarterly basis.

The copy of the presentation made by POSOCO on the functioning of the National Grid is enclosed as **Annexure-IV**.

5. New Transmission schemes recommended by RPC(TP)

(i) CEA stated that the inter-state transmission schemes agreed in the Regional Power Committee (Transmission Planning) are reviewed and recommended by NCT, based on which, the schemes are notified in the Gazette/ allotted by MoP for implementation through TBCB/ RTM route respectively. However, it has been observed that some transmission schemes have been put on hold even after MoP order/Gazette notification. This has been due to various reasons like non-receipt of LTA, adequate land not being available for setting up RE generation projects and delay in setting up of RE generation in the identified potential energy zones. MoP is of the view that once the project is notified/allotted by MoP, the project should not be kept on hold. To avoid such situation NCT may also assess the likely implementation schedule of transmission schemes based

on inputs from MNRE/ SECI/CTUIL/POSOCO etc., before recommending the same to MoP.

(ii) Further, MoP vide letter dated 02.08.2021, forwarding the minutes of the 5th meeting of sub-committee on cross cutting issues of setting up of transmission lines in RE rich areas has advised CEA and CTU to explore different options for maximizing transmission capacity utilization, including BESS.

(iii) Accordingly, NCT was requested to recommend the new schemes that has been included for deliberation, keeping in view the above observations of MoP.

Schemes agreed in Regional Power Committees (Transmission Planning)

A. New Inter-State Transmission Schemes in Western Region:

5.1. Transmission system for evacuation of power from Neemuch SEZ (1000 MW):

5.1.1. CEA stated that MNRE vide letter dated 15.04.2020 inter-alia granted approval for 1000 MW RE potential zones at Neemuch. In 3rd meeting of WRPC(TP), the following scheme was agreed for evacuation of power from Neemuch SEZ (1000 MW):

Transmission system for evacuation of power from Neemuch SEZ (1000 MW)

A. Transmission system for providing connectivity and LTA.
   (i) Establishment of 2x500 MVA, 400/220 kV Pooling Station at Neemuch with 1x125 MVAr, 400 kV Bus Reactor
   (ii) Neemuch PS – Chhittorgarh (PG) S/s 400 kV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage).

B. Transmission system strengthening in matching timeframe of Neemuch SEZ.
   (i) Neemuch PS- Mandsaur S/stn 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage).

Implementation of Part A and Part B of the scheme in same time frame would serve as inter-regional corridor for dispersal of RE power as well the evacuation system for Neemuch Solar Park.

The above scheme has been agreed by RPVNL in a meeting held on 08.07.2021 and the scheme would be put up for ratification of NPRC(TP) in its next meeting.

5.1.2. Expert Member, Shri S K Ray Mohapatra enquired about the type of switchgear at the proposed Neemuch pooling station. CEA confirmed that it is an AIS S/stn.

5.1.3. CTU stated that Stage-II Connectivity and LTA of 500 MW has already been granted at proposed Neemuch P.S. with start date of LTA as November, 2022 or availability of transmission system, whichever is later. However, the signing of LTA agreement and submission of CBG amount is still pending.

5.1.4. NCT members observed that with November 2022 being the schedule of RE generation at Neemuch P.S., only 15 month time was available for implementation of the transmission scheme. MNRE informed that the bidding of Neemuch RE park has been

concluded in the month of August 2021, therefore its implementation schedule is likely to get revised.

5.1.5. CTU informed that with the approval of the said scheme in 3rd meeting of WRPC (TP), it has initiated the parallel process of applying for Regulatory Approval for the scheme.

5.1.6. After detailed deliberations NCT recommended the following:

Name of the scheme/est. cost/schedule	**Mode of implementation**	**Purpose /Justification**
Transmission system for evacuation of power from Neemuch SEZ **Estimated Cost**: Rs 547 Crore **Implementation Timeframe** : 18 months from date of SPV acquisition.	TBCB	•Evacuation of power from Neemuch SEZ •Inter-regional link between NR & WR for facilitating dispersal of RE power

Implementation of the scheme to be taken up after receipt of LTA applications from RE developer at Neemuch Pooling Station.

The Detailed Scope of works in the scheme is as given below:

Transmission system for evacuation of power from Neemuch SEZ:

Sr. No	**Scope of the Transmission Scheme**	**Capacity /km**
1	Establishment of 2x500 MVA, 400/220 kV Pooling Station (AIS) at Neemuch with 1x125 MVAr Bus Reactor Future provisions: Space for 400/220 kV ICTs along with bays: 2 nos. 400 kV line bays: 6 nos. 220 kV line bays: 5 nos. 420kV bus reactor along with bays:1	400/220 kV, 500 MVA ICT –2 nos. 400 kV ICT bays – 2 nos. 220 kV ICT bays – 2 nos. 400 kV line bays –4 (2 each for Chittorgarh & Mandsaur lines) 220 kV line bays – *As per connectivity granted to RE developer. (2 no. of bays considered at present corresponding to 500 MW)* 125 MVAr, 420 kV reactor-1 no. 420 kV reactor bay – 1 no.
2	Neemuch PS – Chhittorgarh (PG) S/s 400 kV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	Length ~ 130 km
3	2 nos. of 400 kV line bays at Chhittorgarh (PG) 400 kV S/s for	400 kV line bays – 2 nos. at Chhittorgarh (PG)

	Neemuch PS – Chhittorgarh (PG) S/s 400 kV D/C line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	
4	Neemuch PS- Mandsaur S/stn 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	Length ~120 km
5	2 no. of 400 kV line bays at Mandsaur 400 kV S/s for Neemuch PS- Mandsaur S/stn 400 kV D/c line (conductor with minimum capacity of 2100 MVA/Ckt at nominal voltage)	400 kV line bays – 2 nos. at Mandsaur

Note:

i. *Powergrid to provide space for 2 no. of 400 kV line bays at Chhittorgarh (PG) 400 kV S/s for termination of Neemuch PS – Chhittorgarh (PG) 400 kV D/c line.*
ii. *MPPTCL to provide space for 2 no. of 400 kV line bays at* Mandsaur *400 kV S/s for termination of Neemuch PS –* Mandsaur *400 kV D/c line.*
iii. *Implementation of the scheme to be taken up after receipt of LTA applications from RE developer at Neemuch pooling station.*

5.2. Transmission scheme for evacuation of power from Dholera UMSP:

5.2.1. The Transmission system for evacuation of power from Dholera UMSP (2 GW in Phase-I) was agreed in the 3rd meeting of WRPC (TP) held on 14.06.2021 and put for recommendation of NCT.

5.2.2. On being enquired about the implementation schedule of the project, MNRE informed that the project falls under coastal zone. The environmental studies, CRZ clearance for the project is yet to be done. Moreover, the RE potential of Dholera solar park is subject to the outcome of the potential studies. Accordingly, the scheme may be deferred for now.

5.2.3. NCT agreed to defer the scheme.

5.3. System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ:

5.3.1. CEA stated that in the 3rd meeting of WRPC(TP) held on 14.06.2021, the following transmission system was agreed for System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ:

(i) Banaskantha – Ahmedabad 765 kV D/c line.
(ii) Establishment of 2x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV Kosamba S/s alongwith Kosamba - Kala (GIS) 400 kV D/c line and Kosamba – Magarwada (GIS) 400 kV D/c line.
(iii) Kosamba – Padghe (GIS) 765 kV D/c line.

(iv) Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT.

(v) Augmentation of transformation capacity at Banaskantha 765/400 kV S/ s by 1x1500 MVA ICT and Banaskantha – Sankhari 400 kV 2nd D/c line.

The implementation of the above strengthening scheme was required in the matching time-frame Transmission for evacuation of power from Khavda RE park-Phase A (catering to evacuation of 8 GW from Khavda).

5.3.2. GETCO vide email dated 19.08.2021 has informed that 220 kV outlets from the proposed 765/400/220 kV Kosamba substation would be required in 4-5 years timeframe if substation is located surrounding Surat city. The 400/220 kV, 2 x 500 MVA transformers along with 4 Nos. of 220 kV feeder bays for GETCO downstream system may not be taken-up for immediate implementation and only space/design provision shall be kept and same would be taken up in future as per requirement. If the proposed 765 kV Kosamba substation is located in South Gujrat, GETCO may not need 220 kV outlets in near future considering the fact that 4 nos. of 220 kV outlets are already being planned from 400 kV Vapi-II (under construction as an ISTS scheme in south Gujarat).

5.3.3. Member (Power System), CEA, suggested that in view of the observations made by GETCO, the scheme may be deferred for now. Also the scheme could be re-studied with BESS for optimization of the proposed transmission system for evacuation of power from Khavda RE park.

5.3.4. NCT agreed to defer the scheme.

5.4. Modification in the already agreed Transmission system for evacuation of 8 GW RE from Khavda RE park

5.4.1. CEA stated that the transmission system for evacuation power Khavda RE park would be developed in three phases (Phase A-8 GW, Phase B-7 GW and Phase C-12.27 GW). Phase-A includes Phase- I & II which has already been approved and notified by MoP. Phase-I is associated with evacuation of 3 GW and is under bidding. Phase-II is associated with evacuation of additional 4.5GW and its bidding would be started on receipt of LTA beyond 3 GW from RE developers in Khavda RE park. The following modifications have been approved in the 3rd meeting of WRPC(TP) in respect of "Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II"

i) Establishment of 3 nos. of pooling stations namely, Khavda pooling station 1 (KPS1), Khavda pooling station 2 (KPS2) and Khavda pooling station 3 (KPS3) instead of single Khavda pooling station. Khavda pooling station re-designated as Khavda pooling station 1(KPS1).

ii) Splitting of Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A into two parts.

iii) Modification in the Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C.

iv) Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part E not required in view of the transmission scheme proposed under System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ.

The summary of the schemes is as given below:

Sl.No.	Name of Transmission scheme	Broad Scope	Modification
1.	Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I	• Establishment of Khavda pooling station (GIS), 3x1500 MVA 765/400 kV and 2x500 MVA 400/220 kV. • Khavda PS (GIS) – Bhuj PS 765 kV D/c line.	• Khavda pooling station re-designated as Khavda pooling station 1 (KPS1) • No change in scope. • Establishment of KPS2 and KPS3 agreed as separate additional scheme
2.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A	• Augmentation of Khavda PS by 4x1500 MVA, 765/400 kV and 2x500 MVA, 400/220 kV. • Khavda PS (GIS) – Lakadia PS 765 kV D/c line	• Augmentation of KPS1 by 4x1500 MVA, 765/400 kV and 2x500 MVA, 400/220 kV. • KPS1-KPS2 765 kV D/ C line • KPS2 – Lakadia PS 765 kV D/c line
4.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part B	• Lakadia PS – Ahmedabad 765 kV D/c line	• No change
5.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C	• Establishment of 2x1500 MVA, 765/400 kV Ahmedabad substation. • Ahmedabad – Vadodara 765 kV D/c line	• Establishment of 3x1500 MVA, 765/400 kV Ahmedabad substation. • Ahmedabad – Kosamba/ South Gujrat S/S 765 kV D/c line
6.	Transmission	• LILO of Pirana (PG) –	• No change

	scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part D	Pirana (T) 400 kV D/c line at Ahmedabad S/s	
7.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part E	• Ahmedabad – Indore 765 kV D/c line	• Not required in view of new transmission lines proposed under the scheme *System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ*.

5.4.2. NCT members enquired about the need to establish three pooling station in Khavda RE park. CEA stated that initially the evacuation system with single pooling station at Khavda RE park was planned to accommodate the 10.5 GW Renewable Energy Zones which were shifted from other parts of Gujarat to Khavda due to change in policy of Govt. of Gujarat. Govt. of Gujarat has allocated approx. 50,000 acres of land to a mix of private and public sector project developers (5 nos.) for development of renewable energy projects in the Renewable Energy Park at Khavda for evacuation of appx 30 GW RE from Khavda. As per layout of Khavda RE park as finalized by GPCL, three ISTS Pooling stations in Khavda RE park has been identified to pool RE power for further evacuation. Accordingly, three nos. of pooling stations have been proposed.

5.4.3. CTUIL stated that LTA of 1000 MW has already been granted at erstwhile Khavda Pooling Station which shall now be designated as Khavda Pooling Station 1 (KPS1). Further, LTA applications of 600 MW each has been received from GSECL and GIPCL at KPS2. Therefore, establishment of proposed Khavda Pooling Station 2 (KPS2) through LILO of one ckt of KPS1-Bhuj 765 kV D/C line at KPS2 is required.

5.4.4. Director MoP, enquired that whether the possibility of implementation of Battery Energy & Storage systems with the proposed RE integration scheme for evacuation of 4.5 GW from Khavda RE park under Phase-II has been explored. CEA stated that no BESS has been studied with the Transmission scheme for evacuation of power from Khavda RE park Phase-I & II. The implementation of Battery Energy Storage systems can be studied with the transmission system proposed for evacuation of additional 7 GW RE scheme under Phase-B.

5.4.5. CEA stated that in view of the observations of GETCO regarding location of Kosamba 765/400/220 kV substation, the System Strengthening schemes would be re-looked and there is possibility of shifting of Kosamba 765/400/220 S/s to other location in South of Gujarat. Therefore, Kosamba can be designated as South Gujarat substation. Accordingly, the Ahmedabad – Kosamba 765 kV D/c line can be renamed as

Ahmedabad – South Gujarat 765 kV D/c line under the scheme "Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C".

5.4.6. NCT recommendations are as given below:

(1) Establishment of new pooling stations in Khavda to be taken up only after receipt of LTA applications from RE developers**:**

S.no	Name of the scheme/est. cost/schedule	**Mode of implementation**	Justification
1.	Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park **Estimated Cost**: Rs 789 Crore **Implementation Timeframe** : 24 months from date of SPV acquisition	TBCB	For pooling of power from RE park developers and its further evacuation.
2.	Establishment of Khavda Pooling Station-3 (KPS3) in Khavda RE Park **Estimated Cost**: Rs 665 Crore **Implementation Timeframe** : 24 months from date of SPV acquisition	TBCB	For pooling of power from RE park developers and its further evacuation.

The detailed scope of works is attached as Annexure V

(2) Modification in following packages that have already been notified by MoP vide Gazette notification dated 23.09.2020 for Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II:

Sl. No.	**Earlier Notified Transmission Scheme**	**Scope of works of earlier notified Transmission scheme**	**Modified Transmission Scheme approved by NCT**
1.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda PS under Phase-II Part A	• Augmentation of Khavda PS by 4x1500 MVA, 765/400 kV and	Scheme split into two parts: **Part –I**: Transmission Scheme for evacuation of 4.5 GW RE

Sl. No.	Earlier Notified Transmission Scheme	Scope of works of earlier notified Transmission scheme	Modified Transmission Scheme approved by NCT
		2x500 MVA, 400/220 kV ICTs. • Khavda PS (GIS) – Lakadia PS 765 kV D/c line	injection at Khavda P.S. under Phase-II Part A: • KPS2 (GIS) – Lakadia 765 kV D/C line with 330 MVAr switchable line reactor at Khavda end. • 2 nos. of 765 kV line bays each at Lakadia PS & KPS2 (GIS) for Khavda PS2 (GIS) – Lakadia PS 765 kV D/c line
			Part-II: Transmission scheme for injection beyond 3GW RE power at Khavda PS1 (KPS1): a) Augmentation of Khavda PS1 by 765/400 kV transformation capacity* (max. upto 4x1500 MVA) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor on 2nd 765 kV and 400 kV bus respectively. b) KPS1- Khavda PS2 GIS (KPS2) 765 kV D/C line (to be established with bypassing of LILO of one ckt. of KPS1 - Bhuj at KPS2 and utilisation of LILO section) ** Actual no. of ICTs may be decided based on LTA requirement.*
2.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C	Establishment of 2x1500 MVA, 765/400 kV, Ahmedabad S/s with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor.	Establishment of 3x1500 MVA, 765/400 kV Ahmedabad S/s with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor
		Ahmedabad – Vadodara 765 kV D/c line	Ahmedabad – South Gujarat 765 kV D/c line with 240 MVAr switchable line reactor

Sl. No.	Earlier Notified Transmission Scheme	Scope of works of earlier notified Transmission scheme	Modified Transmission Scheme approved by NCT
			at both ends (~line length 220 km)
		2 nos. of 765 kV line bays at Vadodara for Ahmedabad – Vadodara 765 kV D/c line	2 nos. of 765 kV line bays at South Gujarat for Ahmedabad – South Gujarat 765 kV D/c line

The modifications recommended:

Sl. No.	Name of the scheme/est. cost/schedule	Mode of Implementation	Justification
1.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda PS under Phase-II Part A **Estimated Cost**: Rs 862 Crore **Implementation Timeframe** : 24 months from date of SPV acquisition	TBCB	Modification in the scope of already notified scheme.
2.	Transmission scheme for injection beyond 3 GW RE power at Khavda PS1 (KPS1) **Estimated Cost**: Rs 780 Crore **Implementation Timeframe** : 24 months from date of SPV acquisition	TBCB	Modification in the scope of already notified scheme.
3	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C **Estimated Cost**: Rs 1440 Crore **Implementation Timeframe**: 24 months from date of SPV acquisition	TBCB	Modification in the scope of already notified scheme.

The detailed scope of the above scheme is enclosed at **Annexure-VI**.

(3) Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part E already notified by MoP vide Gazette notification dated 23.09.2020 is not required in view of new transmission lines proposed under the scheme *System Strengthening in Gujarat associated with integration of RE projects from Khavda potential REZ*.

5.5. Transmission system for evacuation of additional 7 GW RE power from Khavda RE park Phase-B:

5.5.1. CEA stated that in the 3rd meeting of WRPC(TP) held on 14.06.2021, the transmission system for evacuation of additional 7 GW (in addition to 8 GW under Phase-A) RE

power from Khavda RE park was agreed. It included establishment of a 765 kV corridor namely, KPS2- Halvad-Vataman-Kosamba and establishment of 765/400 kV switching stations at Halvad and Vataman. Implementation of the transmission system has been proposed through four nos. transmission schemes.

5.5.2. Director, MoP stated that the possibility of implementation of Battery Energy & Storage systems can be explored alongwith with this additional 7 GW RE scheme under Phase-B.

5.5.3. Adviser, MNRE, also opined that transmission system for evacuation of 8 GW power from Khavda RE park has already been recommended, therefore additional transmission system may be re-studied considering BESS.

5.5.4. Expert member, Shri R. Saha, stated that with adoption of new technologies like BESS and other storage systems, the implication on overall cost of the scheme and the techno-economic feasibility of the scheme also needs to be analysed while firming up the system.

5.5.5. After deliberations, NCT deferred the scheme for re-study with consideration of BESS at Khavda RE park.

5.6. Transmission system strengthening beyond Kolhapur for export of power from Solar & Wind Energy Zones in Southern Region- Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line.

5.6.1. CEA stated that in the 4th meeting of NCT held on 20th & 28th January, 2021, it was agreed that Strengthening of Kolhapur (PG) - Kolhapur (MSETCL) 400 kV section may be deliberated in WRPC(TP) meeting based on the operational constraint reported by POSOCO. The issue was deliberated in the 3rd meeting of WRPC(TP) held on 14.06.2021 wherein re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line with conductor of minimum capacity of 2100 MVA/Ckt was agreed.

5.6.2. NCT made the following recommendation:

Sl. No.	Name of the scheme	Mode of implementation	Justification
1.	Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line Estimated cost: Rs 54 cr. Implementation timeframe: 15 months from date of issue of MoP OM	RTM	Remedial measure to overcome operational constraint (‘N-1’ non-compliance) reported by POSOCO.

The details of the scheme is given below:

Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line with conductor of minimum capacity of 2100 MVA/Ckt at nominal voltage along with bay up-gradation work at Kolhapur (MSETCL).	Re-conductoring length – 60 km approx. 400 kV bay upgradation- 2 nos.

5.7. Scheme to control fault level at Indore S/s:

5.7.1. CEA stated that Indore 765/400/220 kV S/s in MP acts as a node for transfer of power from generation projects in MP and Gujarat to load centres in MP through high capacity 400 kV and 765 kV networks. A large number of RE generation projects are coming up in Gujarat whose power is getting dispersed through various substations (at 765 kV level) including Indore (PG) for onward transfer of power to other parts of the grid resulting in high short circuit levels of interconnected grid. As per system studies, it was observed that short circuit level at Indore (PG) 400 kV substation in 2022-2023 time-frame crosses 50 kA as against designed rating of 40 kA. The issue was deliberated in the 3rd meeting of WRPC(TP) held on 14.06.2021 wherein, 400 kV Bus Splitting of 765/400/220 kV Indore substation into two sections A&B and shifting of 765/400 kV, 1x1500 MVA ICT from section A to Section B (through jumpering arrangement) was agreed.

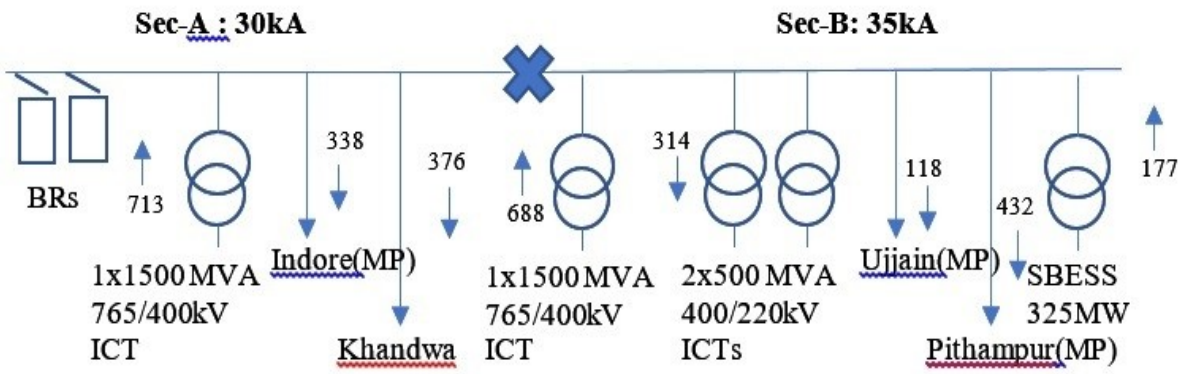
Transmission elements on 400 kV Bus Section A:

(i) 1 no. of 765/400 kV 1x1500MVA ICT
(ii) Indore (MP) 400 kV D/C line
(iii) Khandwa 400 kV D/C line
(iv) 2x125 MVA Bus reactors.

Transmission elements on 400 kV Bus Section B:

(i) 1 no. of 765/400 kV 1500MVA ICT
(ii) 2 nos. of 400/220 kV, 500MVA ICT
(iii) Ujjain (MP) 400 kV D/C line
(iv) Pithampur (MP) 400 kV D/C line.
(v) 1 no. of 400/220 kV 500MVA ICT associated with M/s SBESS

The schematic of the 400 kV section after bus splitting is as given below:



5.7.2. Regarding query on the actual scope of works involved in implementing the bus splitting scheme at Indore, CTUIL informed that the details of the same is to obtained from PGCIL.

5.7.3. NCT suggested to put up the scheme again in the next meeting along with scope of works and estimated cost of the scheme.

5.8. Scheme for fault level control at Dehgam (PG) & Ranchhodpura (GETCO) S/s

5.8.1. CEA stated that the following transmission scheme was agreed under ISTS in the 3rd WRPC(TP) meeting held on 14.06.2021 to control the fault level at Dehgam (PG) & Ranchhodpura (GETCO) S/s

- Bypassing of Rachhodpura(GETCO) – Dehgam(PG) 400 kV D/c line at Dehgam(PG) S/s and connecting it with Dehgam(PG) – Pirana 400 kV D/c line (one circuit via Nicol) so as to form Ranchhodpura(GETCO) – Pirana(PG) 400 kV D/c line (one circuit via Nicol).

GETCO vide its letter dated 19.08.2021 has raised issues with respect to ownership, transmission charges, O&M issues etc. of the Ranchodpura-Pirana 400 kV D/C line that would established with implementation of the above schemes. One section of this would be ISTS line and other section would be intra-state line. Accordingly, the scheme would be re-discussed in the WRPC(TP) meeting.

5.8.2. NCT agreed to defer the scheme.

5.9. Augmentation of 1x500 MVA, 400/220 kV ICT at Bhatapara (PG)

5.9.1. CEA stated that the 3rd 400/220 kV ICT at Bhatapara has been agreed in the 3rd meeting of WRPC(TP) to overcome the operational constraint ('N-1' non-compliance) during the high electricity demand of Chhattisgarh.

In addition to that, the loading on the Bhatapara (PG) – Bhatapara (CSPTCL) 220 kV S/c line is high in present scenario even with the existing 2x315 MVA, 400/220 kV ICTs at Bhatpara(PG) substation. With additional ICT at Bhatpara(PG), the loading on Bhatapara (PG) – Bhatapara (CSPTCL) 220 kV S/c line would further increase. Therefore, LILO of one circuit of Bhatapara (PG) – Suhela 220 kV T/c line at Bhatapara (CSPTCL) has also been agreed to be implemented in matching time-frame

of implementation of 1x500 MVA, 400/220 kV ICT at Bhatapara (PG) by CSPTCL as intra-state scheme.

5.9.2. NCT made the following recommendation:

S.no	Name of the scheme	Mode of implementation	Justification
1.	Augmentation of 1x500 MVA, 400/220 kV ICT (3rd) at Bhatapara (PG) **Estimated cost:** Rs 30 cr. **Implementation timeframe:** 15 months from date of issue of MoP OM	RTM	Remedial measure to overcome operational constraint ('N-1' non compliance) of 400/220 ICTs at Bhatpara (PG) 400/220 kV substation. LILO of one circuit of Bhatapara (PG) – Suhela 220 kV T/c line at Bhatapara to be implemented by CSPTCL in matching time-frame of Bhatpara ICT.

Details of the scheme is given below:

Augmentation of 1x500 MVA, 400/220 kV ICT (3rd) at Bhatapara (PG)

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of 1x500 MVA, 400/220 kV ICT (3rd) at Bhatapara (PG)	400/220 kV, 500 MVA ICT –1 nos. 400 kV ICT bays – 1 nos. 220 kV ICT bays – 1 nos.
Approximate cost (Rs. Cr)		**30**

Note: To be implemented in the timeframe of implementation of LILO of one circuit of Bhatapara (PG) – Suhela 220 kV T/c line at Bhatapara (CSPTCL) under intra-state

B. Schemes agreed in Northern Regional Power Committees (Transmission Planning)

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

Director (PSPA-I), CEA, stated that the transmission system for evacuation for 8.9 GW under Phase-I and 8.1 GW under Phase-II had been agreed and presently under implementation. Subsequently, SECI had requested to plan the transmission system for additional 20 GW SEZs envisaged in Rajasthan & proposed to be connected to the ISTS network in Bhadla, Fatehgarh and Ramgarh area. The locations of generation were identified by SECI based on the feedback of RE generation developers looking into the availability of land for setting up generation projects and proper access to these areas.

