

I/1641/2018



भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केन्द्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन-I प्रभाग

Power System Planning & Appraisal-I Division

To,

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.	Chief Operating Officer, Central Transmission Utility POWERGRID, Saudamini, Plot No. 2, Sector-29, Gurgaon – 122 001.	6.	Sh. Surinder Singh Sur, Joint Adviser (Energy) NITI Aayog, Parliament Street, New Delhi – 110 001.
7.	Shri P. K. Pahwa, Ex. Member (GO&D), CEA 428 C, Pocket -2, Mayur Vihar, Phase -1, Delhi – 110091.	8.	Shri Prabhakar Singh, Ex. Director (Projects), POWERGRID D 904, Tulip Ivory, Sector-70, Gurgaon – 122 001.

विषय: 27 जुलाई, 2018 को आयोजित "ट्रांसमिशन पर राष्ट्रीय समिति" (एनसीटी) की पहली बैठक का कार्यवृत्त।

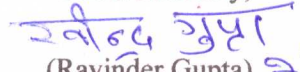
Subject: 1st meeting of the "National Committee on Transmission" (NCT) held on 27th July, 2018 – Minutes of the meeting.

Sir/Madam,

The 1st meeting of the "National Committee on Transmission" (NCT) was held on 27th July, 2018 in CEA, New Delhi under the chairmanship of Shri Pankaj Batra, Chairperson, CEA.

The minutes of the meeting has been uploaded on CEA website: <http://www.cea.nic.in> (path to access – Home Page – Wing specific documents/ power system related reports/ National Committee on transmission).

Yours faithfully,


(Ravinder Gupta) 2/8/18

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

Copy to:

- Joint Secretary (Trans), Ministry of Power, Shram Shakti Bhawan, New Delhi-110001
- Chief Engineer (PSPA-II), CEA
- CEO, RECTPCL, ECE House, 3rd Floor, Annexe - II, [28A, KG Marg, New Delhi - 110001](#)
- PFC Consulting Ltd, First Floor, "Urjanidhi", 1, Barakhmba Lane, Connaught Place, New Delhi -110001

I/1641/2018 Minutes of 1st meeting of National Committee on Transmission (NCT) held on 27th July 2018 in CEA, New Delhi

List of participants is enclosed at Annexure-I.

Chairperson, CEA welcomed the participants to the 1st meeting of the National Committee on Transmission and requested Chief Engineer (PSPA-I), CEA to take up the agenda for discussions.

1. Confirmation of the minutes of 37th meeting of Empowered Committee (EC) on Transmission

Chief Engineer (PSPA-I), CEA stated that the minutes of 37th meeting of EC on Transmission held on 20th September, 2017 were issued vide CEA letter No. 100/1/EC (37)/2017–PSP&PA-I/1178-1187 dated 24th October, 2017. No comment / observation had been received.

1.1. As the constitution and the name of the committee has been changed, Members of the NCT said they have no comments on the minutes of 37th meeting of the Empowered Committee on Transmission.

2. Constitution of the "National Committee on Transmission" (NCT) in accordance with the Guidelines for Encouraging Competition in Development of Transmission Projects:

2.1 Chief Engineer (PSPA-I), CEA stated that MoP vide their office order no. 15/3/2017–Trans dated 13.04.2018 has constituted the "National Committee on Transmission" (NCT) along with its Terms of Reference (ToR) and frequency of meeting. The composition of the Committee is as given below:

1	Chairperson, Central Electricity Authority (CEA)	Chairman
2	Member (Power System), CEA	Member
3	Member (Economic & Commercial), CEA	Member
4	Director (Trans), M/o Power, Govt. of India	Member
5	Chief Operating Officer, Central Transmission Utility (POWERGRID)	Member
6	Adviser, NITI Aayog #	Member
7	Two experts from Power Sector *	Member
8	Chief Engineer (from Power System Wing), Central Electricity Authority #	Member Secretary

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.

2.2 He said that ToR of the Committee are to:

- (i) Formulate the transmission schemes based on transmission projects agreed in the Regional Standing Committee on Transmission (RSCTs).
- (ii) Examine the cost of the schemes.

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- (iii) Recommend the mode of implementation of transmission schemes i.e. Tariff Based Competitive Bidding (TBCB) / Regulated Tariff Mechanism (RTM), as per the existing Tariff Policy.
 - (iv) Form the Bid Evaluation Committee (BEC) for a TBCB Project. #
 - (v) Recommend the urgency of projects for RTM.
- # The formation of BEC will be done as per the Guidelines prepared by the Ministry of Power.

The NCT shall meet as and when required but at least once in every six months.