Further, these locations have the potential of both solar and wind generation. Considering it, load flow studies were carried out and discussed with NR constituents in various meetings. Based on the deliberations, transmission system for additional 20 GW REZ in Northern Region (Phase-III) was agreed in the 3rd NRPC (TP) meeting held on 19.02.2021 as given below:

i) Establishment of 5x500 MVA 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor
ii) Establishment of 2x1500 MVA 765/400kV & 10x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor
iii) Establishment of 3x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor
iv) Fatehgarh-2 – Bhadla-3 400kV D/c line (Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 2- Bhadla-3 400kV D/c line (200 km)
v) Fatehgarh-4- Fatehgarh-3 400 kV 2xD/c twin HLTS line (50 km)
vi) Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3- Bhadla-3 400kV D/c line (200 km)
vii) Ramgarh – Bhadla-3 765kV D/c line (180 km) along with 240 MVAr line reactor at each circuit at Ramgarh end of Ramgarh – Bhadla-3 765kV D/c line
viii) Bhadla-3 – Sikar-II 765 kV D/c line (380 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 – Sikar-II 765 kV D/c line
ix) Sikar-II – Khetri 765 kV D/c line (90 Km)
x) Sikar-II – Narela 765 kV D/c line (260 Km) along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II – Narela 765 kV D/c line
xi) Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)
xii) Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-II PS
xiii) Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-II PS
xiv) Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)
xv) Jhatikara – Dwarka 400kV D/c line (Quad) (20km)
xvi) Establishment of 6x1500 MVA 765/400kV & 5x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr,765kV & 2x125 MVAr, 420kV Bus Reactors
xvii) Augmentation of 1x500 MVA ICT (5th), 400/220kV ICT at Fatehgarh-3 Substation (section-1*)
xviii) Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr, 765 kV Bus Reactor & 2x125 MVAr, 420 kVBus Reactor

xix) Fatehgarh-3– Beawar 765 kV 2xD/c (350 km) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line

xx) LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar (45 km)

xxi) LILO of 400kV Kota –Merta line at Beawar (20 km)

xxii) Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr 765 kV Bus Reactor & 2x125 MVAr, 420 kVBus Reactor

xxiii) Beawar – Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end

xxiv) LILO of both circuits of Jaipur(Phagi)-Gwalior 765 kV D/c at Dausa (40km) along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line

xxv) LILO of both circuits of Agra – Jaipur(south) 400kV D/c at Dausa (30km) along with 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Agra 400kV D/c line

xxvi) 6000MW, ±800KV HVDC terminal at Bhadla-3 substation

xxvii) 6000MW, ±800KV HVDC terminal station at suitable location near Fatehpur (UP)

xxviii) Establishment of 5x1500MVA, 765/400KV ICT at pooling station at suitable location near Fatehpur along with 2x330MVAr (765kV) bus reactor

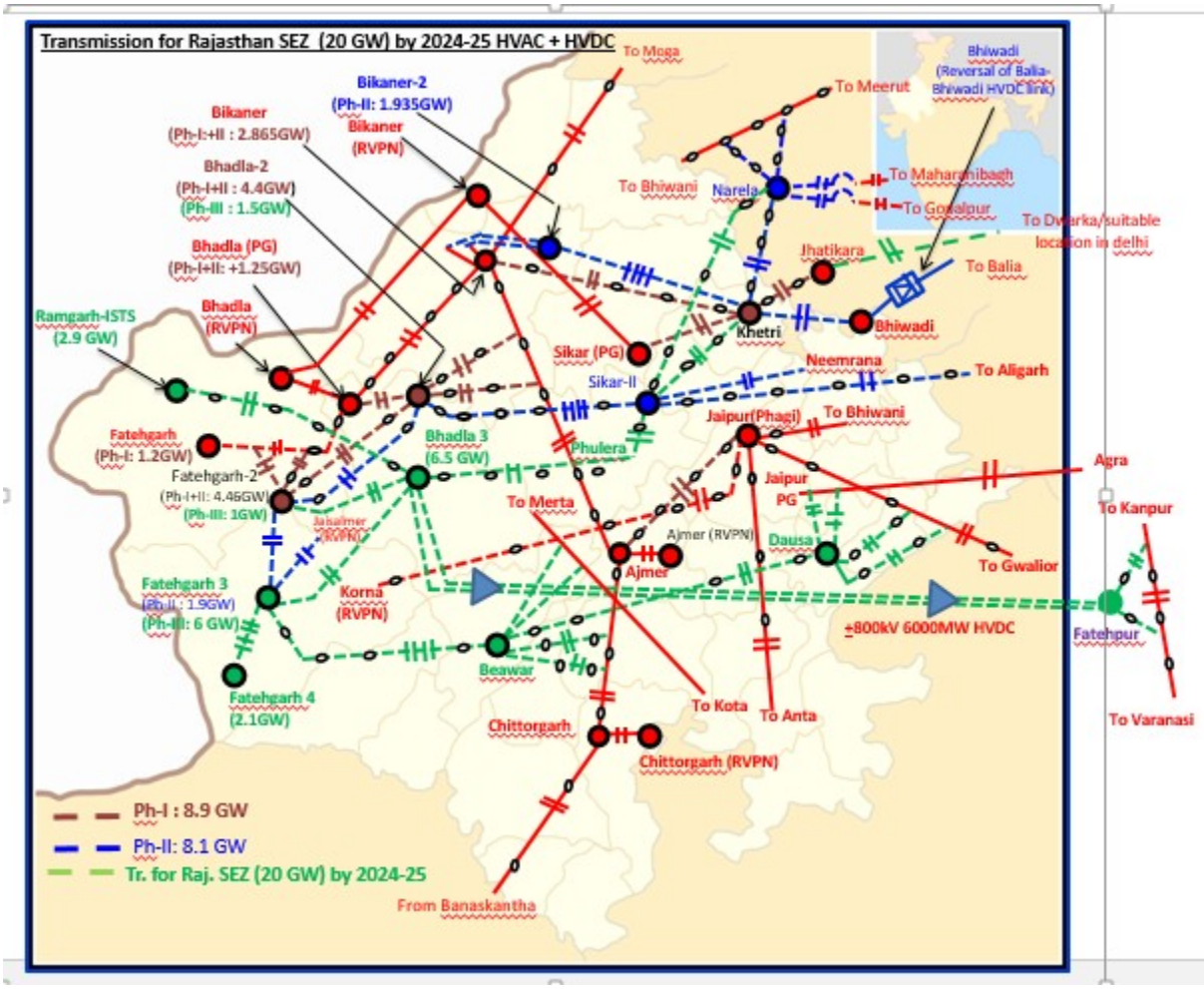
xxix) ±800 kV HVDC line (Hexa lapwing) between Bhadla-3 & Fatehpur (950km)

xxx) LILO of both ckts of 765 kV Varanasi – Kanpur (GIS) D/c at Fatehpur(30km)

xxxi) Augmentation of 1x1500 MVA ICT at 765/400kV Kanpur(GIS) substation

xxxii) STATCOM :

- Fatehgarh – III S/s: STATCOM: ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR
- Ramgarh S/s : STATCOM : ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR



She further stated that the transmission lines envisaged in the 20 GW scheme would be passing through the GIB (Great Indian Bustard) potential zone as per the area marked in the Hon'ble Supreme Court of India Order dated 19.04.2021 in Writ Petition No. 838 of 2019 regarding GIB case. Further, in the aforesaid order, Hon'ble Supreme Court has constituted a committee for the specific purpose of assessing the feasibility of laying the transmission line after taking into consideration all technical details. Hon'ble Supreme Court has also directed that for all future cases of installing transmission lines in the priority zone or potential zone, feasibility for the lines to be laid underground is to be assessed. Wherever feasible, the transmission line has to be laid underground otherwise of overhead line with bird diverters can be installed only after ratification of its feasibility by the Committee constituted by Hon'ble Supreme Court.

COO(CTUIL) stated that earlier only priority zone was defined, so the transmission schemes were planned bypassing this zone. Now with the above mentioned order of Hon'ble Supreme Court, due to the newly defined Potential zone, some of the transmission schemes earlier approved under Part B, C and D of Phase-II (8.1 GW) are falling under this potential zone. CERC has directed Powergrid subsidiaries for the schemes: Part B, C and D of Phase-II to comply with the direction of Hon'ble Supreme Court.

Member (Power System), CEA, added that beside the transmission lines under the ISTS schemes, the dedicated lines of generators would also be falling under the GIB zone.

Therefore, the generators as well as the developers of these transmission schemes would require to comply with the direction of Hon'ble Supreme Court, which in turn would cause delay the completion of the projects and the transmission schemes. Considering this, the transmission developers may have to approach the Committee constituted by Hon'ble Supreme Court well in advance.

Regarding the transmission scheme under Phase –III in Rajasthan, Expert Member, Dr. R. Saha, suggested that the option of series compensation, SVC, Synchronous condenser should be considered in future before zeroing in for STATCOM which is comparatively costly device. In this regard, Director (PSPA-I), CEA, stated that Rajasthan has huge RE potential of around 190 GW. As of now, the planned Transmission system under Phase-III consists of STATCOM for providing voltage stability. Other option like SVC, Synchronous condenser and the other options like Battery Energy Storage system will also be explored in near future.

Director (PSPA-I), stated that the transmission system for additional 20 GW REZ in Northern Region (Phase-III) has been divided into the following packages for the ease of implementation:

5.10.1 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A1:

1. The scope of scheme is as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 2x500 MVA, 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor *<u>Future provisions</u>: Space for* *400/220kV ICTs along with bays: 5 nos.* *400 kV line bays along with switchable line reactor: 6 nos.* *400kV Bus Reactor along with bays: 2 nos.* *400kV Sectionalization bay: 1 nos.* *220 kV line bays: 10 nos.* *220kV sectionalization bay: 2 nos.*	400/220 kV, 500 MVA ICT - 2nos. 400 kV ICT bays - 2 nos. 220 kV ICT bays - 2 nos. 400 kV line bays - 2 nos. 220 kV line bays- *As per connectivity granted to RE developer. (4 no. of bays considered at present)* 125 MVAr, 420 kV bus reactor - 2 nos. 420 kV reactor bay - 2 nos.
2.	Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS* line (50 km)	Length – 50 km
3.	Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3- Bhadla-3 400kV D/c line	Length – 200km 400 kV 50 MVAr Switchable line reactor – 4 nos.

Sl.No.	Scope of the Transmission Scheme	Capacity /km
		Switching equipment for 400 kV 50 MVAR switchable line reactor –4 nos.
	Total Estimated Cost (Rs Crore)	**660**

** with minimum capacity of 2100 MW on each circuit at nominal voltage*

Note:

(i) Provision of suitable sectionalization shall be kept at Fatehgarh-4 at 400kV & 220kV level to limit short circuit level

(ii) Developer of Fatehgarh-3 Substation (new section) to provide 2 nos. of 400 kV line bays at Fatehgarh-3 S/s for termination of Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS* line

(iii) Developer of Fatehgarh-3 S/s(new section) to provide 2 nos. of 400 kV line bays along with space for switchable line reactors at Fatehgarh-3 for termination of Fatehgarh 3- Bhadla-3 400kV D/c line

(iv) Developer of Bhadla –3 substation to provide 2 nos. of 400 kV line bays along with space for switchable line reactors at Bhadla -3

(v) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

2. CTUIL indicated that at Fatehgarh-4 PS, Stage-II connectivity applications have been granted for 510 MW, however no LTA application has been received yet. Therefore, implementation of Phase III –Part A1 is to be taken up upon receipt of LTA from RE developers at Fatehgarh-4 PS. In order to enable evacuation of RE power from Fatehgarh-4 PS, implementation schedule of phase III –Part A1 package is to match with package Phase III –Part E1 (Establishment of Fatehgarh-3 PS) & Phase III –Part F (Establishment of Beawar S/s, Fatehgarh-3 PS-Beawar line, LILO of Ajmer-Chittorgarh D/c at Beawar & LILO of Kota-Merta line at Beawar).

3. CTUIL also suggested that the Fatehgarh 3- Bhadla-3 400kV D/c line may be taken up as a separate package or in A2 package and may be taken up later. Therefore, it was decided that Fatehgarh 3- Bhadla-3 400kV D/c line may be taken up as a separate package.

4. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	**Mode of implementation**	**Purpose /Justification**
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part A1 **Estimated Cost**: Rs 210 Crore. **Implementation Timeframe**: 18 months from date of SPV acquisition.	TBCB	For evacuation of RE power getting pooled at Fatehgarh –4.

5. The Detailed Scope of works in the scheme is as given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under phase III –Part A1"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 2x500 MVA, 400/220 kV pooling station at Fatehgarh-4 along with 2x125 MVAr Bus Reactor *Future provisions: Space for* *400/220 kV ICTs along with bays: 5 nos.* *400 kV line bays along with switchable line reactor: 6 nos.* *400 kV Bus Reactor along with bays: 2 nos.* *400 kV Sectionalization bay: 1 nos.* *220 kV line bays: 10 nos.* *220 kV sectionalization bay: 2 nos.*	400/220 kV, 500 MVA ICT - 2nos. 400 kV ICT bays - 2 nos. 220 kV ICT bays - 2 nos. 400 kV line bays - 2 nos. 220 kV line bays- *As per connectivity granted to RE developer. (4 no. of bays considered at present)* 125 MVAr, 420kV bus reactor - 2 nos. 420 kV reactor bay - 2 nos.
2.	Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS* line (50 km)	Length – 50km
3.	2 no. of 400 kV line bays at Fatehgarh-3	400 kV line bays - 2 nos.

** with minimum capacity of 2100 MW on each circuit at nominal voltage*

Note:

(i) Provision of suitable sectionalization shall be kept at Fatehgarh-4 at 400kV & 220kV level to limit short circuit level
(ii) Developer of Fatehgarh-3 S/s(new section) to provide space for 2 nos. of 400 kV line bays at Fatehgarh-3 S/s for termination of Fatehgarh-4- Fatehgarh-3 400 kV D/c twin HLTS* line
(iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
(iv) Implementation of the scheme to be taken up after receipt of LTA applications from RE developer at Fatehgarh-4 pooling station.

5.10.2 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A2

1. Director (PSPA-I), CEA, stated that the scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part A2" has been planned to enable the evacuation of RE power from Fatehgarh-4 under Phase III.

2. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part A2 **Estimated Cost**: Rs 100 Crore **Implementation Timeframe** : 15 months from MoP OM.	RTM (The above scheme includes augmentation of 3 no. of transformers at Fatehgarh-4, which are required to be taken up for implementation at later stage based on the number of LTA applications received)	For evacuation of RE power (beyond 1000 MW) getting pooled at Fatehgarh –4.

3. The detailed scope of scheme is as under:

"Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part A2"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of 3x500 MVA, 400/220 kV pooling station at Fatehgarh-4 .	400/220 kV, 500 MVA ICT - 3nos. 400 kV ICT bays - 3 nos. 220 kV ICT bays - 3 nos. 220 kV line bays- *As per connectivity granted to RE developer. (5 no. of bays considered at present)*

Note:

(ii) The implementation of number of 220 kV bays and 400/220 kV transformers shall only be taken up based on receipt of stage-II connectivity and commensurate LTA respectively (beyond 1000 MW at Fatehgarh-4).

(iii) 220 kV line bays and Transformer augmentations shall be reviewed based on stage-II connectivity at 220kV voltage level and LTA applications respectively

5.10.3 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A3

1. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under phase III –Part A3	TBCB (Fatehgarh 3- Bhadla-3	For evacuation of RE power (beyond 2000 MW) getting pooled at Fatehgarh

Estimated Cost: Rs 505 Crore **Implementation Timeframe**: 18 months from date of SPV acquisition.	400kV D/c line may be taken up for implementation on receipt of LTA beyond 2000 MW at Fatehgarh-4)	–4.

2. The detailed scope of the scheme is as follows:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A3"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Fatehgarh 3- Bhadla-3 400kV D/c line(Quad) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 3-Bhadla-3 400kV D/c line	Length – 200km 400 kV 50 MVAr Switchable line reactor – 4 nos. Switching equipment for 400 kV 50 MVAR switchable line reactor –4 nos. 400kV line bays Bhadla-3 S/s & Fatehgarh-3 S/s -4 nos. (2+2)

Note:

(i) Fatehgarh 3- Bhadla-3 400kV D/c line may be taken up for implementation on receipt of LTA beyond 2000 MW at Fatehgarh-4.

(ii) Developer of Fatehgarh-3 S/s(new section) to provide space 2 nos. of 400 kV line bays along with space for switchable line reactors at Fatehgarh-3

(iii) Developer of Bhadla –3 substation to provide space for 2 nos. of 400 kV line bays along with space for switchable line reactors at Bhadla -3

5.10.4 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B1

1. The scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part B1" has been planned to establish connectivity as well as enable the evacuation of RE power from Bhadla-3 and Ramgarh PS (beyond Bhadla-3) under phase III.

2. CTUIL stated that at present Stage-II connectivity applications for 224MW quantum has already been granted at Bhadla-3 PS, however regulatory compliance is still pending in above connectivity case. Further Stage-II connectivity applications for 2600MW has been granted at Ramgarh PS. However, no LTA application has been received yet at both the above pooling stations. Therefore, implementation of Phase III –Part B1 may be taken up upon receipt of LTA from RE developers at Ramgarh PS/Bhadla-3 PS.

3. After detailed deliberations, NCT recommended the following :

Name of the scheme/est. cost/schedule	**Mode of implementation**	**Purpose /Justification**
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under phase III –Part B1 **Estimated Cost**: Rs 2500 Crore **Implementation Timeframe**: 18 months from date of SPV acquisition.	TBCB (Implementation of Phase III –Part B1 may be taken up upon receipt of LTA from RE developers at Ramgarh PS/ Bhadla-3 PS)	For evacuation of RE power getting pooled at Bhadla-3.

4. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B1"

Sl. No.	**Scope of the Transmission Scheme**	**Capacity /km**
1.	Establishment of 2x1500 MVA 765/400kV & 3x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor <u>Future provisions</u>*: Space for* *765/400kV ICTs along with bays: 2nos.* *765kV line bay along with switchable line reactor: 4nos.* *765kV line bay: 4nos.* *765kV Bus Reactor along with bays: 2 nos.* *400/220 kV ICTs along with bays: 10nos.* *400 kV line bays: 8 nos.* *400 kV line bays along with switchable line reactor:4* *400kV Bus Reactor along with bays: 2*	765/400kV 1500 MVA ICTs: 2 nos *(7x500 MVA including one spare unit)* 765kV ICT bays - 2 nos. 400/220 kV, 500 MVA ICT - 3nos. 765kV line bays -2 nos. 400 kV ICT bays – 5 nos. 220 kV ICT bays - 3 nos. 400 kV line bays - 2 nos 220 kV line bays: *As per connectivity granted to RE developers (5 no. of bays considered at present)* 330 MVAr Bus Reactor-2 nos. *(7x110 MVAr, including one spare unit)* 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor - 2 nos. 420 kV reactor bay - 2 nos.

Sl. No.	Scope of the Transmission Scheme	Capacity /km
	nos. *400kV Sectionalization bay: 2 nos.* *220 kV line bays: 12 nos.* *220kV sectionalization bay: 2nos.*	
2.	Fatehgarh-2 – Bhadla-3 400kV D/c line (Quad moose) along with 50 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 2- Bhadla-3 400kV D/c line	Length – 200km 400 kV 50 MVAR switchable line reactor –4 Switching equipment for 400 kV 50 MVAR switchable line reactor –4
3.	2 nos. of 400 kV line bays at Fatehgarh-2 for Fatehgarh-2 – Bhadla-3 400kV D/c line	400 kV line bays - 2 nos.
4.	Bhadla-3 – Sikar-II 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 – Sikar-II 765 kV D/c line	Length – 380km Switching equipment for 765 kV 330 MVAR switchable line reactor –4 765 kV, 330 MVAr Switchable line reactor-4
5	2 nos. of 765kV line bays at Sikar-II	765 kV line bays - 2nos

Note:

(i) Implementation of the scheme to be taken up upon receipt of LTA from RE generation developers at Ramgarh PS/Bhadla-3 PS
(ii) Provision of suitable sectionalization shall be kept at Bhadla-3 at 400kV & 220kV level to limit short circuit level
(iii) Powergrid to provide space for 2 nos. of 400 kV line bays along with space for switchable line reactors at Fatehgarh-2 S/s
(iv) The line lengths mentioned above are approximate, as the exact length shall be obtained after detailed survey.
(v) Developer of Sikar-II S/s to provide space for 2 nos. of 765 kV line bays at Sikar-II S/s along with space for switchable line reactors

5.10.5 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B2

1. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part B2 **Estimated Cost**: Rs 235 Crore **Implementation Timeframe** : 15 months from MoP OM.	RTM (The implementation of number of 220kV bays and transformers to be taken up based on receipt of Stage-II connectivity and commensurate LTA respectively (beyond 1500MW at Bhadla-3))	For evacuation of RE power (beyond 1500 MW) getting pooled at Bhadla-3.

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B2"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of 7x500 MVA 400/220 kV transformation capacity at Bhadla-3	400/220 kV, 500 MVA ICT - 7nos. 400 kV ICT bays – 7 nos. 220 kV ICT bays - 7 nos 220 kV line bays: As per connectivity granted to RE developers (10 no. of bays considered at present). 220 kV bus sectionalizer-1 nos

Note:

(i) The implementation of number of 220 kV bays and 400/220 kV transformers to be taken up based on receipt of stage-II connectivity and commensurate LTA respectively (beyond 1500 MW at Bhadla-3).

(ii) 220 kV line bays and Transformer augmentations shall be reviewed based on stage-II connectivity at 220 kV voltage level and LTA applications respectively.

5.10.6 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C1:

1. The scope of scheme is as under:

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 2x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor *Future provisions: Space for* *765/400kV ICTs along with bays: 3nos.* *765kV line bay along with switchable line reactor: 2nos.* *765kV Bus Reactor along with bays: 2 nos.* *400/220 kV ICTs along with bays: 6 nos.* *400 kV line bays along with switchable line reactor: 4nos.* *400 kV line bays: 4 nos.* *400kV Bus Reactor along with bays: 2 nos.* *400kV Sectionalization bay: 3 nos.* *220 kV line bays: 8 nos.* *220kV sectionalisation bay: 2 nos.*	765/400kV1500 MVA ICTs : 2 nos *(7x500 MVA including one spare unit)* 765kV ICT bays –2 nos. 400/220 kV, 500 MVA ICT – 2nos. 400 kV ICT bays – 4 nos. 220 kV ICT bays – 2 nos. 400 kV line bays – 2 nos. (for RE connectivity) 220kV line bays -4 nos. 765 kV line bays – 2 nos. 240 MVAr Bus Reactor-2 nos. *(7x80 MVAr including one spare unit)* 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos. 400 kV bus sectionalizer- 1no
2.	Ramgarh – Bhadla-3 765kV D/c line(180 km) along with 240 MVAr switchable line reactor at each circuit at Ramgarh end of Ramgarh – Bhadla-3 765kV D/c line	Length – 180km 765 kV, 240 MVAr switchable line reactor- 2 nos Switching equipment for 765 kV 240 MVAR switchable line reactor –2 nos.
3	STATCOM at Ramgarh S/s: ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR	
4	2 nos. of 765kV line bays at Bhadla-III	765 kV line bays - 2nos

Note:

(i) Developer of Bhadla-3 S/s to provide space for 2 nos. of 765 kV line bays at Bhadla-3 S/s for termination of Ramgarh – Bhadla-3 765kV D/c line

(ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

(iii) Provision of suitable sectionalization shall be kept at Ramgarh at 400kV & 220kV level to limit short circuit level

2. CTU informed that at present 2600 MW Stage-II connectivity applications granted at Ramgarh PS, however no LTA application is received yet. Therefore, implementation of Phase III –Part C1 may be taken up upon receipt of LTA from RE developers at Ramgarh PS.

3. Further, STATCOM package was deliberated to be excluded from this package in view of its requirement at later stage with adequate LTA applications.

4. POSOCO stated that Battery Energy Storage System could be treated as an alternative to STATCOM and therefore needs to be explored for evacuation of power from RE sources. In this regard, Member (PS) stated that studies pertaining to Battery Storage System could be done in and accordingly revised proposal could be taken up, if required.

5. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	**Mode of implementation**	**Purpose /Justification**
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part C1 **Estimated Cost**: Rs 1160 Crore **Implementation Timeframe**: 18 months from date of SPV acquisition.	TBCB (Implementation schedule of Phase III – Part C1 package is to matched with package Phase III –Part B1 (establishment of Bhadla-3 PS, 765kV Bhadla-3 PS-Sikar-2 D/c line, 400kV Bhadla-3 PS-Fatehgarh-2 D/c line)	For evacuation of RE power getting pooled at Ramgarh.

6. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C1"

Sl. No.	**Scope of the Transmission Scheme**	**Capacity /km**
1.	Establishment of 2x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Ramgarh along with 2x240 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus reactor *<u>Future provisions</u>: Space for*	765/400kV1500 MVA ICTs: 2 nos *(7x500 MVA including one spare unit)* 765kV ICT bays –2 nos.

Sl. No.	Scope of the Transmission Scheme	Capacity /km
	765/400kV ICTs along with bays: 3nos. *765kV line bay along with switchable line reactor: 2nos.* *765kV Bus Reactor along with bays: 2 nos.* *400/220 kV ICTs along with bays: 6 nos.* *400 kV line bays along with switchable line reactor: 4nos.* *400 kV line bays: 4 nos.* *400kV Bus Reactor along with bays: 2 nos.* *400kV Sectionalization bay: 3 nos.* *220 kV line bays: 8 nos.* *220kV sectionalisation bay: 2 nos.*	400/220 kV, 500 MVA ICT – 2nos. 400 kV ICT bays – 4 nos. 220 kV ICT bays – 2 nos. 400kV line bays - *As per connectivity granted to RE developer. (2 no. of bays considered at present)* 220kV line bays -*As per connectivity granted to RE developer. (4 no. of bays considered at present)* 765 kV line bays – 2 nos. 240 MVAr Bus Reactor-2 nos. *(7x80 MVAr considering one spare unit*) 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos.
2.	Ramgarh – Bhadla-3 765 kV D/c line (180 km) along with 240 MVAr switchable line reactor at each circuit at Ramgarh end of Ramgarh – Bhadla-3 765kV D/c line	Length – 180km 765 kV, 240 MVAr switchable line reactor- 2 nos Switching equipment for 765 kV 240 MVAR switchable line reactor – 2 nos.
3.	2 nos. of 765kV line bays at Bhadla-3	765 kV line bays - 2nos

Note:

(i) Implementation schedule of Phase III –Part C1 package is to match with package Phase III –Part B1 (establishment of Bhadla-3 PS, 765kV Bhadla-3 PS-Sikar-2 D/c line, 400kV Bhadla-3 PS-Fatehgarh-2 D/c line)
(ii) Developer of Bhadla-3 S/s to provide space for 2 nos. of 765 kV line bays at Bhadla-3 S/s for termination of Ramgarh – Bhadla-3 765kV D/c line
(iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
(iv) Provision of suitable sectionalization shall be kept at Ramgarh at 400kV & 220kV level to limit short circuit level
(v) Implementation of the scheme to be taken up upon receipt of LTA from RE

generation developers at Ramgarh PS/Bhadla-3 PS

5.10.7 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C2

1. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part C2 **Estimated Cost**: Rs 80 Crore **Implementation Timeframe**: 15 months from MoP OM.	RTM (The implementation of package comprising number of 220kV bays and transformers to be taken up based on receipt of Stage-II connectivity and commensurate LTA respectively (beyond 1500MW at Ramgarh PS))	For evacuation of RE power (beyond 1500 MW) getting pooled at Ramgarh.

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C2"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of 1x1500 MVA 765/400kV at Ramgarh	765/400kV 1500 MVA ICT : 1 no 765 kV ICT bay – 1 no 400 kV ICT bay -1 no 220 kV line bays: *As per connectivity granted to RE developer. (3 no. of bays considered at present)*

Note:

(i) The implementation of package comprising number of 220kV bays and transformers. The 220kV bays to be taken based on receipt of Stage-II connectivity (beyond 1200 MW at 220kV level) and the implementation of transformer to be taken up upon receipt of LTA beyond 1500MW at Ramgarh PS.

(ii) 220 kV line bays and Transformer augmentations shall be reviewed based on stage-II connectivity at 220 kV voltage level and LTA applications respectively

5.10.8 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C3:

1. After deliberations, NCT recommended that the scheme be deferred at present and would be considered at a later stage based on requirement as per studies.

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part C3 **Estimated Cost**: Rs 300 Crore **Implementation Timeframe**: 15 months from MoP OM.	RTM (The implementation of Phase-III Part C3 to be taken up after grant of LTA beyond 2000 MW(about) at Ramgarh PS, if required, as per the studies)	May be taken up based on the requirement as per the studies wrt BESS.

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C3"

Sl.No.	Scope of the Transmission Scheme	Capacity (MVAr)
1.	Ramgarh S/s : STATCOM : ± 2x300MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR	± 2 x 300MVAr

Note:

i) Transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part C3" may be taken up based on the requirement as per the studies with respect to Battery Energy Storage System.

ii) The implementation of Phase-III Part C3 to be taken up after grant of LTA beyond 2000 MW(about) at Ramgarh PS, if required, as per the studies.

5.10.9 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part D:

1. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part D **Estimated Cost**: Rs 1680 Crore **Implementation Timeframe**: 18 months from date of SPV acquisition.	TBCB	For evacuation of RE power getting pooled at Ramgarh/Bhadla-3 and required to facilitate LTA to generators at Bhadla-3 and/or Ramgarh.

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part D"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Sikar-II – Khetri 765 kV D/c line	Length – 90km
2	Sikar-II – Narela 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II – Narela 765 kV D/c line	Length – 260km Switching equipment for 765 kV 240 MVAR switchable line reactor –4 nos. 240 MVAr, 765kV Switchable line reactor- 4 nos.
3	Jhatikara – Dwarka 400kV D/c line (Quad) (20km)	Length – 20km
5	765kV line bays at Sikar -II for Sikar-II – Khetri 765 kV D/c line and Sikar-II – Narela 765 kV D/c line	765 kV line bays - 4nos
6	2 nos. of 765kV line bays at both Khetri and Narela S/s	765 kV line bays - 4nos
7	2 nos. of 400kV line bays at both Jhatikara and Dwaraka S/s	400 kV line bays - 4nos

Note:

(i) Developer of Sikar-II S/s to provide space for 4 nos. of 765 kV line bays at Sikar-II S/s along with space for two nos. of switchable line reactors

(ii) Developer of Narela S/s to provide space for 2 nos. of 765 kV line bays along with space for switchable line reactors at Narela S/s

(iii) Powergrid to provide space for two nos. of 765 kV line bays at Khetri substation
(iv) Powergrid and DTL to provide space for two nos. of 400kV line bays both at Jhatikara and Dwarka S/s respectively
(v) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.
(vi) Scheme to be implemented in matching time frame of Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C1

5.10.10 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E1

1. The scope of scheme is as under:

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 4x1500 MVA 765/400kV &3x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr, 765kV & 2x125 MVAr, 420kV Bus Reactors	765/400kV 1500 MVA, ICT: 4 nos (*13x500 MVA, including one spare unit*) 330 MVAr, 765 kV bus reactor- 2 nos. (*7x110 MVAr, including one spare unit*) 765kV ICT bays - 4 nos. 400/220 kV, 500 MVA ICT - 3nos. 400 kV ICT bays –7 nos. 220 kV ICT bays - 3 nos. 765 kV line bays - 2nos. 400 kV line bays - 4 nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor - 2 nos. 420 kV reactor bay - 2 nos.
2	Fatehgarh – III S/s : STATCOM : ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR	

Note:

(i) Provision of suitable sectionalization shall be kept at Fatehgarh-3 at 400kV & 220kV level to limit short circuit level STATCOM to be placed at new section of Fatehgarh-III PS from where phase-III scheme emanating

(ii) Developer of Fatehgarh-III substation to provide space for Fatehgarh-III new section

2. Director (PSPA-I), CEA, stated that 1.9 GW at Fatehgarh -3 (Phase –II) is already under implementation by the subsidiary of PGCIL. The above transmission scheme is for evacuating 6 GW potential at Fatehgarh-3 (Phase-III), which is utilising the future provision of the earlier approved scheme under Phase-II. Therefore, the future provisions mentioned in the proposed scheme would be deleted.

3. She further explained that some generators which are to be connected at 220 kV at Fatehgarh-III have been given connectivity in the new section and they have sought connectivity from March, 2022, onwards.

4. CTU stated that at present, 5425 MW Stage-II connectivity applications and 820MW LTA applications granted at Fatehgarh-3 PS. Therefore, implementation of Phase III – Part E1 is to be taken up for evacuation of power from for RE developers at Fatehgarh-3 PS. Also based on the present application, it is worthwhile to consider only three 1500 MVA ICTs. Further, STATCOM package was deliberated to be excluded from this package and may be taken up as per requirement at later stage.

5. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	**Mode of implementation**	**Purpose /Justification**
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part E1 **Estimated Cost**: Rs 435 Crore **Implementation Timeframe**: 18 months from MoP OM.	RTM [Transmission system for 1.9 GW at Fatehgarh -3 (Phase –II) is already under implementation by the subsidiary of PGCIL. Transmission system under Phase-III- Part E1 is for evacuating 6 GW potential at Fatehgarh-3 (Phase-III), which is utilising the future provision of the earlier approved scheme under Phase-II. Hence, the scheme is proposed to be awarded under RTM]	For evacuation of RE power getting pooled at Fatehgarh-3.

6. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E1"

Sl. No.	**Scope of the Transmission Scheme**	**Capacity /km**
1.	Establishment of 3x1500 MVA 765/400kV	765/400kV 1500 MVA ICT: 3 nos

Sl. No.	Scope of the Transmission Scheme	Capacity /km
	&3x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section*) (In addition to 4x500 MVA ICT proposed under Rajasthan SEZ Ph-II-of Section-1) along with 2x330 MVAr, 765kV & 2x125 MVAr, 420kV Bus Reactors	(*10x500 MVA, including one spare unit*) 330 MVAr, 765 kV bus reactor- 2 (*7x110 MVAr, including one spare unit*) 765kV ICT bays - 3 nos. 400/220 kV, 500 MVA ICT - 3nos. 400 kV ICT bays –6 nos. 220 kV ICT bays - 3 nos. 765 kV line bays - 2nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor - 2 nos. 420 kV reactor bay - 2 nos.

Note:

(i) Provision of suitable sectionalization shall be kept at Fatehgarh-3 at 400kV & 220kV level to limit short circuit level

5.10.11 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E2

1. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part E2 **Estimated Cost**: Rs 245 Crore **Implementation Timeframe**: 15 months from MoP OM	RTM [Implementation to be taken up at later stage based on the number of LTA applications received beyond 3000MW cumulative at Fatehgarh-3 (new section) & Fatehgarh-4 PS]	For evacuation of RE power getting pooled at Fatehgarh-3.

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E2"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of 3x1500 MVA 765/400kV & 2x500 MVA 400/220 kV pooling station at Fatehgarh-3 (new section)	765/400kV 1500 MVA ICT:3 nos. 400/220 kV 500 MVA ICT:2 nos 765kV ICT bay – 3 nos 400kV ICT bay -5 nos. 220 kV ICT bay- 2nos

Note: Implementation to be taken up at later stage based on the number of LTA applications received beyond 3000MW cumulative at Fatehgarh-3 (new section) & Fatehgarh-4 PS.

5.10.12 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III: Part E3

1. NCT stated that provision of STATCOM at Fatehgarh-III may be taken up as a separate package and implemented as per the requirement and studies wrt Battery Energy Storage System. Further, its requirement would be reviewed at a later date.
2. The revised scope of the scheme is as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km	Remarks
1	Fatehgarh – III S/s : STATCOM : ± 2x300 MVAr, 4x125 MVAr MSC, 2x125 MVAr MSR	2x±300MVAr	May be taken up based on the requirement as per the studies wrt BESS.

Note: STATCOM to be placed at new section of Fatehgarh-III PS from where Phase-III scheme emanating

5.10.13 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part F:

1. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part F **Estimated Cost**: Rs 2220 Crore **Implementation Timeframe**: 18 months from date of SPV acquisition.	TBCB	For evacuation of RE power getting pooled at Fatehgarh-3 (new section) and/or Fatehgarh-4

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part F"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1	Establishment of 2x1500MVA 765/400kV Substation at suitable location near Beawar along with 2x330 MVAr 765kV Bus Reactor & 2x125 MVAr 420kV Bus Reactor *Future provisions: Space for* *765/400kV ICTs along with bays:2 nos.* *765kV line bay along with switchable line reactor: 6nos.* *765kV Bus Reactor along with bays: 2 nos.* *400/220 kV ICTs along with bays:2nos.* *400 kV line bays along with switchable line reactor: 4 nos.* *400kV Bus Reactor along with bays: 1nos.* *220 kV line bays: 4nos.*	765/400kV 1500 MVA ICTs: 2 nos (*7x500 MVA, including one spare unit*) 330 MVAr, 765 kV bus reactor- 2 (*7x110 MVAr, including one spare unit*) 765kV ICT bays – 2 nos. 400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos 400kV line bay- 2nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos.
2	LILO of both circuit of Ajmer-Chittorgarh 765 kV D/c at Beawar	Length – 45km
3	LILO of 400kV Kota –Merta line at Beawar	Length – 20km

Sl. No.	Scope of the Transmission Scheme	Capacity /km
4	Fatehgarh-3– Beawar 765 kV D/c along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	Length – 350km Switching equipment for 765 kV 330 MVAR switchable line reactor –4 nos. 765 kV, 330 MVAr Switchable line reactor- 4 nos.

Note:

(i) Developer of Fategarh-3 S/s to provide 2 nos. of 765 kV line bays at Fatehgarh-3 S/s along with space for 765kV switchable line reactors

(ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

(iii) Scheme to be taken up subject to receipt of LTA applications at Fatehgarh-3 (new section and/or Fatehgarh-4.

5.10.14 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part G:

1. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part G **Estimated Cost**: Rs 1530 Crore **Implementation Timeframe**: 18 months from date of SPV acquisition.	TBCB (Implementation to be taken up upon receipt of LTA beyond 3000 MW cumulative at Fatehgarh-3 PS (new section) & Fatehgarh-4 PS)	For evacuation of RE power (beyond 3000 MW) getting pooled at Fatehgarh-3 (new section) and/or Fatehgarh-4

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part G"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Fatehgarh-3– Beawar 765 kV D/c(2nd) along with 330 MVAr Switchable line reactor for each circuit at each end of Fatehgarh-3– Beawar 765 kV D/c line	Length – 350km Switching equipment for 765 kV 330 MVAR switchable line reactor –4 765 kV, 330 MVAr Switchable line reactor- 4
2	2 nos. of 765kV line bays at both at Beawar & Fatehgarh-3	765 kV line bays - 4nos

Note:

(i) Implementation to be taken up upon receipt of LTA beyond 3000 MW cumulative at Fatehgarh-3 PS (new section) & Fatehgarh-4 PS).

(ii) Developer of Fategarh-3 S/s to provide space for 2 nos. of 765 kV line bays at Fatehgarh-3 S/s along with space for 765 switchable line reactors.

(iii) Developer of Beawar S/s to provide space for 2 nos. of 765 kV line bays at Beawar S/s along with space for 765kV switchable line reactors.

(iv) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

5.10.15 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part H:

1. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part H **Estimated Cost**: Rs 1910 Crore **Implementation Timeframe**: 18 months from date of SPV acquisition.	TBCB (Implementation to be taken up upon receipt of LTA beyond 3000 MW cumulative at Fatehgarh-3 PS (new section) & Fatehgarh-4 PS)	For evacuation of RE power getting pooled at Fatehgarh-3 (new section) and/or Fatehgarh-4

2. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part H"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 2x1500 MVA 765/400kV substation at suitable location near Dausa along with 2x330 MVAr, 765 kV Bus Reactor & 2x125 MVAr, 420 kV bus Reactor *Future provisions: Space for* *765/400kV ICTs along with bays: 2 nos.* *765kV line bay along with switchable line reactor: 4nos.* *765kV Bus Reactor along with bays: 2 nos.* *400/220 kV ICTs along with bays: 2 nos.* *400 kV line bays along with switchable line reactor: 4 nos.* *400kV Bus Reactor along with bays: 1 nos.* *220 kV line bays: 4nos.*	765/400kV 1500 MVA ICTs: 2 nos. (*7x500 MVA, including one spare unit*) 330 MVAr, 765 kV bus reactor- 2nos. (*7x110 MVAr, including one spare unit*) 765kV ICT bays – 2 nos 400 kV ICT bays – 2 nos. 765 kV line bays – 6 nos. 400kV line bay- 4 nos. 765kV reactor bay- 2 nos. 125 MVAr, 420kV bus reactor – 2 nos. 420 kV reactor bay – 2 nos.
2.	LILO of both circuits of Jaipur(Phagi)-Gwalior 765 kV D/c at Dausa along with 240 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Gwalior 765 kV D/c line	Length – 40km Switching equipment for 765 kV 240 MVAR switchable line reactor –2 240 MVAr 765 kV Switchable line reactor- 2 (*7x80 MVAr considering one spare unit*) (also to be used as spare reactor at Dausa end for 765kV Beawar – Dausa D/c line)
3	LILO of both circuits of Agra – Jaipur(south) 400kV D/c at Dausa along with 50 MVAr Switchable line reactor for each circuit at Dausa end of Dausa – Agra 400kV D/c line	Length – 30km Switching equipment for 420 kV, 50 MVAR switchable line reactor –2 420 kV, 50 MVAr Switchable line reactor-2 nos.

Sl. No.	Scope of the Transmission Scheme	Capacity /km
4	Beawar – Dausa 765 kV D/c line (240 km) along with 240 MVAr Switchable line reactor for each circuit at each end	Length – 240km Switching equipment for 765 kV 240 MVAR switchable line reactor –4 765 kV, 240 MVAr Switchable line reactor- 4 nos.
5	2 nos. of 765kV line bays at Beawar for Beawar – Dausa 765 kV D/c line	765 kV line bays – 2 nos

Note:

(i) Implementation of the scheme to be taken up upon receipt of LTA beyond 3000MW (about) cumulative at Fatehgarh-3 PS (new section) and Fatehgarh-4 PS.

(ii) Developer of Beawar S/s to provide space for 2 nos. of 765 kV line bays along with space for 765kV switchable line reactors at their substations

(iii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

5.10.16 Name of Scheme: Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part I:

1. The scope of scheme is as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 6000MW, ±800KV Bhadla(HVDC) terminal station at a suitable location near Bhadla-3 substation	
2.	Establishment of 6000MW, ±800KV Fatehpur(HVDC) terminal station at suitable location near Fatehpur (UP)	
3.	Bhadla-3 - Bhadla(HVDC) 400kV 2xD/c quad moose line along with the line bays at both substations	Line length- 2km 400kV line bays -8 nos.
4	±800KV HVDC line (Hexa lapwing) (4x1500 MW) between Bhadla-3 & Fatehpur (950km)	Length – 950km
5.	Establishment of 5x1500MVA, 765/400KV ICTs at Fatehpur (HVDC) along with	765/400kV 1500 MVA ICT : 5 nos (*16x500 MVA, including one spare*

	2x330MVAr (765kV) bus reactor *Future provisions: Space for* *765/400kV ICTs along with bays: 1 nos.* *765kV line bay along with switchable line reactor: 4nos.* *765kV Bus Reactor along with bays: 2 nos.* *400/220 kV ICTs along with bays: 4nos.* *400 kV line bays along with switchable line reactor: 4 nos.* *400kV Bus Reactor along with bays: 1 nos.* *220 kV line bays: 6nos.*	*unit)* 765kV ICT bays – 5 nos. 400 kV ICT bays – 5 nos. 765 kV line bays – 4 nos. 330 MVAr, 765kV Bus Reactor-2 nos. *(7x110 MVAr, including one spare unit)* 765kV reactor bay- 2 nos.
7.	LILO of both ckts of 765kV Varanasi – Kanpur (GIS) D/c at Fatehpur(30km)	Length – 30km
	Total Estimated Cost (Rs Crores)	**12700**

Note:

(i) Developer of Bhadla-3 S/s to provide space 4nos. of 400kV bays at their substation

(ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

2. CTUIL stated that at present 2824MW Stage-II connectivity applications granted at Ramgarh/Bhadla-3 PS, however no LTA application yet granted. For further dispersal of RE power from Ramgarh PS/Bhadla-3 PS, 765kV D/c HVAC corridor towards Sikar-2 and 6000MW HVDC corridor towards Fatehpur was agreed in 3rd NRPC(TP) meeting. However, due to longer time in implementation and higher cost of HVDC system, 765kV HVAC corridor towards Sikar-2 is to be taken up for implementation in first phase. It is emerged that when LTA at Ramgarh/Bhadla-3 PS is beyond 3500 MW, there shall be need for implementation of HVDC system additionally which may be reviewed in next NCT meeting based on LTA status at Ramgarh/Bhadla-3.

3. Member (Power System), CEA, stated that it would be better to defer this scheme and simultaneously option of Battery Storage System could be explored which could reduce the requirement of HVDC lines. Accordingly, the revised proposal could be discussed in the next NCT meeting.

4. POSOCO also stated that due to the uncertainty of GIB issue, it would be better to defer this scheme at this stage.

5. After deliberations, NCT recommended that Transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under phase III –Part I" may be deferred and to be reviewed in next NCT meeting.

5.10.17 Name of Scheme: Transformer augmentation at various substations for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part J:

1. The scope of scheme is as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	2Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS	400/220kV 500 MVA ICT:1 no 400 kV ICT bays – 1 nos. 220 kV ICT bays – 1 nos.
2.	3Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS	765/400kV 1500 MVA ICT: 1 no. 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
3.	4Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)	765/400kV 1500 MVA ICT: 1 no 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
4.	5Augmentation of 1x500 MVA ICT (5th), 400/220kV ICT at Fatehgarh-3 Substation (section-1*)	400/220kV 500 MVA ICT:1 no. 400 kV ICT bays – 1 no. 220 kV ICT bays – 1 no.
5.	6Augmentation of 1x1500MVA ICT at 765/400kV Kanpur(GIS) substation	765/400kV 1500 MVA ICT: 1 no. 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
6.	7Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)	765/400kV 1500 MVA ICTs : 1 no 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.

2. CTUIL stated that one of the pilot project of Battery Storage System of 250 MW is being planned at perspective location near Fatehgarh-3, therefore there might be a possibility that the 5th ICT of 500 MVA at Fatehgarh-3 S/s may not be required and hence this item needs to be reviewed. Also, augmentation of 1x1500MVA ICT at 765/400kV Kanpur(GIS) substation is linked with HVDC system (LILO of Varanasi-Kanpur at Fatehpur) and since the timeframe of HVDC has now been delayed, therefore, this item could also be taken up later.

3. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase III –Part J **Estimated Cost**: Rs 225 Crore **Implementation Timeframe**: The Implementation timeframe of the package is linked with the implementation of various schemes under Phase-III.	RTM	For evacuation of RE power getting pooled at Fatehgarh-2, Bhadla-2, Bikaner (PG) and Jhatikara Substation.

4. Detailed scope of the scheme is given below:

"Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part J"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS	400/220kV 500 MVA ICT:1 no 400 kV ICT bays – 1 nos. 220 kV ICT bays – 1 nos.
2.	Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS	765/400kV 1500 MVA ICT: 1 no. 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
3.	Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG)	765/400kV 1500 MVA ICT: 1 no 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.
4.	Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section)	765/400kV 1500 MVA ICTs : 1 no 765kV ICT bays – 1no. 400 kV ICT bays – 1 no.

Note:

Implementation schedule of above transmission elements under Part J is as under:

a) Augmentation with 400/220kV, 1x500MVA Transformer (10th) at Fatehgarh-2 PS: *Implementation shall be taken up after LTA of 4490MW at 220kV level of Fatehgarh-2 (Presently 3660MW LTA granted at 220kV level of Fatehgarh-2)*

b) Augmentation with 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS : *At present 5945MW Stage-II connectivity applications and 2645MW LTA applications granted at Bhadla-2 PS. Implementation of 765/400kV, 1x1500MVA Transformer (5th) at Bhadla-2 PS shall be taken up after receipt of LTA of about 4000MW at Bhadla-2 PS*

c) Augmentation with 765/400kV, 1x1500MVA Transformer (3rd) at Bikaner (PG) *: At present 3935MW Stage-II connectivity applications and 2975MW LTA applications granted at Bikaner/Bikaner-2 PS. Implementation of 1x1500MVA transformer (3rd) at Bikaner (PG) shall be taken up upon additional 1000MW (about) LTA at Bikaner(PG)/ Bikaner-2 PS*

d) Augmentation of 1x1500 MVA ICT (3rd), 765/400kV ICT at Jhatikara Substation (Bamnoli/Dwarka section): *Implementation shall be taken up after receipt of LTA at Bhadla-3 PS/Ramgarh PS matching with transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part D*

5.11 Name of Scheme: Creation of 400/220 kV, 2x315 MVA S/S at Siot, Jammu & Kashmir

1. Director, PSPA-1 stated that in the 3rd meeting of NRPC (TP) held on 19.02.2021, JKPTCL stated that they are in urgent requirement of a 400 kV substation at Siot as they are facing shortfall of transmission capacity in the areas of Jammu, Rajouri and Punch district. The proposed 400 kV substation would feed the areas near Akhnoor and Jammu region and the interconnection with Katra-II would also improve reliability of supply, considering the importance of Katra being a holy town with lots of visiting pilgrims. The substation would also provide relief from the low voltage issues at Draba/Chandak. The details of the scheme are as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 2x315MVA, 400/220kV Siot S/s with 1x125 MVAR (420 kV) bus reactors <u>Future provisions</u>*: Space for* *400/220kV ICTs along with bays: 2 nos.* *400 kV line bays along with switchable line reactor: 4nos.* *220 kV line bays: 4 nos.*	400/220 kV, 315 MVA ICT – 2 nos. 400 kV ICT bays - 2 nos. 220 kV ICT bays - 2 nos. 400 kV line bays - 4 nos. 220 kV line bays - 6 nos. 125MVAr, 420kV bus reactor - 1 nos. 420 kV reactor bay - 1 nos.
2.	LILO of 400 kV D/c Amargarh (Kunzer)-Samba line at 400/220 kV Siot S/s	Length – 15 km

2. CTUIL opined that considering the transportation constraints due to difficult terrain,

single phase units for transformers may be considered in place of three phase transformer at proposed Siot S/s. Further, bus reactor of 80MVAr suggested in place of 125MVAr due to above limitation.

3. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	**Mode of implementation**	**Purpose /Justification**
Creation of 400/220 kV, 2x315 MVA S/S at Siot, Jammu & Kashmir **Estimated Cost**: Rs 270 Crore **Implementation Timeframe**: March, 2024	TBCB	To feed the areas near Akhnoor and Jammu region and the interconnection with Katra-II would also improve reliability of supply

4. Detailed scope of the scheme is given below:

"Creation of 400/220 kV, 2x315 MVA S/S at Siot, Jammu & Kashmir"

Sl.No.	**Scope of the Transmission Scheme**	**Capacity /km**
1.	Establishment of 7x105 MVA, 400/220kV Siot S/s with 1x80 MVAR (420 kV) bus reactors <u>*Future provisions*</u>*: Space for* *400/220kV ICTs along with bays: 2 nos.* *400 kV line bays along with switchable line reactor: 4 nos.* *220 kV line bays: 4 nos.*	315 MVA, 400/220 kV ICT (*7x105 MVA, including one spare*) 400 kV ICT bays - 2 nos. 220 kV ICT bays - 2 nos. 400 kV line bays - 4 nos. 220 kV line bays - 6 nos. 80 MVAr, 420kV bus reactor - 1 nos. 420 kV reactor bay - 1 nos.
2.	LILO of 400 kV D/c Amargarh (Kunzer)- Samba line at 400/220 kV Siot S/s	Length – 15 km

5.12 400 kV Khandukhal(Srinagar)-Rampura (Kashipur) D/c line:

1. Director, PSPA-1 stated that Uttarakhand Integrated Transmission Project (UITP) scheme

is under implementation by PTCUL. CERC vide order dated 31.01.2013 had declared the scheme as a deemed ISTS scheme. The scheme comprises of transmission system for evacuation of power from proposed HEP's in various river basins of Uttarakhand. There are certain deemed Inter-State Transmission System (deemed ISTS) elements of UITP, where PTCUL had not been able to achieve the targeted timeline (deadlines). Amongst these are the 400 kV D/C Srinagar (Khandukhal) – Kashipur (Rampura)Transmission line which was required to evacuate power from upcoming projects in the Alaknanda basin (Vishnugad Pipalkoti HEP of THDC and Tapovan Vishnugad HEP of NTPC), and the 220 kV D/C Mori-Dehradun line which was proposed to evacuate power from proposed generators in Yamuna basin. M/s PTCUL vide letter dated 12.01.2021 conveyed that Board of Directors of PTCUL had accorded approval for handing over of construction of 400 kV Khandukhal-Rampura Transmission Line to Central Sector.