- 2.3 He added that NITI Aayog vide their office order no. 1-22/2/8/2018-P&E dated 08.05.2018 has nominated Sh. Surinder Singh Sur, Joint Adviser (Energy), NITI Aayog as member of the NC. MoP vide their office order no. 15/3/2017-Trans dated 08.06.2018 has nominated following two experts in Power Sector as members in NCT:
- i) Shri P. K. Pahwa, Ex. Member (GO&D), CEA and
 - ii) Shri Prabhakar Singh, Ex. Director (Projects), POWERGRID
- 2.4 Further CEA vide its office order no. 14/4/2018-Adm.Coord/1948-50 dated 27-07-2018 has nominated Chief Engineer (PSPA-I), CEA as Member Secretary to the NCT.
- 2.5 To a query from Member (E&C) to explain the item no. (i) of the ToR, CE, CEA stated that inter-state transmission projects agreed in the five Regional Standing Committee Meetings are clubbed together to form a transmission scheme/s so that the transmission scheme has a reasonable cost to attract competitive bids.
- 2.6 Members noted the same.

3. Notification / approval of transmission schemes approved in 37th meeting of Empowered Committee on Transmission by MoP

- 3.1 Chief Engineer (PSPA-I), CEA stated MoP vide Gazette notification dated 04.05.2018 has notified the following schemes (approved in 37th meeting of EC on Transmission) for implementation through TBCB route:

Package-1: Name of Scheme: Northern Region System Strengthening Scheme – XL (NRSS-XL) – RECTPCL (BPC)

The scheme includes:

Part-A :System Strengthening Scheme in Northern Region

Part-B: Reactive Power Compensation in Northern Region

Part-C: System Strengthening Scheme in Northern Region for grant of LTA to M/s Essel Saurya Urja Company of Rajasthan Ltd

Package-2: Name of Scheme: Western Region Strengthening Scheme –XIX (WRSS-XIX) and North Eastern Region Strengthening Scheme – IX (NERSS-IX) – PFCCL (BPC)

The scheme includes:

Part A: Additional 400 kV outlets from Banaskantha 765/400 kV S/S

Part B: Establishment of new substation at Vapi / Ambethi area and its associated transmission lines

Part C: Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID

Part D: North Eastern Region Strengthening Scheme – IX

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3.2 He further stated that based on the request from UPPTCL, MoP has excluded the following transmission elements from the Package-1. These elements were also recommended by EC on transmission in its 37th meeting to be implemented through TBCB.

No.	Transmission Scheme	Detailed scope of works
1.	Replacement of 1x315 MVA ICT by 1x500 MVA ICT and implementation of two nos. of 220 kV line bays at Lucknow	<ul style="list-style-type: none"> • 400/220kV ICT 500MVA, • 400kV ICT bay -1 • 220kV ICT bay-1 • 220kV line bay-2
2.	1x315 MVA, 400/220 kV ICT (to be shifted from Lucknow after refurbishment if required) with 2 nos. of 220 kV line bays at Gorakhpur	<ul style="list-style-type: none"> • 400kV ICT bay -1 • 220kV ICT bay-1 • 220kV line bay-2

3.3 He added that MoP vide its office order no. 15/3/2017-Trans-Pt(2) dated 26.04.2018 has allocated the following transmission schemes to POWERGRID for implementation through RTM under compressed time schedule. These schemes were agreed to be implemented by POWERGRID through Regulated Tariff Mechanism (RTM) in the 37th meeting of EC on Transmission:

S. No.	Name of Scheme
(i)	New 400kV feed to Maharani Bagh (PG) 400/220kV S/s
(ii)	TCR of capacity 500 MVAR at Kurukshetra 400 kV bus.
(iii)	Converting Fixed Line Reactors into Switchable Line Reactors in Over Compensated lines
(iv)	2 nos. 220 kV feeder bays associated with 1x500 MVA, 400/220 kV 3 rd ICT at Khandwa (PG) substation
(v)	North Eastern Region Strengthening Scheme –VIII

3.4 Members noted the same.

4. Review / Modification of transmission schemes (recommended by Empowered Committee).

4.1. Grant of connectivity and Long Term Open Access to HPPCL-450 MW Shongtong Karcham HEP:

4.1.1. Director (PSPA-I), CEA stated that Empowered Committee on Transmission in its 36th meeting held on 26th July, 2016 has recommended the transmission system associated with Shongtong Karcham HEP to be implemented through TBCB with following scope of work.