2. The matter was deliberated in the 3rd meeting of NRPC (TP), wherein implementation of 400 kV D/c Khandukhal(Srinagar)-Rampura (Kashipur) line was agreed to be taken up under central sector as an ISTS scheme with the matching time frame of commissioning of Vishnugad Pipalkoti HEP of THDC or Tapovan Vishnugad HEP of NTPC, whichever is earlier.

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	400 kV D/c Khandukhal(Srinagar)-Rampura (Kashipur) line	Length – 195 km
2.	2 nos. of 400 KV bays both at Khandukhal Srinagar) & Rampura(Kashipur) S/s	400 kV line bays -4

Note:

(i) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

(ii) PTCUL to provide space for2 nos. of 400kV bays each at Rampura (Kashipur) & Khandukhal(Srinagar) S/s respectively.

3. CTU stated that the conductor configuration of the line, Quad Bersimis needs to be mentioned. Also, earlier the line length noted was 150 km and now, it has been modified to 195 km, which would require the need of line reactor. 2x80 MVAR switchable line reactors with inter-tripping arrangement could be utilized at both ends.

4. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
400 kV Khandukhal(Srinagar)-Rampura (Kashipur) D/c line **Estimated Cost**: Rs 800 Crore **Implementation Timeframe**: The timeline to be considered as matching time frame of commissioning of Vishnugad Pipalkoti HEP (Dec'23) of THDC or Tapovan Vishnugad HEP of NTPC, whichever is earlier.	TBCB	To evacuate power from upcoming projects in the Alaknanda basin (Vishnugad Pipalkoti HEP of THDC and Tapovan Vishnugad HEP of NTPC)

5. Detailed scope of the scheme is given below:

"400 kV Khandukhal(Srinagar)-Rampura (Kashipur) D/c line":

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	400 kV D/c Khandukhal(Srinagar)-Rampura (Kashipur) line (Quad Bersimis)	Length – 195 km
2	1x80MVAr swithcable line reactor at Khandukhal(Srinagar) end at each ckt of Khandukhal(Srinagar) -Rampura (Kashipur) line (Quad Bersimis)	Switching equipment for 420 kV 80 MVAR switchable line reactor –2 420 kV, 80 MVAr Switchable line reactor- 2
3.	2 nos. of 400 KV bays both at Khandukhal Srinagar) & Rampura(Kashipur) S/s	400 kV line bays -4

Note:

(i) The timeline to be considered as matching time frame of commissioning of Vishnugad Pipalkoti HEP (Dec'23) of THDC or Tapovan Vishnugad HEP of NTPC, whichever is earlier.

(ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

(iii) PTCUL to provide space for 2 nos. of 400kV bays each at Rampura (Kashipur) & Khandukhal(Srinagar) S/s respectively along with the space for switchable line reactor

5.13 System Strengthening scheme for reconductoring of portion of Dulhasti-Kishtwar-Kishenpur 400 kV (Quad) S/c:

1. Director, PSPA-1 stated that earlier Ratle HEP (690 MW) was planned to be developed in the downstream of Dulhasti HEP and it was agreed that Dulhasti-Kishenpur D/c Quad (S/c strung) would be LILOed at Ratle HEP and 2nd quad circuit shall be strung from Kishenpur and terminated at Ratle matching with the commissioning of Ratle HEP. For cost optimization, it was agreed to implement Dulhasti-Kishenpur 400kV S/c line (Quad) with Twin Moose conductor till Ratle LILO point. Beyond Ratle LILO point, line was implemented with Quad Moose conductor. However, LTA & Connectivity application for Ratle HEP was revoked at later stage due to non-signing of requisite agreements.
2. For connectivity of Pakaldul HEP (1000 MW), LILO of one circuit of Dulhasti - Kishenpur 400 kV line (quad) has been agreed at Kishtwar Pooling station. However, as location of proposed Kishtwar S/s is above Ratle location and towards Dulhasti, portion of Dulhasti-Ratle LILO tap Point of Dulhasti (TW loc 10 indicated at Fig-1) - Kishenpur 400 kV line (TW loc 49-indicated at Fig-1) (approx. 13 kms) implemented through twin moose conductor, needs to be re-conductored with Quad moose conductor. This reconductoring of approx. 13 km section (LILO tap Point of Dulhasti - Kishenpur 400 kV line) would be needed to cater to power transfer requirement from hydro projects (Pakaldul, Kiru & Kwar) including LTA of Pakaldul (1000 MW) HEP. An exhibit depicting above arrangement is at Fig-1.

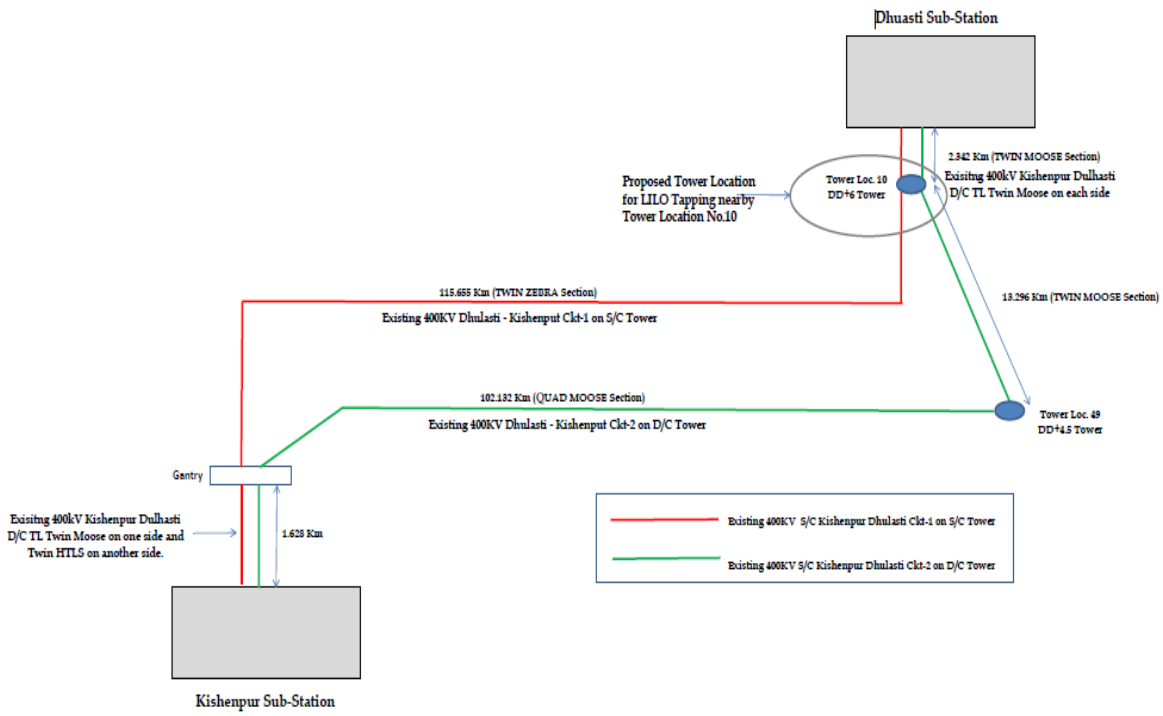


Fig-1

3. Also, the matter was deliberated in 3rd meeting of NRPC (TP) held on 19.02.2021 wherein reconductoring of Dulhasti-Ratle LILO tap Point of Dulhasti - Kishenpur 400 kV line (approx. 13 kms) implemented through twin moose conductor with Quad moose conductor in matching time frame of Pakaldul HEP generation was agreed.
4. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
System Strengthening scheme for reconductoring of portion of Dulhasti-Kishtwar- Kishenpur 400 kV (Quad) S/c **Estimated Cost**: Rs 13 Crore **Implementation Timeframe**: In matching time frame of Pakaldul HEP generation.	RTM (Existing line of POWERGRID)	To cater to power transfer requirement from hydro projects (Pakaldul, Kiru & Kwar) including LTA of Pakaldul (1000 MW) HEP

5. Detailed scope of the scheme is given below:
"System Strengthening scheme for reconductoring of portion of Dulhasti-Kishtwar-Kishenpur 400 kV (Quad) S/c"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Reconductoring of Dulhasti-Ratle LILO tap Point of Dulhasti - Kishenpur 400 kV line (approx. 13 kms) implemented through twin moose conductor, with Quad moose conductor in matching time frame of Pakaldul HEP generation.	Length – 13 km

Note: To be implemented in matching time frame of Pakaldul HEP generation.

5.14 Grant of 400 kV & 220 kV bays to RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS:

1. Director, PSPA-1 stated that the establishment of 4x500MVA, 400/220kV Fatehgarh-III PS Ramgarh-II Pooling Station was agreed in the 5th meeting of NRSCT held on 13.09.2019 under "Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under Phase II –Part A". The Transmission scheme is currently under bidding through TBCB.
2. In the 3rd meeting of NRPC (TP) held on 19.02.2021, CTU intimated that several Stage-II Connectivity applications have been received at Fatehgarh-III PS at various voltage levels i.e. 400kV & 220kV level for which 6 nos. of 220kV bays and 3 nos. of 400kV bays are required at Fatehgarh-III PS and proposed that bays may be implemented under ISTS matching with RE generators.

3. Accordingly, as per the detailed procedure for grant of connectivity to RE generators, it was agreed that 6 nos. of 220kV bays and 3 nos. of 400kV bays at Fatehgarh-III PS may be implemented under ISTS matching with RE generators.

4. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
Grant of 400 kV & 220 kV bays to RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS **Estimated Cost**: Rs 75 Crore **Implementation Timeframe**: 15 months from MoP OM	RTM	To grant connectivity to RE generators

5. Detailed scope of the scheme is given below:

"Grant of 400 kV & 220 kV bays to RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	6 nos. of 220 kV bays and 3 nos. of 400 kV bays along with bus extension of 220 kV & 400 kV bus as well as bus sectionaliser arrangement between both the levels i.e 400 kV new section and 220 kV new section with under implementation section at Fatehgarh-III PS	400 kV line bays - 3 nos. 220kV line bays - 6 nos. 400kV bus sectionaliser : 1 no. 220kV bus sectionalizer : 1 no.

5.15 Addition of new 1x315 MVA, 400/220kV ICT at Amargarh, J&K:

1. Director, PSPA-1 stated that JKPDD had submitted DPRs for Jammu Region & Kashmir region for strengthening of the transmission network of J &K considering a load of around 4800 MW by 2026-27. Considering the same, system studies were carried out by CEA and as per the system studies, it emerged that 2x315MVA, 400/220kV ICTs at Amargarh (Kunzar) are 'N-1' non complaint in 2025-26 scenario.
2. Further, Matter was deliberated in the 3rd meeting of NRPC (TP) held on 19.02.2021 wherein addition of new 1x315 MVA, 400/220kV ICT at Amargarh was agreed to be taken up under ISTS with the time frame of March 2026.
3. It was opined that considering transportation constraints due to difficult terrain, single phase units for transformers may be considered in place of three phase transformer at Amargarh S/s.

4. Detailed scope of the scheme is given below:

"**Addition of new 1x315 MVA, 400/220kV ICT at Amargarh, J&K"**

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1	Augmentation with 400/220kV, 1x315MVA Transformer (3rd) at Amargarh, J&K	400/220kV 105 MVA single phase ICT: 3 no 400 kV ICT bays – 1 nos. 220 kV ICT bays – 1 nos.
	Total Estimated Cost (Rs Crores)	**40**

Time frame as per NRPC(TP) – March, 2026

5. NCT recommended that the scheme may be implemented through RTM route. However, since the timeframe of Amargarh is March, 2026, therefore, this could be deferred and may be taken up later.

5.16 Establishment of 400/220kV Nange Pooling Station for proposed SJVN Hydro Power Plant Luhri Stage-I, II & Sunni Dam:

1. Director, PSPA-1 stated that in the 2nd NRSCT meeting held on 13.11.18, transmission system for connectivity to Luhri-I (210 MW), Luhri-II (172 MW) & Sunni Dam (382 MW) HEP were agreed. It was decided that power from all the three stages of Luhri HEP would be evacuated at 220 kV level and would be pooled at 400/220 kV proposed ISTS Nange pooling station located near Luhri-II HEP and further evacuated to Koldam through 400 kV D/c line.

2. Matter was further deliberated in the 3rd meeting of NRPC (TP) held on 19.02.2021, wherein SJVNL intimated that commissioning schedules for Luhri Stage-I (210 MW), Sunni Dam (382 MW) and Luhri Stage -II (172 MW) are April 2025, January 2027 and October 2027 respectively. Accordingly, 2x315 MVA ICT capacity at Nange Pooling station shall be required in the time frame of Luhri Stage-I HEP (210 MW).

3. After deliberations, it was agreed that following transmission system may be taken up for implementation with the time frame of Luhri-I HEP (April 2025):

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 7x105 MVA, 400/220kV Nange GIS Pooling Station *<u>Future provisions</u>: Space for* *400/220kV ICTs along with bays: 2 nos.* *400 kV line bays along with switchable line*	400/220 kV 105 MVA ICT - 7nos. 400 kV ICT bays - 2 nos. 220 kV ICT bays - 2 nos. 400 kV line bays - 2 nos. 125 MVAr, 420kV bus

	reactor: 2nos. *220 kV line bays: 10 nos.*	reactor – 1 no. 420 kV reactor bay - 1no.
2.	Nange GIS Pooling Station – Koldam 400 kV D/c line	Length – 50 km
3.	2 nos. of 400kV GIS line bays at Koldam	400 kV line bays (GIS) - 2 nos
	Total Estimated Cost (Rs Crores)	**330**

Note:

(i) NTPC to provide space for2 nos. of 400 kV line bays at Koldam S/s

(ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

The above transmission system would also be utilized for connectivity of Sunni Dam and Luhri-II HEPs of M/s SJVNL. Time frame as per NRPC (TP)- April, 2025.

4. Member (PS) informed that NTPC has forwarded some observation regarding the availability of space at Koldam S/s for 2nos. of 400kV bays, **therefore the scheme may be deferred presently. The same would be put up again after resolution of the issue with NTPC.**

Members noted the same.

5.17 1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) under system strengthening.

1. Director, PSPA-1 stated that in the 3rd meeting of NRPC (TP) held on 19.02.2021, UPPTCL intimated that 2x315 MVA ICTs at Sohawal(PG) have been observed to be 'N-1' non-compliant under peak load conditions and requested for its augmentation. Accordingly, 1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) was agreed under system strengthening. Also, UPPTCL has requested to implement the ICT at the earliest due to increase in load.

2. CTUIL stated that UPPTCL vide letter 24.08.21 again requested that transformer augmentation work at Sohawal (PG) substation may be implemented on top priority to maintain reliable supply besides TTC enhancement perspective.

3. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) under system strengthening **Estimated Cost**: Rs 30 Crore **Implementation Timeframe**: 15 months from MoP OM	RTM	To maintain reliable supply besides TTC enhancement perspective.

4. Detailed scope of the scheme is given below:

"1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG) under system strengthening"

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1	Augmentation with 400/220kV, 1x500 MVA Transformer (3rd)at Sohawal (PG)	400/220kV 500 MVAICT:1 no 400 kV ICT bays – 1 nos. 220 kV ICT bays – 1 nos.

5.18 One no of 220 kV bay at Chamera Pooling point for 2nd Circuit stringing of 220 kV Karian – Chamera Pool line under implementation by HPPTCL with time fame of December 21.

1. Director, PSPA-1 stated that construction of 220/33 kV substation at Karian in Ravi Basin had been approved in 29th meeting of SCPSPNR held on 29.12.2010. Accordingly, 2 No. of 220 kV Bays were approved for termination of 220 kV D/C line from Karian at 400/220 kV, 2x315 MVA Chamera Pooling station of PGCIL at Rajera. Subsequently, in the 30th SCPSPNR meeting held on 19.12.2011, HPPTCL had informed that one bay would be required in first instance.
2. Subsequently, in order to strengthen the intra-state transmission system, HPPTCL has planned 2nd circuit stringing of 220 kV Karian to Chamera transmission line, for which 220kV bay is required to be implemented at Chamera Pool and the same was approved in 3rd meeting of NRPC(TP). HPPTCL had requested that the implementation of the above scheme may be carried out by December 2021.
3. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
One no of 220 kV bay at Chamera Pooling point for 2nd Circuit stringing of 220 kV Karian – Chamera Pool line **Estimated Cost**: Rs 4 Crore **Implementation Timeframe**: 12 months from MoP OM.	RTM	To strengthen the intra-state transmission system of HP

4. Detailed scope of the scheme is given below:

"One no of 220 kV bay at Chamera Pooling point for 2nd Circuit stringing of 220 kV Karian – Chamera Pool line"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1	One no of 220kV bay at Chamera Pooling point (PG) for 2ndCircuit stringing of 220 kV Karian – Chamera Pool line	220 kV line bay -1 no

5.19 220 kV bays at 400 kV substation PGCIL Khatkar (Jind) & Naggal (Panchkula) substation:

1. Director, PSPA-1 stated that the following 220kV bays have been agreed in the 3rd meeting of NRPC(TP):

   - For LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind), 4 nos. of bays are required, out of which 2 nos. of bays are already existing. Therefore, implementation of 2 nos. of bays has been agreed. HVPNL has indicated the timeframe for implementation of the above 2 bays as July 2023.
   - For termination of 220 kV D/C line from 400 kV PGCIL Naggal (Panchkula) to proposed 220 kV substation Sadhaura, 2 nos. of 2 nos. of bays has been agreed. HVPNL has indicated the timeframe for implementation of the 2 bays at 400 kV PGCIL Naggal as September, 2023.

2. After deliberations, NCT recommended the following:

Name of the scheme/est. cost/schedule	Mode of implementation	Purpose /Justification
220 kV bays at 400 kV substation PGCIL Khatkar (Jind) & Naggal (Panchkula) substation **Estimated Cost**: Rs 16 Crore **Implementation Timeframe**: PGCIL Khatkar (Jind)- July, 2023 Naggal (Panchkula) substation- September, 2023	RTM	• For LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind). • For termination of 220 kV D/C line from 400 kV PGCIL Naggal (Panchkula) to proposed 220 kV substation Sadhaura

3. Detailed scope of the scheme is given below:

"220 kV bays at 400 kV substation PGCIL Khatkar (Jind) & Naggal (Panchkula) substation"

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1	220 kV bays at 400 kV substation PGCIL Khatkar (Jind) for LILO of both circuits of 220 kV Jind HVPNL to PTPS D/C line at 400 kV substation PGCIL Khatkar (Jind)	220 kV line bays -2nos
2	220 kV bays at 400 kV PGCIL Naggal (Panchkula) substation for 220 kV D/C line from 400 kV PGCIL Naggal (Panchkula) to proposed 220 kV substation Sadhaura	220 kV line bays -2 nos

5.20 Strengthening of 220 kV Alusteng (Srinagar)- Leh Transmission System:

1. Director, PSPA-1 stated that Powergrid vide letter dated 25.02.2021 has submitted a proposal for strengthening of 220 kV Alusteng (Srinagar)- Leh Transmission System with following elements with total estimated cost of Rs 226 Crores:

(a) Laying of cable for about 15km between Minamarg and Zojila Top section of Alusteng –Drass 220kV section.

(b) Installation of 2x25 MVAR, 220kV bus reactors at 220/66kV Drass S/s

(c) Installation of 1x25 MVAR, 220kV bus reactors at 220/66kV Alusteng S/s

2. She further informed that Srinagar- Leh 220 kV S/c transmission line has become an ISTS line after bifurcation of state of J&K into UT of J&K and UT of Ladakh and the transmission line has been transferred to Powergrid by MoP vide letter dated 23.03.2021. MoP has directed CEA to take up the proposal of Powergrid in the NCT meeting for taking decision regarding its implementation under RTM The detail scope is as under:

Sl.No.	Scope of the Transmission Scheme	Capacity /km
1	Laying of cable about 15km provided between Minamarg and Zojila Top section of Alusteng – Drass 220kV section	Length- 15 km
2	2x25 MVAR, 220kV bus reactors at 220/66kV Drass S/s	25 MVAr, 220kV bus reactor – 2 nos. 220 kV reactor bay – 2 nos.
3	1x25 MVAR, 220kV bus reactors at 220/66kV Alusteng S/s	25 MVAr, 220kV bus reactor – 1 no. 220 kV reactor bay – 1 no.
	Estimated Cost (Rs. Crore) **(as provided by Powergrid)**	**226**

3. NCT recommended that since the line is an ISTS line, the scheme need to be first deliberated in the meeting of NRPC (TP) and may be put up in the next meeting of NCT.

5.21 Summary of the new transmission schemes recommended by NCT in Western and Northern region along with mode of implementation and survey agency.

Mode of Implementation	**New schemes**	**Modifications in earlier notified schemes**	**Schemes assigned for survey No. (Estimated cost of the schemes)**		
			PFCCL	**RECPDCL**	**CTUIL**
TBCB	14	2 (allotted to RECPDCL	5 (Rs 5015 cr.)	5 (Rs. 5614 cr.)	4 (Rs 4937 cr.)
RTM	13	0			

Sl. No.	Transmission scheme	Scheme (New/ Modification of Notified scheme)	Implementation mode	Survey agency	Estimated cost (Rs. Crs.)
1.	Transmission system for evacuation of power from Neemuch SEZ (1000 MW)	New	TBCB	CTUIL	547
2.	Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park	New	TBCB	RECPDCL	789
3.	Establishment of Khavda Pooling Station-3 (KPS3) in Khavda RE Park	New	TBCB	RECPDCL	665
4.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A	Modification	TBCB	RECPDCL	862
5.	Transmission scheme for injection beyond 3 GW RE power at Khavda PS1 (KPS1)	New	TBCB	RECPDCL	780
6.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C	Modification	TBCB	RECPDCL	1440
7.	Transmission system strengthening beyond Kolhapur for export of power from Solar & Wind Energy Zones in Southern Region- Re-conductoring of Kolhapur (PG) – Kolhapur 400 kV D/c line	New	RTM		54
8.	Augmentation of 1x500 MVA, 400/220 kV ICT (3rd) at Bhatapara (PG)	New	RTM		30
9.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A1	New	TBCB	PFCCL	210
10.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A2	New	RTM		100
11.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part A3	New	TBCB	PFCCL	505
12.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B1	New	TBCB	PFCCL	2500
13.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-	New	RTM		235

Sl. No.	Transmission scheme	Scheme (New/ Modification of	Implementation mode	Survey agency	Estimated cost (Rs. Crs.)
	III Part B2				
14.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C1	New	TBCB	RECPDCL	1160
15.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part C2	New	RTM		80
16.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part D	New	TBCB	CTUIL	1680
17.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E1	New	RTM		435
18.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part E2	New	RTM		245
19.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part F	New	TBCB	RECPDCL	2220
20.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part G	New	TBCB	PFCCL	1530
21.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part H	New	TBCB	CTUIL	1910
22.	Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part J	New	RTM		225
23.	Creation of 400/220 kV, 2x315 MVA S/S at Siot , Jammu & Kashmir	New	TBCB	PFCCL	270
24.	Implementation of 400 kV D/c Khandukhal(Srinagar)-Rampura (Kashipur) line to be taken up under central sector as an ISTS scheme	New	TBCB	CTUIL	800

Sl. No.	Transmission scheme	Scheme (New/ Modification of	Implementation mode	Survey agency	Estimated cost (Rs. Crs.)
25.	System Strengthening scheme for Reconductoring of portion of Dulhasti-Kishtwar- Kishenpur 400 kV (Quad) S/c	New	RTM		13
26.	Grant of 400kV & 220kV bays to RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS under ISTS	New	RTM		75
27.	1x500 MVA, 400/220 kV ICT augmentation (3rd) at Sohawal (PG)) under system strengthening	New	RTM		30
28.	One no of 220kV bay at Chamera Pooling point for 2ndCircuit stringing of 220 kV Karian – Chamera Pool line under implementation by HPPTCL	New	RTM		4
29.	220 kV bays at 400 kV substation PGCIL Khatkar (Jind)&Naggal (Panchkula) substation	New	RTM		16

Annexure IA

List of participants of 5th NCT meeting held on 25.08.2021 and 02.09.2021 through VC

Sr. No.	Name (Sh./Smt.)	Designation	1st meeting held on 25.08.2021	2nd meeting held on 02.09.2021
Central Electricity Authority				
1.	Dinesh Chandra	Chairperson	Yes	Yes
2.	Goutam Roy	Member (PS) CEA	Yes	Yes
3.	Gorityala Veera Mahendar	Member (E&C) CEA	Yes	Yes
4.	Ishan Sharan	Chief Engineer (PSPA-I)	Yes	Yes
5.	Awdhesh Kumar Yadav	Director (PSPA-I)	Yes	Yes
6.	Manjari Chaturvedi	Director (PSPA-I)	Yes	Yes
7.	J. Ganeshwara Rao	Dy. Director	Yes	Yes
8.	Priyam Srivastava	Dy. Director	Yes	Yes
9.	Vikas Sachan	Dy. Director	Yes	Yes
Ministry of Power				
10.	Goutam Ghosh	Director (Trans)	Yes	No
MNRE				
11.	Irfan Ahmad	Director	Yes	Yes
12.	Dilip Nigam	Adviser	Yes	Yes
13.	Rohit Thakwani	Scientist-C	Yes	No
Technical Experts				
14.	S. K. Ray Mohapatra	Technical Expert	Yes	Yes
15.	Radheshyam Saha	Technical Expert	Yes	Yes
Central Transmission Utility of India Limited				
16.	Subir Sen	COO	Yes	Yes
17.	Ashok Pal	Dy. COO	Yes	Yes
18.	Partha Sarthi Das	Sr. General Manager	No	Yes
19.	Kashish Bhambhani	Sr DGM	Yes	No
20.	Puneet Tyagi	Sr GM	No	Yes
21.	Chinmay Sharma	Sr. Engineer	No	Yes
POSOCO				
22.	KVS Baba	CMD	Yes	No

23.	S.R. Narasimhan	Director (System Operation)	Yes	Yes
24.	Rajiv Porwal	Chief General Manager (NLDC)	Yes	Yes
25.	Vivek Pandey	General Manager	Yes	No
26.	Priyam Jain	Manager	Yes	Yes
27.	Prabhankar Porwal	Dy. Manager	Yes	No

Annexure-IIIA

Status of schemes recommended in 4th NCT meeting

	Sl. No	Name of the Transmission Scheme	MoP Approval	BPC
1.		Transmission system for evacuation of power from RE projects in Rajgarh (1500 MW) SEZ in Madhya Pradesh: Phase-I	MoP Gazette Notification dated 19.07.2021	RECPDCL
2.		Transmission system for evacuation of power from RE projects in Rajgarh (1000 MW) SEZ in Madhya Pradesh: Phase- II	Referred back to NCT. NCT to recommend the same to MoP as and when there is certainty of RE generation.	
3.		Transmission Scheme for Solar Energy Zone in Gadag (1000 MW), Karnataka: Phase-I.	MoP Gazette Notification dated 19.07.2021	RECPDCL
4.		Transmission Scheme for Solar Energy Zone in Gadag (1500 MW), Karnataka: Phase-II	Referred back to NCT. NCT to recommend the same to MoP as and when there is certainty of RE generation.	
5.		Transmission Scheme for Evacuation of power from RE sources in Karur/Tirrupur Wind Energy Zone (Tamil Nadu) (1000 MW)- Phase I	MoP Gazette Notification dated 19.07.2021	PFCCL
6.		Transmission Scheme for Evacuation of power from RE sources in Karur/Tirrupur Wind Energy Zone (Tamil Nadu) (1500 MW): Phase II	Referred back to NCT. NCT to recommend the same to MoP as and when there is certainty of RE generation.	
7.		Transmission system for evacuation of power from Chhatarpur SEZ (1500 MW	MoP Gazette Notification dated 19-07.2021	PFCCL
8.		ICT Augmentation at 2x315 MVA, 400/220 kV Shujalpur (PG) substation	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
9.		Transmission scheme for providing connectivity and LTA to M/s SBESS for its 325 MW Wind Project in Dhar, Madhya Pradesh to be implemented under ISTS	MoP OM dated 13.04.2021	RTM (PGCIL)
10.		Implementation of 400kV bays for RE generators at Bhadla-II PS, Fatehgarh-II.	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)

11.	Implementation of 400kV bay for RE generators at Fatehgarh-III (erstwhile Ramgarh-II) PS	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (Powergrid Ramgarh Trans. Ltd., subsidiary of PGCIL)
12.	Implementation of 220 kV bay at Shahjahanpur 400/220 substation (PGCIL)	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
13.	Implementation of 1x80 MVAR, 765kV Spare Reactor at Bhadla-II S/s	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
14.	Implementation of the 1x500 MVA, 400/220kV ICT (8th) at Bhadla Pooling Station	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
15.	Regional System Strengthening scheme to mitigate the overloading of 400 kV NP Kunta-Kolar S/C line	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
16.	Augmentation of transformation capacity at existing Hiriyur and Kochi S/stns	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
17.	Restoring of one circuit of Kudankulam – Tuticorin PS 400 kV (quad) D/c line at Tirunelveli to control loadings/un-balancing on Kudankulam – Tirunelveli 400 kV (quad) lines.	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
18.	Implementation of 1 no. of 230 kV bay at Tuticorin-II GIS PS	MoP OM No.15/3/2018-Trans - Part(1) dated 16.07. 2021	RTM (PGCIL)
19.	Transmission system for connectivity to Teesta-IV HEP (520 MW)	Referred back to NCT. The project is likely to be commissioned in 2026-27. NCT to send its recommendation to MoP at appropriate time to avoid creation of stranded asset.	
20.	System Strengthening Scheme for Eastern and North Eastern Regions: A: Eastern Region Strengthening Scheme-XXV (ERSS-XXV) B. North Eastern Region Strengthening Scheme-XV (NERSS-XV)	MoP Gazette Notification dated 19-07.2021.	RECPDCL
21.	Transmission system for evacuation of power from Pakaldul HEP in Chenab Valley HEPs - Connectivity System	MoP Gazette Notification dated 19-07.2021 modified the scope of transmission scheme.	PFFCCL

	Scheme already notified vide Gazette of India dated 25.09.2020.		
22.	Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra Scheme already notified vide Gazette notification dated 24.01.2020.	MoP Gazette Notification dated 19-07.2021 modified the scope of transmission scheme.	RECTPCL
23.	Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I Scheme already notified vide Gazette Notification dated 25.09.2020.	MoP Gazette Notification dated 19-07.2021 modified the scope of transmission scheme.	PFCCL
24.	Transmission system strengthening scheme for evacuation of power from solar energy zones in Rajasthan (8.1 GW) under PhaseII-Part F Scheme already notified vide Gazette notification dated 24.01.2020.	MoP Gazette Notification dated 19-07.2021 modified the scope of transmission scheme.	PFCCL
25.	Reconductoring of ISTS lines of POWERGRID. Already notified vide MoP OM dated 25.09.2020.	MoP OM No.15/3/2018-Trans – Part (1) dated 16.07. 2021 modified the scope of transmission scheme	RTM (PGCIL)

Annexure-IIIB

Status of ISTS TBCB projects furnished by RECPDCL (as on 31.08.2021)

S.N.	Name of the project	Status
Projects under bidding		
1.	Transmission system for evacuation of power from RE projects in Osmanabad area (1 GW) in Maharashtra	Present bid deadline **23.09.2021**
2.	Transmission system for evacuation of power from RE projects in Rajgarh (2500 MW) SEZ in Madhya Pradesh	NCT in its meetings held on 20.01.2020 and 28.01.2020 recommended the phasing of transmission projects into two projects. **Subsequently, MoP issued Gazette Notification dated 19.07.2021 with modified scope.** **Present bidding process is being annulled and has been re-initiated** **SPV expected to be transferred in Q3 of FY 2021-22.**
3.	Transmission Scheme for Solar Energy Zone in Gadag (2500 MW), Karnataka - Part – A	NCT in its meetings held on 20.01.2020 and 28.01.2020 recommended the phasing of transmission projects into two projects. **Subsequently, MoP issued Gazette Notification dated 19.07.2021 with modified scope** **Present bidding process is being**

		annulled and has been re-initiated. **SPV expected to be transferred in Q3 of FY 2021-22.**
Projects on hold due to unavailability of land for setting up RE generations		
4.	Transmission Scheme for Solar Energy Zone in Bidar (2500 MW), Karnataka	**As per directions of SECI, bidding process on hold due to non-availability of land for setting up RE generations.** Present bid deadline 23.08.2021 Bid deadline may have to be extended **SPV expected to be transferred in Q4 of FY 2021-22 subject to availability of land.**
Projects whose bidding is yet to be initiated		
5.	System Strengthening Scheme for Eastern and North Eastern Regions	• MoP vide its Gazette Notification dated 19.07.2021 allocated the project to RECPDCL • **Bidding Process will be initiated upon receipt of RFP inputs from CTU** • **SPV expected to be transferred in Q4 of FY 2021-22.**
6.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A, Gujarat	**Bidding process to be initiated after submission of LTA by Developers/ Generators.**
7.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part B, Gujarat	
8.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C, Gujarat	
9.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part D, Gujarat	
10.	Transmission scheme for evacuation of 4.5 GW RE injection at Khavda	

	P.S. under Phase-II – Part E, Gujarat	

Status of ISTS TBCB projects furnished by PFCCL (as on 31.08.2021)

S. No.	Name of ITP	Present Status
	Projects under bidding	
1.	Evacuation of Power from RE Sources in Koppal Wind Energy Zone (Karnataka) (2500 MW)	• Bid process was initiated with the issuance of RfQ documents on 21.10.2019 and RfP documents on 20.12.2019; • RfP bid submission was originally scheduled on 20.02.2020 which has been extended 18 times up to 06.09.2021 due to non-availability of LTTCs and regulatory approval; • CEA vide mail dated 30.07.2021 has forwarded the letter of CTU dated 07.07.2021, informing that M/s Renew Surya Ojas Pvt. Ltd. is identified as LTTC for the scheme; • RfP bid submission to be done as per scheduled date on 06.09.2021. However, the SPV shall be transferred only after receipt of regulatory approval.
2.	Transmission System Strengthening Scheme for Evacuation of Power from Solar Energy Zones in Rajasthan (8.1GW) under Phase-II Part-G	• Single Stage bid process initiated on 06.03.2020; • RfP bid submission was originally scheduled on 08.05.2020 which has been extended 8 times up to 11.01.2021 due to non-availability of LTA application; • Bid process was kept on hold as no Connectivity/LTA applications are received; • Regulatory Approval has been received on 12.05.2020; • CTU vide letter dated 30.06.2021 has forwarded the list of LTTCs for the Scheme; • Bid process has been reinitiated with the last date of RfP bids submission scheduled on 15.09.2021.
3.	Establishment of new 220/132kV substation at Nangalbibra	• Single Stage bid process initiated on 04.02.2021; • RfP bid submission was originally scheduled on 12.04.2021 which has been extended up to 18.08.2021. • RfP bids are submitted by four (04) bidders namely Adani Transmission Ltd., Power Grid Corporation of India Ltd., Megha Engineering & Infrastructure Ltd. and Sterlite Grid 26 Ltd. on 18.08.2021 and RfP (Technical) bids are opened on the same day; • Evaluation of RfP (Technical) bids is under progress and

		SPV is likely to be transferred during September 2021.
4.	Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I	• Single Stage RfP bid process initiated on 06.05.2021; • RfP bid submission was originally scheduled on 09.07.2021 which has been extended 2 times up to 27.08.2021 due to non-availability of LTTCs and regulatory approval**;** • CTU vide mail dated 03.08.2021 has informed that Adani Renewable Energy Holding Four Limited has been identified as LTTC for the scheme; • The RfP bid submission is likely to be extended till 17.09.2021 on request of bidders seeking time for re-survey on account of clarification provided on transmission line route being fixed from PS-I to India Bridge. • RfP bid submission to be done as per scheduled date 17.09.2021. However, SPV shall be transferred only receipt of regulatory approval.
5.	Transmission system for evacuation power from Pakaldul HEP in Chenab Valley HEPs - Connectivity System	• Single Stage bid process initiated on 04.02.2021; • RfP bid submission was originally scheduled on 12.04.2021 which has been extended 3 times up to 13.09.2021 due to change in scope of the transmission scheme and lockdown imposed by Govt. for Covid-19; • During the 4th meeting of NCT held on 20.01.2021, it was decided that 400/132 kV ICT along with bays at Kishtwar PS to be added to the existing scheme; • MoP vide Gazette Notification dated 19.07.2021 has notified the revised scope of the transmission scheme; • PFCCL vide letter dated 23.07.2021 has requested CTU to provide the revised RfP inputs for the transmission scheme.
6.	Evacuation of Power from RE Sources in Karur/ Tiruppur Wind Energy Zone (Tamil Nadu) (2500 MW)	• Bid process was initiated with the issuance of RfQ documents on 21.10.2019 and RfP documents on 20.02.2020; • RfP bid submission was originally scheduled on 24.04.2020 which has been extended 7 times up to 01.12.2020; • Bid process has been kept in Abeyance as no Connectivity/ LTA applications are received; • Further, during the 4th meeting of NCT held on 20.01.2021, it was decided that the scheme may be implemented in two phases; • MoP vide Gazette Notification dated 19.07.2021 has notified the revised scope of the transmission scheme; • CTU vide letter dated 05.08.2021 has provided the revised RfP inputs for the transmission scheme to CEA for review. • The revised RfP document under single stage bidding is likely to be issued on 27.08.2021.

Projects on hold		
7.	Transmission System Strengthening Scheme for Evacuation of Power from Solar Energy Zones in Rajasthan (8.1GW) under Phase-II Part-E	• Single Stage bid process initiated on 06.03.2020; • RfP bid submission was originally scheduled on 08.05.2020 which has been extended 11 times up to 12.05.2021 due to non-availability of LTA applications; • Bid process on hold as no Connectivity/LTA applications have been received; • Regulatory Approval has been received on 12.05.2020.
8.	Transmission scheme for Solar Energy Zone in Ananthpuram (Ananthapur) (2500 MW) and Kurnool (1000 MW), Andhra Pradesh	• Single Stage bid process initiated on 06.03.2020; • RfP bid submission was originally scheduled on 08.05.2020 which has been extended 6 times up to 01.12.2020; • Bid process has been kept in Abeyance as there are issues with availability of land for setting up RE generation projects and no Connectivity/LTA applications are received; • List of LTTCs and Regulatory approval is awaited.
Bidding yet to Start		
9.	Transmission system for evacuation of power from Chhatarpur SEZ (1500 MW)	• MoP vide Gazette Notification 19.07.2021 has appointed PFCCL as BPC; • PFCCL vide letter dated 23.07.2021 requested CTU to provide technical inputs for issuance of RfP documents. • Single stage RfP documents to be issued shortly on receipt of RfP inputs.

Annexure-V

Detailed scope of works of Establishment of new pooling stations in Khavda

1.0 Establishment of Khavda Pooling Station-2 (KPS2) in Khavda RE Park:

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1	Establishment of 765/400 kV, 4x1500MVA, KPS2 (GIS) with 2x330 MVAR 765 kV bus reactor and 2x125 MVAR 400 kV bus reactor. Adequate space for future expansion of 5x1500 MVA 765/400 kV ICT's *Bus sectionalizer at 765kV & 400kV.* *On each bus section, there shall be 2x1500MVA 765/400kV ICTs, 1x330MVAr, 765 kV & 1x125MVAr 420kV bus reactor, space for future expansion.* *Bus sectionalizer at 765 kV level shall normally be closed and bus sectionalizer at 400 kV level shall normally be open* Future provisions: Space for 765/400 kV ICTs along with bays: 5 nos. 765kV line bays: 8 nos. 400kV line bays: 10 nos. To take care of any drawal needs of area in future: 400/220 kV ICT: 2 nos. 220 kV line bays: 4 nos.	1500MVA, 765/400kV ICT- 4 nos. (13x500 MVA including one spare unit) 765 kV ICT bays – 4 nos. 400 kV ICT bays – 4 nos. 765 kV line bays – 2 nos. 400 kV line bays – 3 nos. Actual nos. a*s per connectivity granted to RE developer (3 no. of bays considered at present, one each for NTPC, GSECL & GIPCL)* 1x330 MVAr, 765 kV bus reactor-2 (7x110 MVAr, including one spare unit) 765 kV reactor bay – 2 1x125 MVAr 400 kV bus reactor-2 400 kV reactor bay – 2 765 kV bus sectionalizer bay – 2 400 kV bus sectionalizer bay – 2
2.	LILO of one ckt. of KPS1- Bhuj PS 765 kV D/c line at KPS2	Line length – 1 km
Approximate cost (Rs.)		**789 Cr.**

Note: Implementation to be taken up only after receipt of LTA applications from RE developers at KPS2

2.0 Establishment of Khavda Pooling Station-3 (KPS3) in Khavda RE Park:

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1	Establishment of 765/400 kV, 3x1500 MVA, KPS3 (GIS) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 400 kV bus reactor. Adequate space for future expansion of 5x1500 MVA 765/400 kV ICT's Future provisions: Space for 765/400 kV ICTs along with bays: 5 nos. 765kV line bays: 4 nos. 400kV line bays: 10 nos. 765 kV Bus sectionalizer breaker: 2 nos. 400 kV Bus sectionalizer breaker: 2 nos. To take care of any drawal needs of area in future: 400/220 kV ICT: 2 nos. 220 kV line bays: 4 nos.	1500MVA, 765/400kV ICT- 3 (10x500 MVA, including one spare unit) 765 kV ICT bays – 3 400 kV ICT bays – 3 765 kV line bays – 2 nos. 400 kV line bays – 3 nos, actual nos. a*s per connectivity granted to RE developer* 1x330 MVAr, 765 kV bus reactor-1 (4x110 MVAr, including one spare unit) 765 kV reactor bay – 1 1x125 MVAr 400 kV bus reactor-1 400 kV reactor bay – 1
2.	KPS3- KPS2 765 kV D/c line	20 km
3.	2 no. of 765 kV line bays at KPS2 765 kV S/s for KPS3-KPS2 765 kV D/c line	765 kV line bays: 2 nos. at KPS2 end
Approximate cost (Rs.)		**665 Cr.**

Note:

(i) *Pooling station shall be created with bus section-I with 765/400 kV, 3x1500MVA ICTs and 1x330 MVAR 765 kV & 1x125 MVAR 400 kV bus reactors.*

(ii) *Bus section II (future) shall be created with 765/400 kV, 4x1500MVA ICTs and 1x330 MVAR 765 kV & 1x125 MVAR 400 kV bus reactors.*

(iii) *Bus sectionalizer at 765kV level shall normally be closed and bus sectionalizer at 400kV level shall normally be open*

(iv) *Developer of KPS2 765 kV S/s to provide space for 2 no. of 765 kV line bays at KPS2 765 kV S/s for termination of KPS3-KPS2 765 kV D/c line.*

(v) *Implementation to be taken up only after receipt of LTA applications from RE developers at KPS3*

Annexure-VI

Detailed Scope of works of Transmission Schemes already notified by MoP for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II- Part A & C after approved modifications.

1. **Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part A**

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	KPS2 (GIS) – Lakadia 765 kV D/C line with 330 MVAr switchable line reactors at KPS2 end	159 km
2.	330 MVAR switchable line reactors at KPS2 end of KPS2 (GIS) – Lakadia 765 kV D/C line	• 330 MVAr, 765 kV switchable line reactor- 2. • Switching equipments for 765 kV line reactor- 2 • 1x110 MVAr spare bus reactor available at KPS2 (GIS) to be used as spare
3.	2 nos. of 765 kV line bays each at Lakadia PS & KPS2 (GIS) for Khavda PS2 (GIS) – Lakadia PS 765 kV D/c line	765 kV line bays (GIS) – 4
Approximate cost (Rs)		**862 Crs**

Note: (i) Transmission system for evacuation of 3 GW RE injection at Khavda is being taken up under Phase-I. Phase-II RE scheme for evacuation of 4.5 GW RE injection at Khavda needs to be taken up for evacuation requirement beyond 3 GW from Khavda RE park .

(ii) Implementation of all the transmission packages proposed for evacuation of 4.5 GW RE injection at Khavda RE park under Phase-II (Part A to Part D) needs to be taken up in similar timeframe.

2. **Transmission scheme for injection beyond 3 GW RE power at Khavda PS1 (KPS1)**

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Augmentation of Khavda PS1 by 765/400 kV transformation capacity * (max. upto 4x1500 MVA) with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor on 2nd 765 kV and 400 kV bus section respectively	765/400 kV, 1500 MVA- 4 (13x500 MVA, including one spare unit) (Actual no. of ICTs may be decided based on LTA requirement) 765 kV ICT bays - 4 765 kV line bays - 2 400 kV ICT bays – 4 400 kV line bays – 3 nos, actual no. a*s per connectivity granted to RE developer* 1x330 MVAr, 765 kV bus reactor- 1 (4x110 MVAr, including one spare unit)

		765 kV reactor bay – 1 125 MVAr, 420 kV reactor- 1 400 kV Reactor bay- 1 765 kV bus sectionalizer- 2 400 kV bus sectionalizer- 2
2.	KPS1-Khavda PS GIS (KPS2) 765 kV D/C line (to be established with bypassing of LILO of one ckt. of KPS1-Bhuj at KPS2 and utilisation of LILO section)	Length ~ 20 km
Approximate cost (Rs.)		**780 Crs**

* Actual no. of ICTs may be decided based on LTA requirement

Note: Implementation to be taken up only after receipt of LTA applications from RE developers beyond 3 GW at KPS1

3. Transmission scheme for evacuation of 4.5 GW RE injection at Khavda P.S. under Phase-II – Part C

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1.	Establishment of 3x1500 MVA, 765/400 kV Ahmedabad S/s with 1x330 MVAR 765 kV bus reactor and 1x125 MVAR 420 kV bus reactor. Establishment of 3X1500 MVA, 765/400 kV, Ahmedabad S/s with 1X330 MVAR 765 kV bus reactor and 1X125 MVAR 420 kV bus reactor. Future Scope: Space for 765/400 kV, ICT along with bays- 2 400/220 kV, ICT along with bays- 4 765 kV Line bays- 8 400 kV Line bays- 8 220 kV Line bays- 7 765 kV reactor along with bays- 1 400 kV reactor along with bays- 1	765/400 kV, 1500 MVA- 3 (10x500 MVA, including one spare unit) 765 kV ICT bays – 3 400 kV ICT bays - 3 765 kV lin1440e bays-4 (2 for Lakadia-Ahmedabad and 2 for Ahmedabad to South Gujarat) 400 kV line bays – 4 (for LILO of Pirana (PG) – Pirana (T) 400kV D/c line at Ahmedabad 1x330 MVAr, 765 kV bus reactor- 1 (4x110 MVAr, including one spare unit) 765 kV reactor bay – 1 125 MVAr, 420 kV reactor- 1 400 kV Reactor bay- 1
2.	Ahmedabad – South Gujarat 765 kV D/c line with 240 MVAr switchable line reactor at both ends (~line length 220 km)	220 km
3.	2 nos. of 765 kV line bays at South Gujarat end for Ahmedabad – South Gujarat 765 kV D/c line	765 kV line bays – 2
4.	240 MVAr switchable line reactor at both ends of Ahmedabad – South Gujarat 765 kV D/c line	• 1x240 MVAr, 765 kV switchable reactor- 4

		• Switching equipments for 765 kV line reactor - 4
Approximate cost (Rs.)		**1440 Crs**

Note: (i) Transmission system for evacuation of 3 GW RE injection at Khavda is being taken up under Phase-I. Phase-II RE scheme for evacuation of 4.5 GW RE injection at Khavda needs to be taken up for evacuation requirement beyond 3 GW from Khavda RE park .

(ii) Implementation of all the transmission packages proposed for evacuation of 4.5 GW RE injection at Khavda RE park under Phase-II (Part A to Part D) needs to be taken up in similar timeframe.

Annexure-IB

सत्यमेव जयते

भारत सरकार

Government of India
विद्युत मंत्रालय

Ministry of Power
केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority
विद्युत प्रणाली योजना एवं मूल्यांकन - I प्रभाग

Power System Planning & Appraisal - I Division

सेवा में / To

-As per enclosed list-

विषय: "ट्रांसमिशन पर राष्ट्रीय समिति" (एनसीटी) की 4th बैठक - मिनट

Subject: Corrigendum to the Minutes of the 4th Meeting of "National Committee on Transmission" (NCT)

Sir/Madam,

The two sittings of the 4th meeting of the "National Committee on Transmission" (NCT) were held on 20.01.2020 and 28.01.2020 respectively under the Chairmanship of Shri P. S. Mhaske, Chairperson, CEA. Minutes of the meeting were issued vide vide CEA letter No. CEA-PS-11-15(11)/1/2020-PSPA-I Division dated 22.03.2021.

Subsequently, CTU vide email dated 26 .03.2021 conveyed its observations on the issued minutes. The same have been examined and the Corrigendum to the Minutes of the 4th meeting of the National Committee on Transmission held on 20.01.2020 and 28.01.2020 are attached herewith

भवदीय,

(Ishan Sharan)
Chief Engineer (PSPA-I) &
Member Secretary (NCT)

Copy to:

(i) Joint Secretary (Trans), Ministry of Power, Shram Shakti Bhawan, New Delhi-110001.
(ii) CMD (POSOCO), B-9, Qutub, Institutional Area, Katwaria Sarai, New Delhi – 110010

List of addressees:

1.	Chairperson, Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	2.	Member (Power System), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.
3.	Member (Economic & Commercial), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	4.	Director (Trans), Ministry of Power Shram Shakti Bhawan, New Delhi-110001.
5.	Sh. Dilip Nigam, Scientist 'G', MNRE, Block no. 14, CGO Complex, Lodhi Road, New Delhi – 110003	6.	Chief Operating Officer, Central Transmission Utility POWERGRID, Saudamini, Plot No. 2, Sector-29, Gurgaon – 122 001.
7.	Sh. Rajnath Ram, Adviser (Energy), NITI Aayog, Parliament Street, New Delhi – 110 001.	8.	Sh. P. K. Pahwa, Ex. Member (GO&D), CEA 428 C, Pocket -2, Mayur Vihar, Phase -1, Delhi – 110091.
9.	Shri Prabhakar Singh, Ex. Director (Projects), POWERGRID D 904, Tulip Ivory, Sector-70, Gurgaon – 122 001.		

Corrigendum to the Minutes of the 4th meeting of the National Committee on Transmission held on 20.01.2020 and 28.01.2020

The Minutes of 4th meeting of the National Committee on Transmission were issued vide CEA letter No. CEA-PS-11-15(11)/1/2020-PSPA-I Division dated 22.03.2021. Following corrigendum is issued based on the observations received from CTU vide their email dated 26 .03.2021.

(A) Item No. 3.3.2: Transmission Scheme for Solar Energy Zone in Gadag (2500 MW), Karnataka – Part A:

1.1. The following Table is mentioned in para 3.3.2 of the minutes of the 4th NCT meeting:

Modification in Gadag Scheme	Agreed Phases	Transmission System	Remarks
Recent Development :			
SECI in its affidavit to CERC has submitted that implementation of transmission system for Gadag may be taken up in two phases. However there would be no change in the scope of work	Phase I-1000MW needs to be carried out after TSA signing	• Establishment of 400/220 kV, 3x500 MVA at Pachora SEZ PP • Pachora SEZ PP-Bhopal (Sterlite)400 kV D/ c line (Quad/HTLS)	The same was noted down in the meeting held on 16.10.2020 and it was agreed amongst CEA, CTU, MNRE and SECI. As there is no change in overall scope of the works involved in the scheme, the phases formulated for the scheme would be apprised in the next SRPC (TP) and NCT meeting.
	Phase II-1500MW (to be taken up for implementation after receipt of LTA beyond 1000 MW)	Pachora-Shujalpur 400 kV D/c line (Quad/HTLS) (to be taken up only after receipt of connectivity/LTA applications beyond 1000 MW)	

The above Table is being modified as given below:

Modification in Gadag Scheme	Agreed Phases	Transmission System	Remarks
Recent Development :			
SECI in its affidavit to CERC has submitted that	Phase I-1000MW needs to be carried out after TSA signing	• Establishment of 400/220 kV, 2x500 MVA Gadag Pooling Station • Gadag PS-Narendra (New) PS 400 kV	The same was noted down in the meeting held on

implementation of transmission system for Gadag may be taken up in two phases. However there would be no change in the scope of work		(high capacity equivalent to quad moose) D/C Line	16.10.2020 and it was agreed amongst CEA, CTU, MNRE and SECI. As there is no change in overall scope of the works involved in the scheme, the phases formulated for the scheme would be apprised in the next SRPC (TP) and NCT meeting.
	Phase II -1500MW (to be taken up only after receipt of Connectivity/LTA applications beyond 1000 MW at Gadag or beyond 1500 MW at Koppal P.S)	• 400/220 kV, 3x500 MVA ICT Augmentation at Gadag Pooling Station • Gadag PS-Koppal PS 400 kV (high capacity equivalent to quad moose) D/c line (*to be taken up only after receipt of Connectivity/LTA applications beyond 1000 MW at Gadag or beyond 1500 MW at Koppal P.S)*	

(B) The following agenda items (part of additional agenda) were discussed in the meeting, however, the same have been inadvertently left out from being documented in the issued minutes of the 4th meeting of NCT.

- **Additional Agenda Item-1:** Reconductoring of ISTS lines of POWERGRID - North Eastern Region Strengthening Scheme-XII (NERSS-XII)
- **Additional Agenda Item-3:** Modifications in the transmission schemes approved/noted in the 3rd meeting of Reconstituted NCT

Accordingly, the following item/para is being added to the minutes of the meeting:

10. Reconductoring of ISTS lines of Powergrid - North Eastern Region Strengthening Scheme-XII (NERSS-XII)

10.1. Reconductoring of various lines in NER was agreed in the 3rd meeting of NCT held on 26th-28th May 2020. Thereafter, following reconductoring works have been assigned to POWERGRID under Regulated Tariff Mechanism (RTM) by MoP vide their OM dated 25.09.2020. These works are being taken up as NERSS-XII:

Sl. No.	Transmission line	Reconductoring with HTLS	Ampacity of Single HTLS Conductor
1	400 kV D/C Siliguri-Bongaigaon line (Twin Moose)	Twin HTLS	1596 A
2	220 kV D/C Alipurduar-Salakati line (Single Zebra)	Single HTLS	1596 A
3	220 kV D/C BTPS-Salakati line (Single Zebra)	Single HTLS	1596 A
4	132 kV S/C Dimapur-Imphal line (Single Panther)	Single HTLS	798 A
5	132 kV S/C Loktak-Jiribam line (Single Panther)	Single HTLS	798A

10.2. However, based on the technical difficulties (constraints due to design of existing towers) in achieving the approved current rating through HTLS and considering power flow requirement as

per studies, it was agreed in the meeting taken by CEA on 21.12.2020 that the ampacity of HTLS conductors for these lines in NER, as mentioned below in col (E) meets the technical requirement. Hence, in the said meeting, it was also agreed that the proposed modifications may be taken up in the forthcoming meeting of NCT/ERPC(TP)/NERPC(TP).

Sl. No.	Name of transmission line	Ampacity of existing ACSR sub-conductor (A)	Ampacity of Single HTLS Conductor as per MoP order (A)	Ampacity of single HTLS sub-conductor agreed considering technical constraints and system requirement (A)
(A)	(B)	(C)	(D)	(E)
1	400kV D/C Siliguri-Bongaigaon line (Twin ACSR Moose)	707	1596	1400
2	220kV D/C Alipurduar-Salakati line (Single ACSR Zebra)	451	1596	1100
3	220kV D/C BPTS-Salakati line (Single ACSR Zebra)	451	1596	1100
4	132kV S/C Dimapur-Imphal line (Single ACSR Panther)	93	798	450
5	132kV S/C Loktak-Jiribam line (Single ACSR Panther)	185	798	600

10.3. After deliberations, NCT noted and approved the above revised rating of HTLS conductors for reconductoring of lines under NERSS-XII. It was also agreed that the scheme would be ratified in the ERPC(TP) and NERPC(TP).

11. Modifications in the transmission schemes approved/noted in the 3rd meeting of Reconstituted NCT:

11.1. NCT in its 3rd meeting held on 26.05.2020 and 28.05.20202, had approved the Transmission scheme for evacuation of 8 GW RE injection at Khavda P.S. MoP vide its Gazette Notification dated 23.09.2020 has notified six number of packages for this scheme alongwith their scope of works and have recommended their implementation through TBCB route.

Subsequent to notification in the gazette, CTU vide letter dated 8.10.2020, pointed out the inadvertent error in the no. of 765 kV GIS line bays in the transmission package "Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I". In the scope of works for this package, the no. of 765 kV line bays at 765/400 kV Khavda (GIS) substation has been inadvertently mentioned as 1 instead of 2 nos. of bays. In addition, 3.5 GW Stage-II connectivity has been granted to M/s Adani Renewables Holding Four Ltd at Khavda. This would require 3 no of 400 kV line bays at Khavda P.S. for termination of the dedicated connectivity line. In the scope of works notified in Gazette, only 1 no of 400 kV bay has been mentioned as against current requirement of 3 no of 400 kV line bays.

11.2. Accordingly, the following corrigendum has been approved by the 4th NCT in the column no. 3 (capacity/km) of the table elucidating the scope of works of the "Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I" at Page no 10, Sl.no. 2 of Gazette Notification dated 23.09.2020:

2. Transmission scheme for evacuation of 3 GW RE injection at Khavda P.S. under Phase-I.

Scope:

Sl No.	Scope of the transmission Scheme	Capacity /km as mentioned in Gazette Notification	Capacity /km after incorporating the corrections
1	765/400 kV ,1500 MVA ICT-3 765 kV ICT bays-3 400 kV ICT bays-3 330 MVAR 765 kV bus reactor-1 765 kV reactor bay-1 765 kV line bay-1 400 kV reactor bay-1 400 kV line bay-1 500 MVA, 765/400 kV Spare ICT-1 110 MVAR , 765 kV, 1-ph reactor (spare unit)-1	765/400 kV ,1500 MVA ICT-3 765 kV ICT bays-3 400 kV ICT bays-3 330 MVAR 765 kV bus reactor-1 765 kV reactor bay-1 765 kV line bay-1 400 kV reactor bay-1 400 kV line bay-1 500 MVA, 765/400 kV Spare ICT-1 110 MVAR , 765 kV, 1-ph reactor (spare unit)-1	765/400 kV ,1500 MVA ICT-3 765 kV ICT bays-3 400 kV ICT bays-3 330 MVAR 765 kV bus reactor-1 765 kV reactor bay-1 ***765 kV line bays-2*** 400 kV reactor bay-1 ***400 kV line bay-3**** 500 MVA, 765/400 kV Spare ICT-1 110 MVAR , 765 kV, 1-ph reactor (spare unit)-1

*For 3.5 GW Stage-II connectivity granted to M/s Adani Renewables Holding Four Ltd

11.3. NCT noted and approved the same.

Annexure-IIA

No.15/3/2017-Trans
Government of India
Ministry of Power
Shram Shakti Bhawan, Rafi Marg, New Delhi

Dated, the 4th November, 2019

OFFICE ORDER

Subject: - Re-constitution of the "National Committee on Transmission" (NCT) - reg.

In supersession of this Ministry's Office Order of even number dated 13.4.2018, constituting the National Committee on Transmission (NCT), the undersigned is directed to state that the composition and terms of reference of existing NCT is amended as mentioned follows:

1	Chairperson, Central Electricity Authority (CEA)	Chairman
2	Member(Power System), CEA	Member
3	Member(Economic & Commercial), CEA	Member
4	Joint Secretary level officer looking after transmission in M/o New & Renewable Energy, Govt. of India @	Member
5	Director(Trans), M/o Power, Govt. of India	Member
6	Chief Operating Officer, Central Transmission Utility (POWERGRID)	Member
7	Advisor, NITI Aayog #	Member
8	Two experts from Power Sector *	Members
9	Chief Engineer (from Power System Wing), CEA #	Member Secretary

@ To be nominated by Secretary (MNRE).
# To be nominated by NITI Aayog/ CEA.
* To be nominated by the Ministry of Power, Govt. of India from time to time, for a maximum period of two years from the date of their nomination.

2. Revised Terms of Reference (ToR) of the Committee are to:

i. Evaluate the functioning of the National Grid on quarterly basis.
ii. Consider the review / recommendations of the RPCTP for system expansion/ strengthening of the transmission system to be presented before the NCT at the end of every quarter i.e. by 15th July, 15th October; 15th January and 15th April.
iii. CTU, as mandated under the Electricity Act, 2003, is to carry out periodic assessment of transmission requirement under ISTS. The CTU shall also make a comprehensive presentation before the National Committee every quarter for ensuring development of an efficient, co-ordinated and economical inter- State transmission system for smooth flow of electricity. CTU, in the process, may also take inputs from the markets to identify constraints and congestion in the transmission system
iv. After considering the recommendations of the CTU and the Regional Committees, the NCT shall assess the trend of growth in demand and generation in various regions; identify the constraints, if any, in the inter- State, inter- Region transfer system and propose construction of transmission lines, grid stations and other infrastructures in order to meet the requirements, which are likely to arise in the near term/ medium term, so that transmission does not constrain growth. The NCT will also draw up perspective plans, keeping the 10 to 15 years' time horizon in mind.

3. While making their recommendations, the NCT will keep the guidelines of the Tariff Policy in mind.

4. Since the NCT will be looking at the National Transmission System i.e. transmission across regions and across States, therefore, prior concurrence of Regional Power Committees

(Transmission Planning) (RPCTPs) will not be relevant. The views of the RPCTPs will be relevant for transmission issues within the region; but for transmission issues across region, the views of RPCTPs will be inadequate because they will not have a national perspective. However, for inter-regional transmission lines crossing across States and Regions, the RPCTP of the originating location of these lines and the RPCTP of the terminating locations shall be consulted by the NCT.

5. The recommendations of the NCT shall be placed before the Ministry of Power, Government of India for decision.

6. The Empowered Committee constituted vide this Ministry's Office Order of even number dated 13.4.2018 stands dissolved.

7. This issues with the approval of the Hon'ble Minister of State (Independent Charge) for Power and New & Renewable Energy.

4/11/2019.

(Bihari Lal)
Under Secretary to the Govt. of India
Telefax: 23325242
Email: transdesk-mop@nic.in

To

1. All members of NCT.
2. Secretary, Ministry of New & Renewable Energy, Govt. of India.
3. Chairperson, CEA, New Delhi.
4. CMDs of all CPSUs under the Ministry of Power, Govt. of India.
5. Heads of all autonomous bodies under the Ministry of Power, Govt. of India.
6. Finance/ Budget Section, Ministry of Power.
7. Power/ Energy Secretaries of all States/UTs.
8. Chief Executives of all State Power Transmission Utilities.

Copy to:

(i) PS to Hon'ble MoSP(IC)/ PPS to Secretary(Power)/ SS&FA/ AS(Trans)/ all Joint Secretaries/ EA/ Directors/ Dy. Secretaries, Ministry of Power.

(ii) Technical Director, NIC, M/o Power, for publishing this order on the website of M/o Power.

Annexure-IIB

No.15/3/2018-Trans-Pt(5)
Government of India
Ministry of Power
Shram Shakti Bhawan, Rafi Marg, New Delhi

Dated, the 20th May 2021

OFFICE ORDER

Subject: - National Committee on Transmission (NCT) – amendment thereof.

In continuation of this Ministry's Office order no. 15/3/2017-Trans dated 04.11.2019 regarding constitution of the National Committee on Transmission (NCT), following amendments are hereby ordered with immediate effect:

a) CMD, POSOCO will be a member of NCT.
b) The following functions would be added to the Terms of Reference of NCT:
   (i) To formulate the packages for the transmission schemes for their implementation and to recommend their mode of implementation i.e. Tariff Based Competitive Bidding (TBCB) / Regulated Tariff Mechanism (RTM), as per the existing Tariff Policy, to Ministry of Power.
   (ii) To examine the cost of the transmission schemes.
   (iii) To allocate the task of carrying out survey amongst CTU, RECTPCL and PFCCL by maintaining a roster.

2. Further, NCT, while considering the Transmission Planning shall also keep in mind the following aspects:

(i) The Regional Power Committees (Transmission Planning) can make meaningful recommendations only regarding their own Region. They cannot decide on transfers across region.

(ii) For enabling growth of Renewable Energy (RE) capacity areas which have high solar/ wind energy potential, will need to be identified and connected to bulk power evacuation systems so that capacity can come up there. This is a national mission as a part of our energy transition goal.

3. This issues with the approval of the Hon'ble Minister of State (Independent Charge) for Power and New & Renewable Energy and Minister of State for Skill Development and Entrepreneurship.

20/5/2021

(Bihari Lal)
Under Secretary to the Govt. of India
Telefax: 23325242
Email: transdesk-mop@nic.in

To
(i) All Members of NCT.
(ii) Secretary, Ministry of New & Renewable Energy, Govt. of India.
(iii) Chairperson, CEA, New Delhi.
(iv) CMD, POSOCO, New Delhi
(v) CMDs of all CPSEs under the Ministry of Power, Govt. of India.

(vi) Heads of all autonomous bodies under the Ministry of Power, Govt. of India.
(vii) Finance/ Budget Section, Ministry of Power.
(viii) Power/ Energy Secretaries of all States/UTs.
(ix) Chief Executives of all State Power Transmission Utilities.
(x) CEO, NITI Aayog, New Delhi.

Copy to:

(i) PS to Hon'ble MoSP(IC)/ Sr PPS/ PPS/ PS to Secretary(Power)/ AS&FA/ AS(SKGR)/ AS(VKD)/ all Joint Secretaries/ Sr. Advisor/ Chief Engineer(Th)/ all Directors/ Dy. Secretaries, Ministry of Power.
(ii) Technical Director, NIC, M/o Power, for publishing this order on the website of M/o Power.

20/5/24.

Annexure-IIC

भारत सरकार

Government of India
विद्युत मंत्रालय
Ministry of Power
केन्द्रीय विद्युत प्राधिकरण
Central Electricity Authority
पावर सिस्टम विंग
Power System Wing

सेवा में / To
As per address list

विषय/ Subject: Constitution of the Cost Committee for estimation of cost of the transmission schemes - reg.

संदर्भ/Reference: MoP OM No. 15/3/2018-Trans Pt(5) dated 20.05.2021.

Sir,

MoP vide letter under reference has issued the amendments to its OM no 15/03/2017 (Trans) dated 04.11.2019 regarding Constitution of the National Committee on Transmission (enclosed as Annexure). The amendments inter-alia includes the function of formulation of packages for the transmission schemes and examining the cost of the transmission schemes within the ToR of the NCT.

The transmission scheme to be formulated by NCT would include schemes to be implemented through TBCB route as well as RTM route. For estimation of the cost of the transmission schemes, it is proposed to formulate a Cost Committee with the following composition:

1.	Chief Engineer (PSPA-I), CEA	Chairman
2.	Director (PSPA-I), CEA	Member & Convener
3.	Director (PSE&TD), CEA	Member
4.	Director (F&CA), CEA	Member
5.	Representative from CTUIL	Member
6.	Representative from Cost Engg. Dept., PGCIL	Member
7.	Representative from PFCCL	Member
8.	Representative from RECPDCL	Member
9.	Chief Engineer from STU/SEB/Electricity Department of the concerned state in which transmission scheme lies	Member

The practice of constitution of the Cost Committee by the National Committee on Transmission (NCT) for the purpose of examination of the cost of the transmission schemes is in line with that of the procedure adopted by the erstwhile NCT.

The Cost Committee is being formulated with the approval of Chairperson, CEA & Chairman of the National Committee on Transmission (NCT).

भवदीय,

2/06/2021
(Goutam Roy)
Member (Power System)

Address list:

1. Member(E&C), CEA (With a request to nominate one suitable officer for the cost Committee)
2. CMD, PGCIL, Saudamini, Plot no 2, Sector 29, Gurugram-with a request to nominate a suitable officer.
3. COO, CTUIL, Saudamini, Plot no 2, Sector 29, Gurugram- with a request to nominate a suitable officer.
4. CEO, PFCCL, Urjanidhi 1, Barakhamba Lane, Connaught Place, New Delhi- with a request to nominate a suitable officer.
5. CEO, RECPDCL, Plot no I-4, Sector 29, Gurugram- with a request to nominate a suitable officer.
6. CMD of STU/SEB/Electricity Department.

Copy for kind information to:

Joint Secretary (Trans), Ministry of Power, Shram Shakti Bhawan, New Delhi-110001

Annexure-IV

5th Meeting of National Committee on Transmission

Grid Performance – 3rd, 4th (2020-21) & 1st Quarter (2021-22)

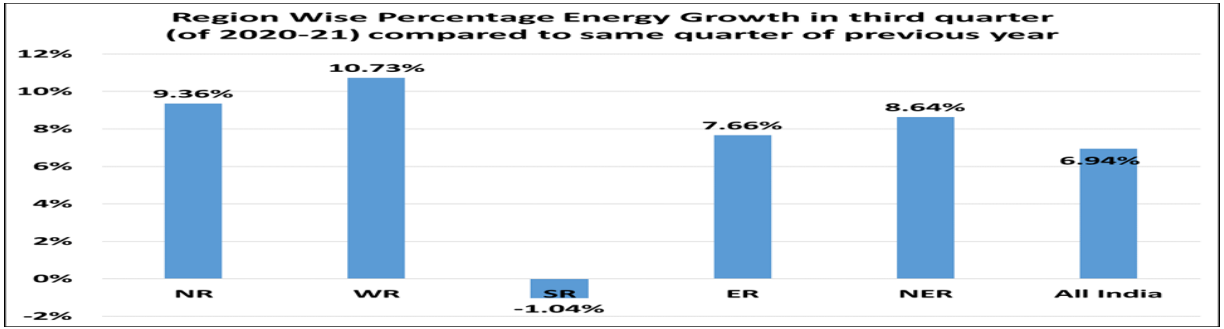
Power System Operation Corporation Limited

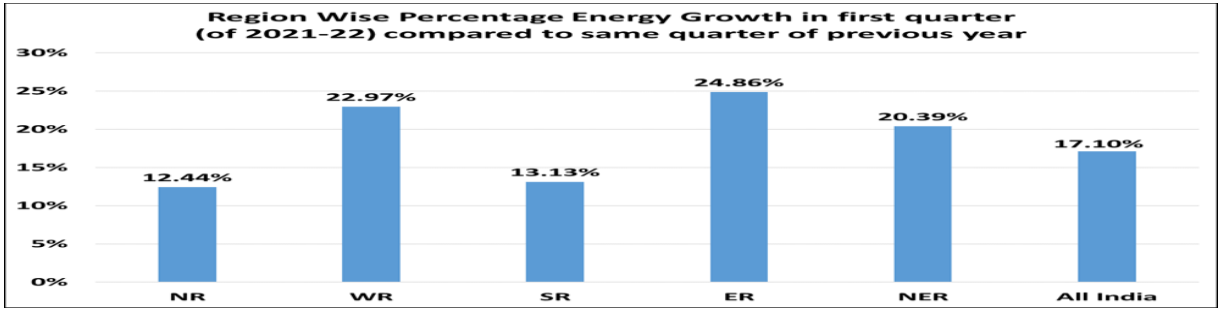
National Load Despatch Center

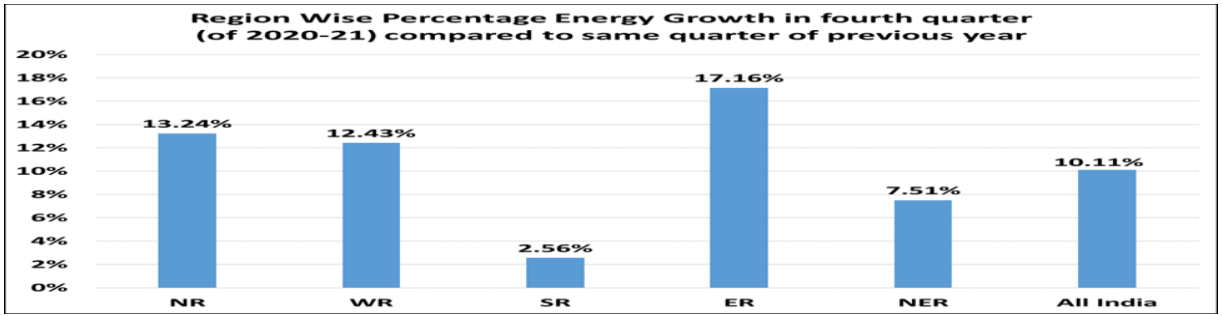
CONTENTS

- **Overview of Grid Operation – Q1, Q2 of FY 2020-21 and Q1 of FY 2021-22**
  - Energy Growth compared to Previous Year
  - Number of Grid Incidents/Disturbances
  - All time highest in last quarters
  - No of grid incidence/disturbance
  - Frequency Response Characteristics
  - Major Grid Incidents/Events
- **All India Demand Profile & Load Factor**
- **All India Generation Stack in Q1 (2021-22)**
- **Automatic Generation Control (AGC) Summary Q1 (2021-22)**
- **All India Generation Stack in Q1 (2021-22)**
- **Cyclones - Q1, Q2 of FY 2020-21 and Q1 of FY 2021-22**
- **Major Elements Commissioned – Q1, Q2 of FY 2020-21 and Q1 of FY 2021-22**
- **Enhancement in Transfer Capability Limits – Q1, Q2 of FY 2020-21 and Q1 of FY 2021-22**
- **Constraints faced during Grid Operation**
  - Transmission Line and ICT Constraints
  - High and Low Voltage Nodes
- **Actions taken to Mitigate Constraints**
  - Lines opened on High Voltage
  - Lines opened to Network Constraints
- **Important Grid Elements under long Outage**
- **Important Elements under Construction**

Energy Growth compared to Previous Year







Highlights

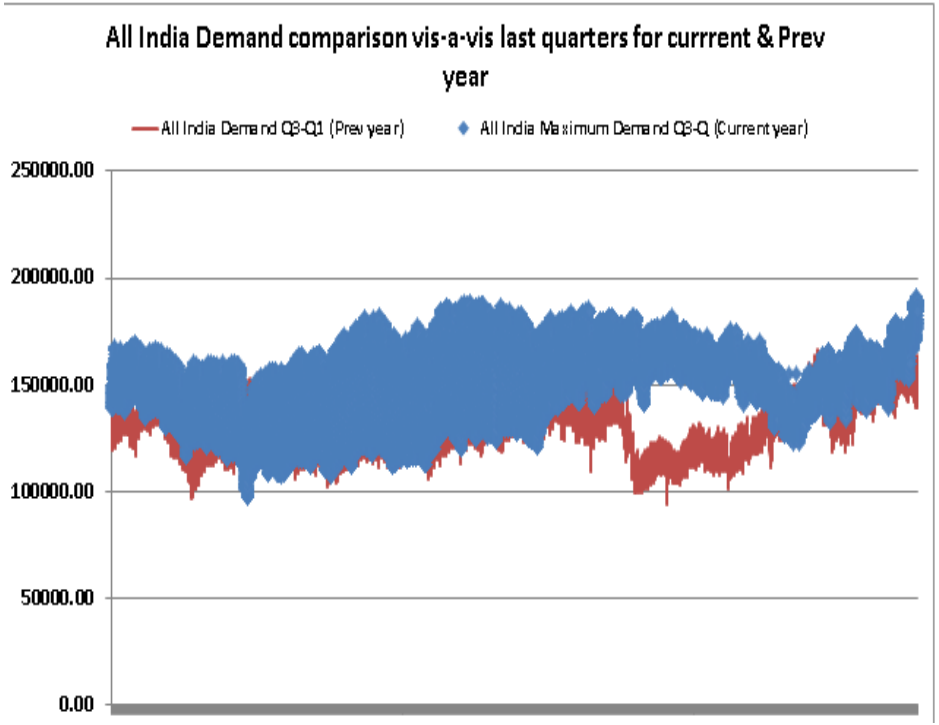
In Q3, All the regions have registered a positive growth rate except southern region for quarter 3 of 2020-21. All India demand revived to pre-Covid levels and during Q3 2020-21, all India energy consumption has even surpassed previous years' consumption for the same quarter.

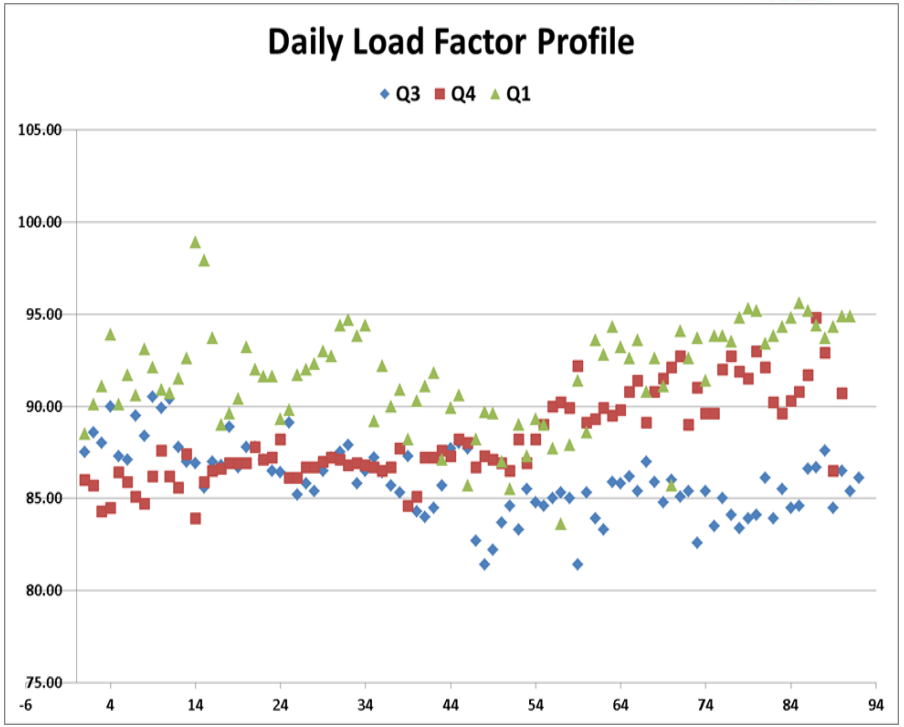
In Q4, All the regions have registered a positive growth rate for quarter 4 of 2020-21.Western Region recorded its maximum demand met of 62395 MW on 22nd Jan 2021 and highest ever energy met of 1345 on 09th March 2021.

In the first quarter of 2020-21, all the regions have registered a positive growth rate. Northern region have recorded its maximum demand during the day as 72370 MW on 30th June 2021. Eastern region have recorded its maximum demand during the day as 24651 MW on 27th April 2021. Southern Region recorded its maximum demand met of 58433 MW on 02nd April ' 21 and highest ever energy met of 1255 MUs on 03rd April ' 21.

Details available at: - https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657 and https://posoco.in/download/nldc-operational-feedback_jul_2020/?wpdmdl=30531

All India Demand Profile & Load Factor



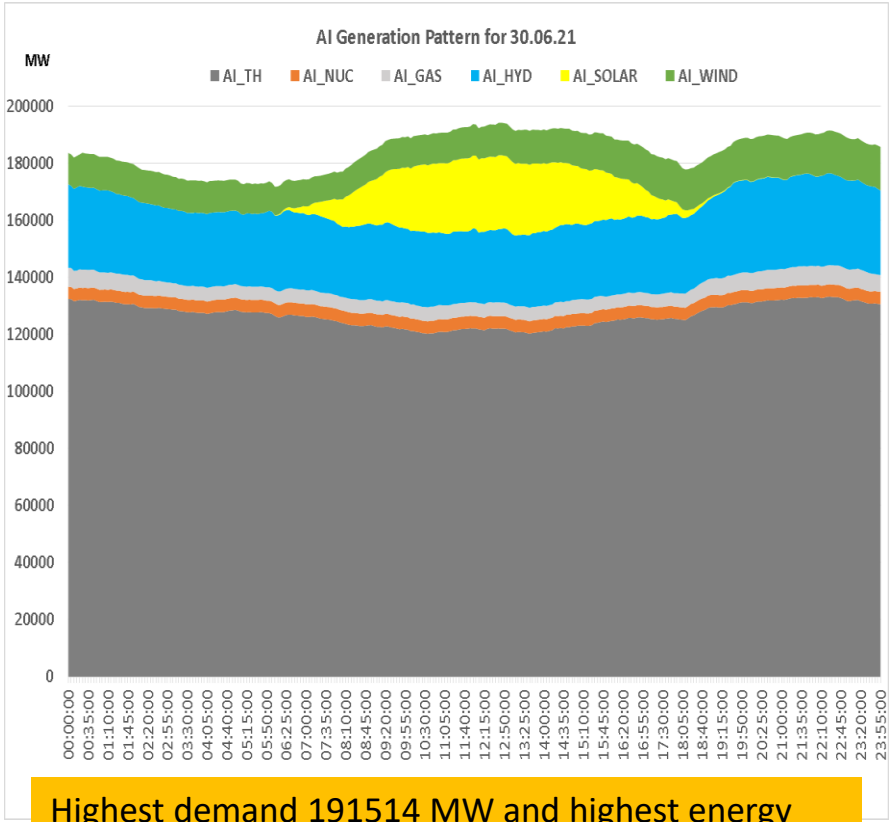


In the second wave of NCOVID-19, there is no as such demand reduction was observed at All India level. All the regions have registered a positive growth rate. Load factor above 85% was observed for most of the time duration.

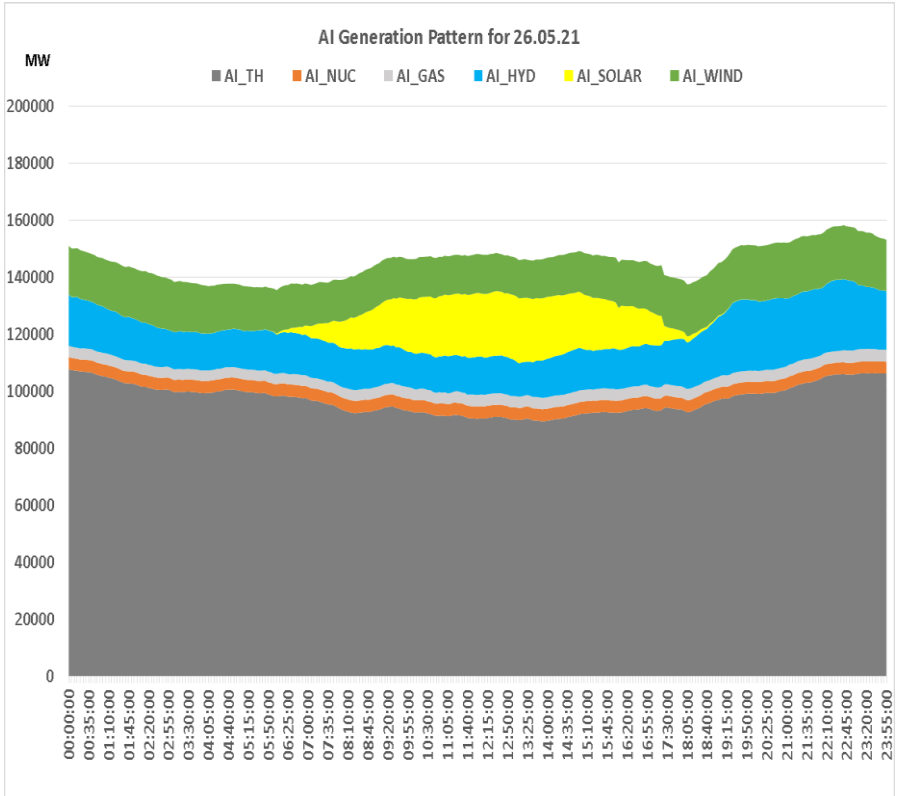
All Time Highest in last three quarters

Regions	Maximum Demand Met during the day(MW)	Demand Met During Evening Peak hrs(MW)	Energy Met(MU)	Hydro Gen(MU)	Wind Gen(MU)	Solar Gen(MU)
NR	73232 02-07-2021	68018 10-07-2021	1642 07-07-2021	389 12-08-2017	71 27-07-2021	58 25-05-2021
WR	62396 22-01-2021	56711 09-03-2021	1388 08-04-2021	167 18-12-2014	268 29-07-2021	43 11-05-2021
SR	58433 02-04-2021	50436 24-02-2020	1255 03-04-2021	208 31-08-2018	246 22-07-2021	122 09-03-2021
ER	25069 19-07-2021	24422 26-07-2021	542 16-07-2021	152 18-07-2020	-	6 19-04-2021
NER	3215 16-06-2021	3067 03-08-2021	60 05-08-2021	37 03-07-2019	-	2 19-12-2020
All India	200570 07-07-2021	190660 14-08-2021	4507.9 07-07-2021	815.8 09-09-2019	541.4 27-07-2021	220.7 01-04-2021

All India Generation Stack of highest energy consumption and highest RE penetration recorded days



Highest demand 191514 MW and highest energy consumption of 4384 MU was recorded on 30th June 2021 in Q1 of FY-2021-22



Highest RE penetration of 28.17 % was observed on 26th May 2021 in Q1 of FY-2021-22

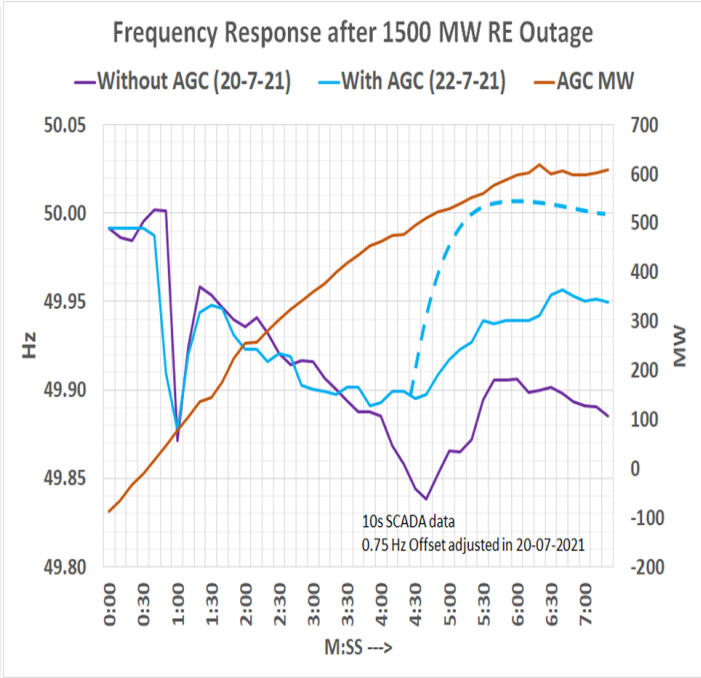
FRC for 3rd, 4th (2020-21) & 1st Quarter (2021-22)

S.No.	Date	Time	Event	NR	ER	WR	NER	SR	All INDIA
1	12-Oct-20	10:05	Total load loss was observed to be 2600MW (2200MW of Mumbai, 400MW of Khargar, Navi Mumbai, Bhiwandi and Thane). Total Generation loss was around 840MW at TATA) and 220MW at Uran.	5698	1894	2694	2993	93	15248
2	26-Dec-20	10:18	B-Phase CT of Unit-5 main bay in Wanakbori substation busted which resulted in tripping of Bus-2 at Wanakbori S/S. Generation loss of 1000MW observed (Unit-8:802MW & Unit 5-210MW).	15970	6885	21640	7866	484	43957
3	19-Feb-21	15:26	Multiple trippings occurred at Bhadla(PG) station while availing planned shutdown of 220kV Bus-II at Bhadla(PG). Total generation loss in the event was around 1300MW.	1399	2811	15059	83	8707	27660
4	10-Mar-21	19:35	400kV Rango-Kishanganj & 400kV Teesta III - Kishenganj tripped due to R-B-N Fault resulting into complete outages of Stations at 400kV(Rangpo, Teesta III, Dikchu) ,220kV (Jorethang,Tashiding,New Melli) & 132kV (Chuzachen,Gangtok) level. Generation loss of 1561 MW due to loss of evacuation path and Load loss of 54 MW occurred in Sikkim .	4959	3659	6365	3	4424	20365
5	24-Mar-21	12:16	Due to Multiple tripping at 400kV Bikaner (RS) station & 220kV side at Bhadla(PG), Solar Generation loss of 2036 MW and Load loss of around 450 MW was observed.	1237	1605	9717	69	4291	13791
6	08-Apr-21	03:29	230 kV TTPS-TTN AUTO-1 and 230 kV TTPS_STERLITE tripped at 03:29 hrs due to Y-phase conductor cut and All other 230KV evacuating lines connected from Tuticorin Thermal Power station tripped.. Generation loss of 1045 MW in all five units (5x210 MW) was observed	3205	1489	7909	86	10875	10568
7	**11-Jun-21**	**16:02**	220 kV Akal-Bhu -1&2 tripped due to snapping of B-phase jumper resulting into 1200MW wind & 300MW solar generation loss in NR	**6353**	**5007**	**9939**	**475**	**4233**	**20000**

Automatic Generation Control (AGC) Summary Q1 (2021-22)

Plants which completed closed loop testing

NR		WR		SR		ER		NER	
Koteshwar	400	Mauda-2	1320	Simhadri-2	1000	Barh-2	1320	Bongaigaon	500
Nathpa Jhakri	1500	CGPL	4150	Simhadri-1	1000	MPL	1050	Loktak	105
Chamera-3	231	Sipat-2	1000	NTECL Vallur	1500	Kahalgaon-2	1500		
Dulhasti	390	Vindhyachal-2	1000	Ramgundam-II	1500	Teesta-V	510		
Tehri	1000	Korba-1&2	2100	Ramgundam-III	500	Rangit	66		
Rihand-I	1000	Korba-3	500	NTPL	1000				
Riahnd-II	1000	Sipat-1	1980						
Rihand-III	1000	Vindhyachal-4	1000						
Anta	419.3	Vindhyachal-3	1000						
Chamera-2	300	Vindhyachal-5	500						
Chamera-1	540	Solapur	1320						
Dhauliganga	280	Gandhar	657						
Unchahar-III	210								
Unchahar-IV	500								
NR Total	8770	WR Total	16527	SR Total	6500	ER Total	4446	NER Total	605



Frequency Control with High RE

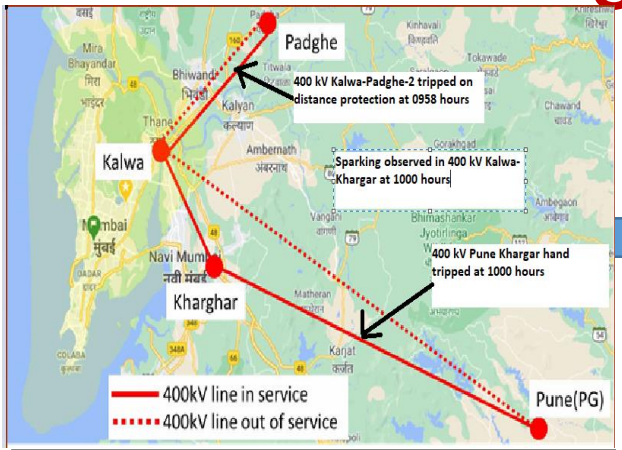
Total 36849 MW, as on 15th August 2021

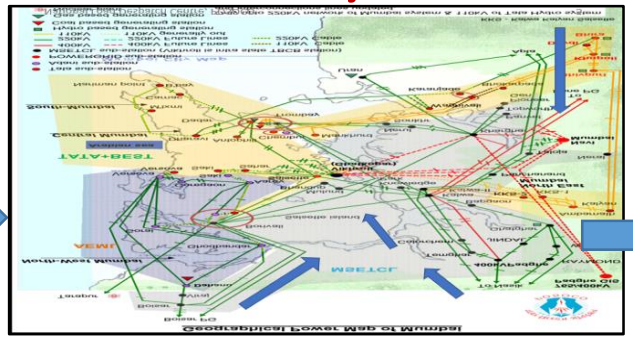
Number of Grid Incidents/Disturbances in 1st Quarter of 2021-22

Region	Grid incidents		Grid Disturbances					Total
	GI-1	GI-2	GD-1	GD-2	GD-3	GD-4	GD-5	
NR	2	31	35	0	0	0	0	68
WR	12	9	23	0	0	0	0	44
SR	3	6	28	0	0	0	0	37
ER	0	1	28	0	0	0	0	29
NER	6	16	50	0	0	0	0	72
All India	23	63	164	0	0	0	0	250

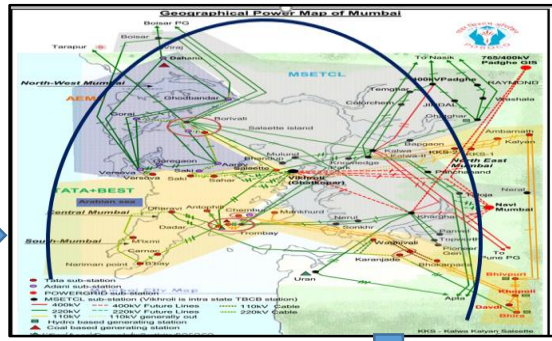
Details available at: - https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657 and https://posoco.in/download/nldc-operational-feedback_jul_2020/?wpdmdl=30531

Major Events - Grid Disturbance in Mumbai on 12th Oct, 2020



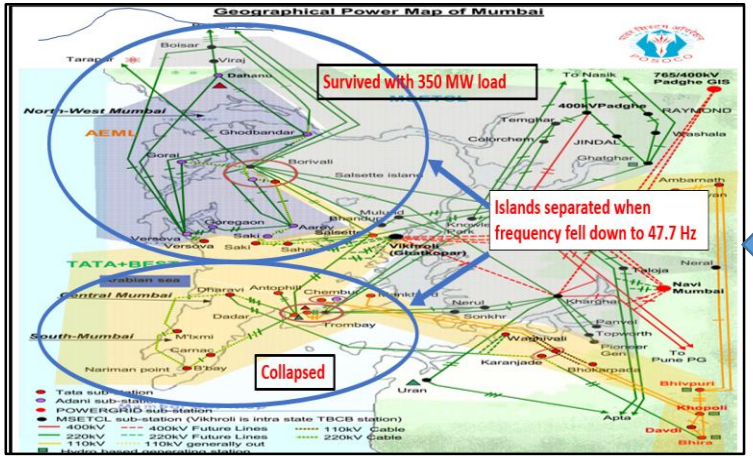


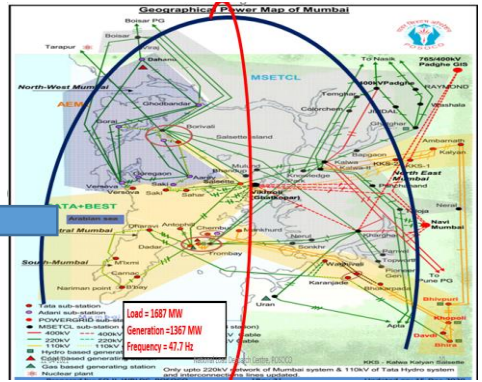
220 kV network stressed and tripped



Island Formation

1. Around 50% load met by import
2. Prior to incident: Two out of four major infeed under outage.
3. Tripping of a hydro unit inside Mumbai increased the import
4. 09:58 hrs: 400 kV Kalwa - Phadge II tripped on fault.
5. 1000 hrs: Inadvertently, healthy circuit 400 kV Pune – Kharghar hand tripped on observance of heavy sparking on 400 kV Kharghar - Kalwa.
6. Islanding: Islands formed (AEML, TPC, MSETCL) and two collapsed



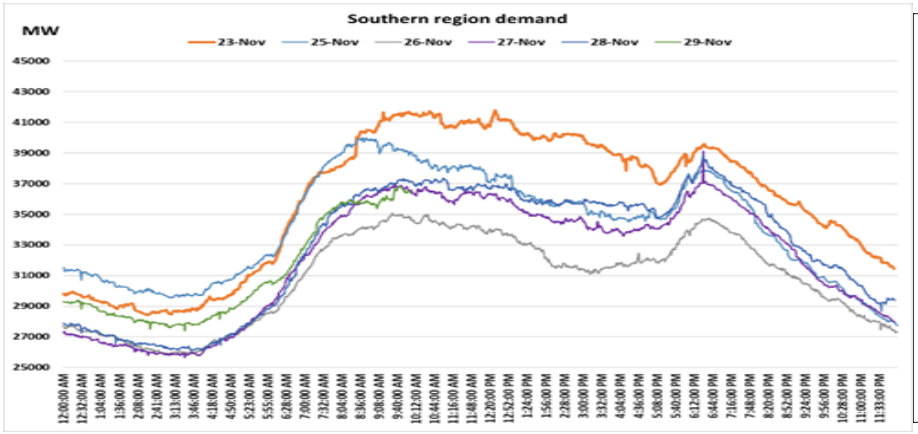


Mumbai Event Observations and Lessons Learned

- Importance of inherent load-generation balance for successful islanding
- Strengthening of transmission schemes and expeditious implementation of planned system
- Proper asset management of substation elements and close monitoring
- Imparting regular training to substation staff to handle contingencies
- Periodic review of Under Frequency Load shedding scheme (s)
- Prior approval of any changes in cranking path and regular mock drills
- Hydro/Gas based plants as synchronous condensers for early restoration
- Planning of Energy Storage and rooftop solar in metropolitan areas to cut down imports
- Sufficient dynamic shunt compensation devices in high load pockets
- Review of protection settings of generating units
- Communication and data visibility at control centres including PMUs

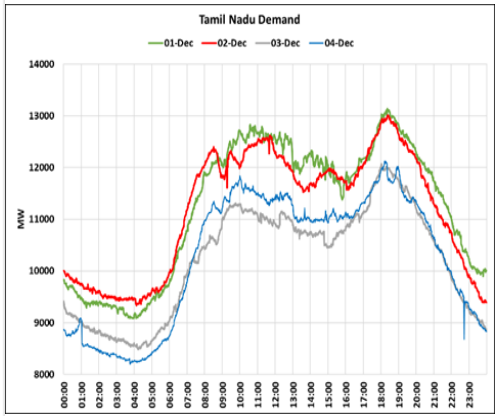
Cyclones in Q3 of FY 2020-21

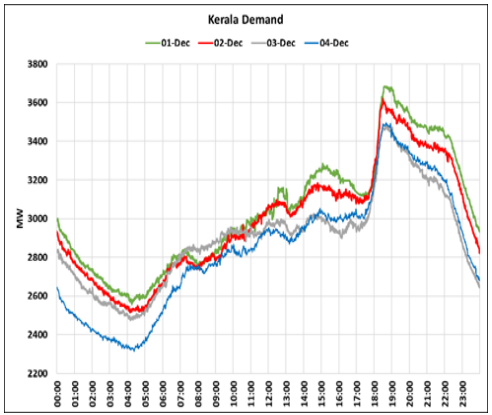
Severe Cyclonic Storm 'NIVAR' (25th & 26th Nov 2020)



- *TANTRANSCO has reported approximately 2600 MW of load outage , which was restored within 24 hours*
- *Puducherry has also reported load loss of 140 MW during the cyclone period.*
- *Generation Outage during Cyclone - 2140 MW (Vallur TPS Unit -1, Vallur TPS Unit -2, Vallur TPS Unit -3, Neyveli2 stage2 Unit-6, MAPS U#2, North Chennai TPS U#3): All generators were revived within 48 hours.*
- *Total 96 lines of state & ISTS tripped during the event.*

Cyclonic Storm 'Burevi' (3rd & 4th Dec 2020)





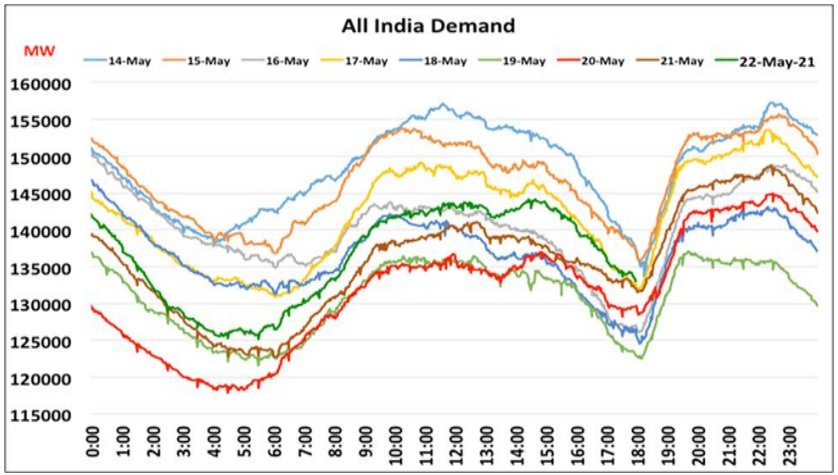
- *During the cyclone period, there was no outage of transmission element in a short time.*
- *Only demand of Tamil Nadu and Kerala for 03rd December 2020 was less by 1300 MW & 150 MW respectively in comparison to demand of 02nd December 2020*

Thunderstorms/Cyclones/Floods etc. are low probability high impact events and system resiliency needs to be enhanced to minimize the impact and quickly restore the system from these events. Learnings in this regard are highlighted in subsequent slides.

Detailed Report of cyclones is available at https://posoco.in/download/nldc-operational-feedback_jan_2021-2/?wpdmdl=34776

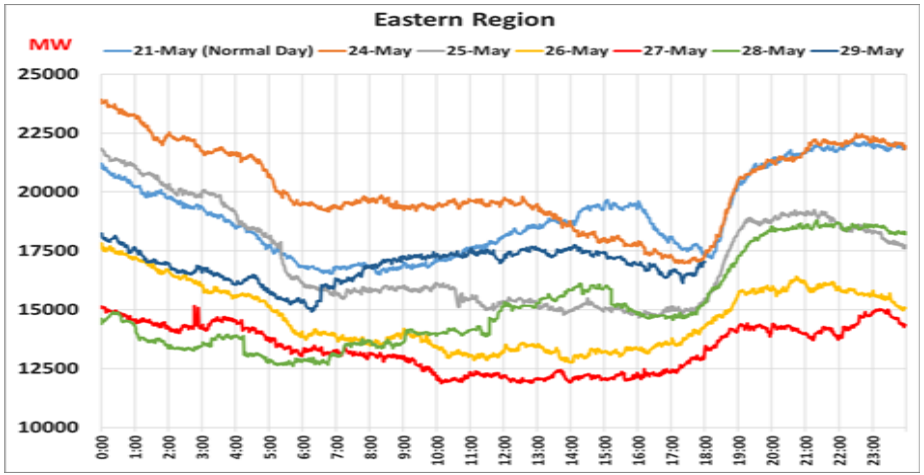
Cyclones in Q1 of FY 2021-22

Extremely Severe Cyclonic Storm 'Tauktae' (15th & 16th May 2021)



- *Demand reduction of around 7 GW was observed in SR on 16th May vis-à-vis 14th May. 07 nos. thermal generating units with a cumulative capacity of 2150 MW were taken under RSD. 12 nos. transmission lines at 220 kV and 110 kV level (all in Kerala) tripped on various faults due to heavy rainfall and lightning during 14-16 May.*
- *WR demand reduction of around 19 GW was observed on 18th May vis-à-vis 14th May. Thermal Generation with a cumulative capacity of 4800 MW were taken under RSD.*
- *Demand reduction of around 15 GW was observed in Northern region too on 19th and 20th May compared with 17th May.*

Severe Cyclonic Storm 'Yaas' (26th & 27th May 2021)



- *ER demand reduction of around 6.5 GW was observed on 26th and 27th May compared with 21st May demand.*
- *13 nos. generating units with a cumulative capacity of 4575 MW were taken out on Low demand/Reserve shutdown during 25-28 May.*
- *53 nos. (03 nos. Power supply interruption occurred on 02 nos. 220 kV (viz. Jasidih and Giridih) and 03 nos. 132 kV (viz. Saria, Jamua and Dumka) substations; all in Jharkhand (JUSNL)*
- *400 kV, 07 nos. 220 kV and 43 nos. 132 kV) transmission lines tripped on various faults during 25-27 May, including 01 no. ISTS line*

Detailed Report of cyclones is available at https://posoco.in/download/nldc-operational-feedback_july_2021/?wpdmdl=38883

Major Elements Commissioned in 3rd , 4th of (2020-21) & 1st Quarter (2021-22)

S.No.	Element	First time Charging / Synchronization Date	Remarks
1	Operation of Muzaffarpur-Dhalkebar D/C lines at rated voltage (400kV)	Line-I & II / 11.11.20	Lines were earlier charged at 220kV level.
2	400kV Imphal-New Kohima D/C	Line-I /10.11.20 Line-II /13.11.20	It will enhance reliability of power to Nagaland capital (Kohima). Owned by Kohima-Mariani Transmission Ltd. (KMTL)
3	400kV New Kohima-Mariani(PG) D/C (Ownership : Kohima-Mariani Transmission Ltd. (KMTL)	30.12.20	30.12.20 Strengthening of transmission network to Nagaland capital (Kohima) and connectivity of south NER also.
4	COD of Unit-4 at Kameng HEP	22.01.21	Ownership : NEEPCO
5	765/400kV Medinipur substation	23.01.21	Under system strengthening scheme in Eastern region. 765/400kV ICTs at Medinipur and downstream network (from Medinipur) are under implementation.
6	765kV New Ranchi-Medinipur D/C lines	Line-I/23.01.21 Line-II/24.01.21	
7	765/400kV ICTs at Medinipur	1500 MVA ICT-I/ 06.02.21 1500 MVA ICT-II/ 06.02.21	Under system strengthening scheme in Eastern region.
8	400/220kV ICT at New Mariani	500 MVA ICT-I/ 03.02.21	Under system strengthening scheme in NER. Improved connectivity at 400kV and below in East Assam.
9	400kV Silchar-Misa D/C lines	Line-I/25.02.21 Line-II/25.02.21	Under system strengthening scheme in NER. Enhanced connectivity of Southern NER with rest of the grid at 400kV level.

Major Elements Commissioned in 3rd , 4th of (2020-21) & 1st Quarter (2021-22)

S.No.	Element	First time Charging / Synchronization Date	Remarks
10	COD of Unit-II at Gadarwada	01.03.21	Super Thermal Power plant (2x800MW) of NTPC at Gadarwada (MP)
11	400kV Silchar-P K Bari D/C lines	Line-I/06.03.21 Line-II/29.03.21	Under system strengthening scheme in NER. Enhanced connectivity of Southern NER with rest of the grid at 400kV level
12	400/132kV Thoubal Substation	12.03.21	For flexible and reliable management of intra-state power supply system
13	765kV Agra(UP)-G Noida(UP) S/C	18.03.21	Under evacuation system establishment of Ghatampur(Kanpur) 3x660MW TPS
14	Reconductoring of 400kV Rangpo-Binaguri D/C	29.03.21	Power flow capacity on lines and reliability of Sikkim generation evacuation have been enhanced by this reconductoring
15	765/400kV ICT-4, ICT-3 at Bhuj Substation	ICT 4 : 01.04.21 ICT 3 : 02.05.21	Under Interstate transmission system strengthening scheme for Renewable Energy in WR-I & WR-II
16	765kV Ajmer-Phagi D/C lines	Line-I/12.04.21 Line-II/24.04.21	Ownership : POWERGRID
17	400kV Misa-New Mariani D/C	04.05.21 (both circuits)	More reliable transmission of power to Nagaland & Manipur

Major Elements Commissioned in 3rd , 4th of (2020-21) & 1st Quarter (2021-22)

S.No.	Element	First time Charging / Synchronization Date /COD	Remarks
18	400kV Baharampur (India)-Bheramara (Bangladesh) ckt-3	14.06.21	Enhanced reliability & connectivity of India with Bangladesh.
19	400 kV Alipurduar(India)-Jigmeling (Bhutan) D/C	18.06.21 (Circuit II) 22.06.21 (Circuit I)	Enhanced connectivity from Bhutan and evacuation of Mangdechu HEP and Punatsangchu HEP(Future)
20	156 MVA, 400/30.5KV Converter Transformer at Vindhyachal HVDC BTB Station	23.06.21 (Block#1)	For the replacement of old converter transformer along with refurbishment of Block #1.
21	HVDC Raigarh – Pugalur Pole I	06.09.21	
22	HVDC Raigarh – Pugalur Pole II	09.03.21	
23	HVDC Raigarh – Pugalur Pole III	13.07.21	
24	HVDC Pugalur – Trichur Pole I	08.06.21	
25	HVDC Pugalur – Trichur Pole II	09.03.21	

Enhancement/modification in Transfer Capability Limits

S. No.	Corridor	Previous Transfer Capability (MW)	Enhanced/modified Transfer Capability (MW)	Delta (MW)	Reason
1	**WR-SR**	6950	9350	2400	TTC/ATC has been revised after commissioning of HVDC Raigarh – Pugalur Pole -1 & II
	ER-SR	5950	5750	-200	
	Import of SR	12900	15100	2200	
2	**WR-NR**	17850	18450	600	a) Reversal in HVDC APD-Agra power Flow direction (b) Commissioning of 765kV Ajmer-Phagi D/C and 765kV G.Noida-Fatehabad S/C
	ER-NR	5500	6850	1350	
	Import of NR	23350	25300	1950	

Transmission Line and ICT Constraints

S. No	Region	Element	Description of the constraints
1	Northern	400 kV Anpara-Sarnath D/C	**Remarks:** Commissioning of 765 kV Anpara D-Unnao to be expedited.
2		765 kV Anpara C-Unnao	**Remarks:** Commissioning of 765 kV Anpara D-Unnao to be expedited.
3		400 kV Anta-Kota line	
4		3x500 MVA, 400/220 kV ICTs at Bhadla (Raj) and Bhadla (PG)	During high solar generation, loading of ICTs are N-1 non-compliant for considerable duration. New ICTs need to be planned.
5		2x1500 MVA , 765/400 kV ICTs at Phagi	**Remarks:** 3rd planned ICT of 1500MVA capacity at Phagi should be expedited.
6		2X315 MVA, 400/220kV ICTs at Dipalpur, Rajpura, Nakodar, Jodhpur, Kurukshetra, Moga, Sohawal and Chhittorgarh (Raj)	Augmentation/ new ICT be explored needs to be planned at these locations..

Transmission Line and ICT Constraints

S. No	Region	Element	Description of the constraints
1	Western	400 kV Kudus-Kala D/C	**Remarks:** Commissioning of 400 kV Padghe (GIS) –Kharghar and Padghe (GIS)-Vikhroli line would relieve loading of Kudus-Kala D/C.
2		400 kV Padghe- Kalwa D/C	**Remarks:** Commissioning of 400 kV Ghatkopar S/S and Padghe (GIS)-Kharghar, Padghe-Navi Mumbai-Ghatkopar and Kharghar-Ghatkopar would give additional infeed to Mumbai and relieve loading of Padghe-Kalwa D/C
3		400 kV Lonikhand - Jejuri S/C	**Remarks:** 400 kV Lonikhand -Karad LILO at Jejuri was planned for commissioning by 2018 - 19. This LILO shall be done on priority basis to avoid any disturbance in Jejuri area. MSETCL informed revised schedule of Dec 2021.
		400 kV Chandrapur-Chandrapur (II) D/C	LILO of one D/C line of 400 kV Chandrapur -I – Bhadravati 2xD/C line at Chandrapur -II is approved in 2nd WRPC (TP). To be expedited.
4		400 kV Warora(MS)- Wardha(PG) S/C and Koradi-II - Wardha(PG) S/C	3rd WRPRCTP formed Committee of MSETCL & POWERGRID to have joint meeting for bypassing of outlets & bus splitting at 400 kV Wardha (PG).
5		400kV Parli(PG) - Parli(MS) D/C	Bypassing of 400 kV Koradi -II -Wardha(PG) & 400 kV Wardha(PG) -Warora(MS) at 400 kV Wardha(PG) and making 400 kV Koradi -II -Warora(MS) S/C would, in addition to controlling the fault level at Wardha(PG), would also relieve 400kV Parli(PG) –Parli (MS)
6		2x315 MVA, 400/220 kV ICTs at Astha, Bhatapara, NSPCL, Akola, Satna, Raigarh (PG) , Korba (West) , Kirnapur , Itarsi , Morena and Akola (MSETCL)	Augmentation/additional ICTs or agreed arrangement need to be expedited.
7		2x315MVA+ 1x500MVA 400/220 kV Dhule MSETCL ICTs	Augmentation work of 400/220KV ICT-II from 315 MVA to 500MVA under progress
8		400 kV Lara –Raigarh D/C	Lines are N-1 non-compliant in case of reverse power flow on HVDC Raigarh – Pugalur with high generation in Raigarh complex and low generation at Lara TPS.
9		400 kV Kolhapur (MS) – Kolhapur (PG) D/C	Lines are N-1 non-compliant during high generation at Kudgi TPS as well during high in SR.

Transmission Line and ICT Constraints

S. No	Region	Element	Description of the constraints
1	Southern	Constraints in Nagjheri PH evacuation	KPTCL to expedite reconductoring of emanating 220 kV lines
2		Tamilnadu 230 kV System	Several 230 kV lines in TN intra-state network are heavily loaded. (Details available at https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657)
3		Downstream network of Mysore 400/220kV SS	220 kV outlets from Mysore are heavily loaded particularly during peak demand scenario of Karnataka.
4		220 kV Bangalore Metro Network	Most of the 220 kV network in Bengaluru is radialised during peak season to prevent overloading of lines. The radialisation of lines decreases the reliability of supply & thus results in Low Voltage situation during peak period and High Voltage during Off-Peak period of the day
5		Andhra Pradesh 220kV Network	Several 220 kV lines in AP intra-state network are heavily loaded. (Details available at https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657
6		Downstream network of UPCL 400/220kV SS	220kV UPCL-Kemar D/C is heaviliy loaded during UPCL full generation and Peak demand scenario of Karnataka
7		400/220 kV ICTs at Kolar, Mysore, Cochin, Narendra, Neyveli II TPS, Hassan, Ramagundam, Somanhalli, Tiruvallam, UPCL, Allundur SS, Jindal SS	Most of the constraint observed during high demand period of SR. Some even observed for whole year. (Details available at https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657)

Transmission Line and ICT Constraints

S. No	Region	Element	Description of the constraints
9	Southern	400/220kV 2x500 MVA ICTs at Kaiga	
10		400/220 kV 3X500 MVA ICTs at Hoody and Nelamangla	
1	Eastern	400/132 kV 2 X 200 MVA Motihari ICT	Constraint observed particularly during peak demands of Bihar and Nepal. Third 315 MVA ICT could not be charged due to problem in Bus extension module at Motihari.
2		400/220 kV Ranchi 2 X 315 MVA ICTs	Additional ICT at 400/220 kV Ranchi has been agreed in 3rd ERPCTP. To be expedited.
3		220 kV Waria-Bidhan Nagar D/C	Operational planning and fault level planning study needs to be performed in joint coordination with DVC .
4		220 kV Patna-Sipara T/C	220 kV Patna-Sipara 1 & 2 HTLS conversion was approved during the 2nd ERPCTP meeting. To be expedited.
1	North-Eastern	220/132 kV, 160 MVA ICT at Kopili	The proposal of replacement of existing 60 MVA, 220/132kV ICTs by 1x160 MVA, 220/132 kV ICT at Kopili HEP of NEEPCO by POWERGRID was agreed in joint standing committee meeting. Kopili Substation is under outage since 07.10.19 due to flooding.
2		220 kV BTPS - Salakati I & II lines	Upgradation of the 220 kV BTPS-Salakati I & II lines with HTLS conductor to be expedited

Low Voltage Nodes Q1 (2021-22)

S. No	Region	Areas
1	Northern	Hindaun, Alwar, Bhadla -PG (during high solar), Bhadla-RS (during high solar), Akal
2	Western	Padghe, Lonikhand, Lonikhand(II), Jejuri (during peak load), 400kV Solapur(MH) observed in 1st quarter of 2021-22.
3	Southern	400kV Kudgi-PG, 400kV Pondicherry, 400kV SVChatram – During morning peak
4	Eastern	NIL
5	North-Eastern	NIL

High Voltage Nodes

S. No	Region	Areas
1	Northern	Suratgarh, Mahendragarh, Allahabad, Fatehpur, Shree Cement, Bawana, Harshvihar, Jalandhar, Makhu, Nakodar, Muktsar, Khedar, Fatheabad, Jind, Jhajjar, Maharaninagh, Bhiwani, Malerkotla, Kubulpur, Mundka
2	Western	Aurangabad(MH), 400kV Bhadrawati (PG), 400kV Chandrapur & Chandrapur(II), 400kV Dhariwal CTU, 400kV EMCO Warora, 400kV New Koyna, 400kV Nanded (MSETCL), 400kV Wardha(PG), 400kV Vadinar, 400kV Sami, 400kV Kirnapur (MPPTCL), 400kV Seoni(PG), 400kV Jagdalpur, 400kV Korba West, 400kV Raita (CSPTCL), NSPCL
3	Southern	765kV Chilkaluripeta, 765 kV Cuddapah, 765 kV Nizamanabd, 400 kV Asupaka, 400 kV Bellary TPS, 400kV Bidadi, 400kV BTPS, 400kV Chandulapur, 400kV Chilkaluripeta, 400kV Cuddapah-PG, 400kV Dharamapuri, 400kV Dichipalli, 400kV Dindi, 400kV Gajwel, 400kV Pavagada, 400kV Podili, 400kV Nirmal, 400kV Nizamabad, 400kV Raita (CSPTCL).
4	Eastern	New PPSP, New Dubri, Maithon-A, 400 kV Durgapur STPS (DSTPS), 400 kV Teesta V, Dikchu , Barh, 400 kV Maithon A
5	North-Eastern	Ranganadi, Balipara, Misa, BNC, Byrnihat

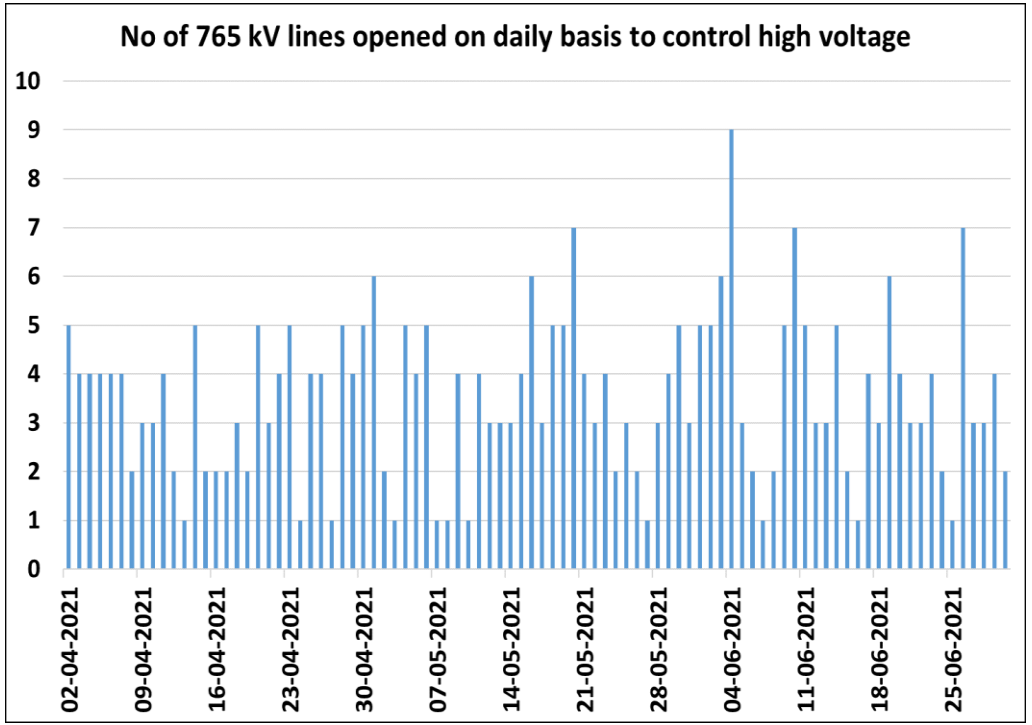
Lines Opened on High Voltage – Q1 FY 2021-22

- **765 kV Lines -** 279 no. of times opened for all openings greater than 3 of the same line

- **Lines with most switching operations:**

  - 765 kV Bikaner-Moga (PG) D/C
  - 765 kV Moga-Meerut (PG) Ckt-1
  - 765 kV Ajmer-Chittorgarh (PG) D/C
  - 765 kV Agra-Fatehpur (PG) D/C
  - 765KV-NIZAMABAD-MAHESHWARAM_PG-2
  - 765KV-RAIPUR-PS (DURG)-JHARSUGUDA-1
  - 765 kV Angul-Jharsuguda-3 & 4
  - 765KV-CUDDAPAH-THIRUVALAM-2
  - 765KV-WARDHA-AURANGABAD-3

- **Line opening considered as last resort for voltage control. L/Rs that can be taken in service as B/Rs must be utilized.**



Details available at: - https://posoco.in/download/nldc-operational-feedback_july_2021/?wpdmdl=38883

Lines Opened on High Voltage – Q1 FY 2021-22

- **400 kV Lines -** 924 no. of times opened for all openings greater than 3 of the same line

S. No.	Region	No. of time 400 kV Lines opened*	Frequently Opened Lines
1.	Northern	586	Bhadla-Jodhpur (RS) Ckt-1 Bhadla-Merta (RS) Ckt-1 Jodhpur-Kankani (RS) Ckt-1
2.	Western	97	400 kV Bhusawal – Aurangabad –M (Waluj)-1 400 kV Amreli – Hadala-1
3.	Southern	241	400KV-Pavagada-Tumkur-1 400KV-Pavagada - Mysore-1
4.	Eastern		
5.	North- Eastern	-	
6.	All India	**924**	

**Considering lines opened 03 times or more during the quarter*

Details available at: - https://posoco.in/download/nldc-operational-feedback_oct_2020_final/?wpdmdl=32657 and https://posoco.in/download/nldc-operational-feedback_jul_2020/?wpdmdl=30531

Major transmission elements opened in Q1 of 2021-22 to control overloading of associated elements

S. No.	Region	Line/ICT Opened at 400 kV level and above	Reason
1.	Western	400kV Taptitanda-Deepnagar-1, 400kV Taptitanda-Aurangabad (Waluj) S/c	To control loading of 765/400kV Ektuni ICT-1 during emergency S/d of Ektuni ICT.
2.		400kV Asoj-Kosamba S/C line & generation backing down at SSP	To control loading of 400kV SSP-Asoj S/C line. SSP generation is high, this constraint is observed.
3.		HVDC Raigarh-Pugalur Pole-1 reverse power order,HVDC Bhandrawati power order reversal	To control loading of 400kV Kolhapur-Kolhapur (MH) D/C line During high generation of Kudgi and RE in SR.
4.	Southern	400 kV Talaguppa Nelamangala S/C	To control loading of 220 kV Sharavathi - Talaguppa circuits during high generation at Sharavathy
5.	North-Eastern	132kV Nirjuli-Gohpur Line	To control loading of 132kV Pare-Lekhi Line (Commissioning of 132 kV Pare -North Lakhimpur D/ C line and LILO of one circuit of 132 kV Pare -North Lakhimpur at Nirjuli to be expedited)
6.		132 kV Umtru – Kahilipara D/C and 132 kV Umtru Sarusajai D/C	To control loading of 132 kV EPIP 2 – Umtru D/C and 132 kV New Umtru – Umtru line

Important Grid Elements under Long Outage

S.No.	Line	Voltage (in kV)	Owner	Outage Date	Revival Date	Remarks
1	400kV IBEUL-Jharsuguda D/C (INDBHARAT)	400kV	POWERGRID	17:30 (29.04.18)	Still out	Tower collapse at Loc. 44, 45
2	220kV Kishenpur (PG)–Ramban Ckt-1	220kV	PDD JK	16:43 (31.03.2020)	Still out	Due to heavy land slide damages occurred to 220 KV D/C KPTL at location no: -187,188 &189 and there is every apprehension of collapsing Tower Loc. No 189
3	220kV Pandiabili – Samangara D/C	220kV	POWERGRID	03.05.2019	Still out	49 Towers collapsed
4	220kV Kishenpur (PG)–Mirbazar (JK)	220kV	PDD JK	08:38 (06.1.21)	Restored on ERS tower 19:00 (14.01.21)	Tower collapsed at location no 107 near Samroli, Udhampur
5	400 KV Akal – Kankani ckt-1	400kV	POWERGRID	21:22(02.06.21)	Still out	R-N fault, Zone-1, Dist. 49.79km, Fault current 5.118kA from Akal end. (Tower Collapse in the line)

Fixed Series Compensator under Long Outage

S.No.	Line	Voltage (in kV)	Owner	Outage Date	Remarks
1	FSCs – 400 kV Kanpur - Ballabhghar D/C	400	POWERGRID	14-03-17 16-03-19	Ckt I FSC has been out due to B-phase Signal column blast. Ckt II FSC hand tripped due to fire in FSC-II of B-phase at Ballabhgarh.
2	FSCs – 765 kV Meerut – Koteshwar D/C	765	POWERGRID	20-02-21 15-05-21	FSCs taken out for upgradation work at 765 kV. Not taken back in service yet.
3	FSC- 400kV Aligarh-Muradnagar	400	POWERGRID	09-10-2015	FSC is out due to LILO of 400 kV Panki –Muradnagar at Aligarh.
4	FSC of Pampore-1 & Pampore-2 at Kishenpur*	400	POWERGRID	30-12-2012	FSC are out due to LILO at Mirbazar (one ckt. of Kishenpur-Mirbazar has been LILOed at Ramban)
5	FSCs – 400 kV Raipur – Wardha D/C	400	POWERGRID	01-02-18 17-11-18	Damping resistor burnt
6	FSC + TCSC - Raigarh-Raipur I, II & III	400	POWERGRID	06-07-16 08-07-16	Fire at TCSC / Main control system failure
7	FSCs- 400 kV Balipara – Bongaigaon 3 & 4	400	POWERGRID	02-09-20	Fire in B-ph capacitor bank of FSC (ckt-3)
8	FSC - 400 kV Rengali-Indravati	400	POWERGRID	23-02-2021	FSC R phase damping resistor got damage during successful autoreclose of the circuit.

Important Grid Elements under Construction

S. No.	Name of element	Agency	Remarks
1	765kV Anpara D- Unnao	UPPTCL	**Scheduled Commissioning: Jan 2012**. Would reduce loading of 400 kV Anpara-Sarnath D/C, Anpara-Mau, and Anpara-Obra lines.
2	765kV Bara -Mainpuri ckt-1 and 2nd 765/400 kV ICT at Mainpuri	SEUPPTCL	**Scheduled Commissioning: Jun 2017**. Would strengthen the evacuation of Bara TPS generation in case of N-1 contingency of 765kV Bara-Mainpuri ckt-2.
3	765/400 kV 1500 MVA ICT 3 at Phagi	RRVPNL	Two existing 1500 MVA ICTs of Phagi become N-1 non-compliant during winter (High Rajasthan demand time). After commissioning of ICT-3, loading on other two ICTs would reduce and ICTs would be N-1 compliant. This would be good from reliability point of view as 765kV Phagi-Gawalior connects NR-WR and plays important role in transfer capability of Rajasthan
4	400/220kV 500MVA ICT-3 at Rajpura	PSTCL	Would address the N-1 non-compliance at Rajpura ICTs during paddy season.
5	5th, 6th & 7th 400/220 kV 500 MVA ICTs at Bhadla PG	POWERGRID	Would address N-1 of ICTs at Bhadla PG during high solar generation. 4th ICT commissioned on 31st Dec 2020.

Important Grid Elements under Construction

S. No.	Name of Element	Agency	Remarks
6	400kV Lonikhand-Karad LILO at Jejuri & commissioning of Hinjewadi	MSETCL	Immediate actions are required to strengthen the infeed to Jejuri. Commissioning of these on priority basis would help in improving the voltage profile of Jejuri, Lonikhand and Pune area.
7	765kV Tamnar-Dharamjaygarh D/C	GTTPL	Would improve the reliability of power evacuation from JPL Stg-2 (4x600MW) & TRN (2x300MW) generation (Total 3000 MW generation). Presently being managed with SPS.
8	400kV Padghe PG-Kharghar, 400kV Padghe PG-Ghatkopar line along with Ghatkopar S/s 400kV Padghe-Ghatkopar LILO at Navi Mumbai, 220kV Apta-Taloja and 220kV Apta-Kalwa LILO at Navi Mumbai	Through TBCB route/MSETCL	Ccheme was finalized in 42nd SCM of WR dtd 17th Nov 2017. Commissioning of this network would relieve the constraints in Mumbai system.
9	400/220kV Xeldem Substation, 400kV Mapusa-Xeldem D/c line & 400kV Narendra-Narendra one ckt LILO at Xeldem along with downstream network at Xeldem	GTTPL	Required for in additional infeed to Goa and reliable supply to the Goa system.

Important Grid Elements under Construction

S. No.	Name of Element	Agency	Remarks
10	765 kV Warora – Warangal – Maheswaram – Kurnool link and 765 kV Warangal - C'peta D/C	WKTL	Will form the WR-SR & ER-SR ring and significantly enhance the import of NEW- SR. Resiliency of the system will also improve and outages of major HVDC links towards SR could be managed after commissioning of these lines.
11	400kV Kadakola SS and Associated system	KPTCL	Will relieve over loading Mysore ICTs and downstream
12	400kV Kottayam SS and Associated system	KSEBL	Will enhance the TTC/ATC of S3(KERALA)
13	400/220kV Cochin ICT-3	Powergrid	Will enhance the TTC/ATC of S3(KERALA)
14	Upgradation of 220/132 kV, 2x100 MVA ICT to 2x160 MVA at Dimapur	POWERGRID	Enhance reliability of Nagaland & Manipur power system
15	220/132 kV, 3rd 30 MVA ICT at Mokokchung (PG)	POWERGRID	Enhance transfer capability of Mokokchung Area of Nagaland Power System
16	220 kV Balipara-Sonabil line II	AEGCL	Enhance reliability and transfer capability of NER power system. As per minutes of 179th OCCM, Assam informed that LOA has been issued and will take 8 months from then

Important Grid Elements under Construction

S. No.	Name of Element	Agency	Remarks
17	Bay of 220 kV Balipara – Sonabil II at Balipara	AEGCL	Enhance reliability of NER Power system. As per minutes of 179th OCCM, Assam informed that Award delayed due to MCC
18	132 kV Monarchak – Surjamaninagar D/C	TSECL	Enhance reliable evacuation of Monarchak Power Station. As per 180th OCCM, target date is Sep'21.
19	220/132 kV, 1x160 MVA ICT with GIS Bay at Kopili	POWERGRID	Enhance reliability of Southern Part of NER power system
20	Reconductoring of 132 kV Imphal(PG)- Imphal II	MSPCL	Enhance transfer capability of Manipur Power System
21	Bay at Agia S/S for 132 kV Agia Nangalbibra Ckt #II	AEGCL	Enhance reliability of Assam & Meghalaya power system

Other Important Aspects for Future Transmission Planning

- All India Studies considering different scenarios for Renewable Generation evacuation planning
- Planning for Reactive Power Management on all India level
- Adequate Short Circuit Ratio at RE Interconnection point to be ensured
- N-1 of ICTs at RE pooling stations

Thank you !!