Scope of the Transmission Scheme	
1.	Shongtong Karcham – Wangtoo 400 kV D/c Line (Quad HTLS Conductor Equivalent to about 3000MW on each ckt)
2.	2 nos. of 400 kV line bays at Wangtoo

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

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Subsequently, MoP vide Gazette notification dated 28th October 2016 has appointed PFCCL as Bid Process Coordinator (BPC) for the transmission scheme. As the generation project does not have firm beneficiaries, CTU filed a petition in CERC on 11.08.2017 for grant of Regulatory Approval for execution of the Transmission System associated with the project. CERC in its order dated 19.3.2018 has stated that the scheme was planned long back considering a number of hydro projects upstream of Shongtong Karcham HEP. In view of non-implementation or delay in upstream projects, CERC directed CTU to discuss the scheme in the Standing Committee Meeting of the Northern Region again in consultation with CEA and may approach Commission for regulatory approval, if required.

PFCCL informed that the bidding process for the transmission scheme has been completed and LoI had been issued to the successful bidder i.e. M/s Essel Infra Projects Ltd on February 21, 2018. However, SPV could not be transferred to the successful bidder for want of regulatory approval for the transmission scheme.

4.1.2. CEA stated that to ascertain the progress of generation project, a team comprising of officers from CEA, CTU, HPPTCL, HPPCL and Directorate of Energy (GoHP) visited the project site on 13.6.2018. Further, in the meeting held on 15.6.2018 at Shimla, the status of major hydro projects upstream of Shongtong Karcham HEP was furnished by Energy Directorate, Himachal Pradesh. As per the status, no major hydro project is expected by 2029-30. The issue was also discussed in the 40th meeting of Standing Committee on Power System Planning in Northern Region (SCPSPNR) held on 22.06.2017, wherein, HPPCL had informed that revised commissioning schedule of Shongtong Karcham HEP as December, 2023 (as against original schedule of September 2021). In the 40th meeting of SCPSPNR, following was agreed:

- i) The scheme 'Connectivity and Long Term Access (LTA) to HPPCL 450 MW from Shongtong Karcham HEP' may be dropped and the SPV for the scheme may be closed
- ii) The developer of Shongtong Karcham HEP (HPPCL) may implement the connectivity line from Shongtong Karcham to Wangtoo as dedicated line as per the CERC Regulation in vogue.
- iii) CTU to revoke the connectivity and HPPCL to apply connectivity to STU. LTA granted to HPPCL needs to be revised by CTU including revised commissioning schedule and system requirement.
- iv) As agreed earlier HPPCL shall provide one 80 MVAR bus reactor at their generation switchyard. This aspect to be kept in view while grant of connectivity by STU.

4.1.3. After deliberations, NCT recommended for the de-notification of the scheme 'Connectivity and Long Term Access (LTA) to HPPCL 450 MW from Shongtong Karcham HEP' as per the decision taken in the 40th meeting of SCPSPNR. PFCCL was advised to close the SPV of the scheme.

4.1.4. PFCCL stated that they had incurred substantial expenses in carrying out the bidding for the scheme. In the event of de-notification of the scheme, the expenses cannot be recovered. Therefore, there should be some mechanism for recovery of expenses incurred by BPC, in case of abandonment/de-notification of transmission schemes.

4.1.5. The Committee requested BPC to take up the matter with Ministry of Power.

4.2. System strengthening Scheme in Northern Region

4.2.1. Director (PSPA-I), CEA stated that MoP vide Gazette notification dated 04.05.2018 had notified the following schemes for implementation through TBCB route:

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Package-1: Name of Scheme: Northern Region System strengthening Scheme – XL (NRSS-XL) – RECTPCL (BPC)

The scheme includes:

Part-A :System strengthening Scheme in Northern Region

Part-B: Reactive Power Compensation in Northern Region

Part-C: System strengthening Scheme in Northern Region for grant of LTA to M/ Essel Saurya Urja Company of Rajasthan Ltd

Package-2: Name of Scheme: Western Region Strengthening Scheme –XIX (WRSS-XIX) and North Eastern Region Strengthening Scheme – IX (NERSS-IX) – PFCCL (BPC)

The scheme includes:

Part A: Additional 400 kV outlets from Banaskantha 765/400 kV S/S

Part B: Establishment of new substation at Vapi / Ambethi area and its associated transmission lines

Part C: Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID

Part D: North Eastern Region Strengthening Scheme – IX

The detailed scope of works covered under the schemes is mentioned at Annexure-II.

4.2.2. He added that following two elements were also recommended to be implemented through TBCB in the 37th meeting of EC on Transmission held on 20.09.2017:

No.	Transmission Scheme	Detailed scope of works
1.	Replacement of 1x315 MVA ICT by 1x500 MVA ICT and implementation of two nos. of 220 kV line bays at Lucknow	<ul style="list-style-type: none"> • 400/220kV ICT 500MVA, • 400kV ICT bay -1 • 220kV ICT bay-1 • 220kV line bay-2
2.	1x315 MVA, 400/220 kV ICT (to be shifted from Lucknow after refurbishment if required) with 2 nos. of 220 kV line bays at Gorakhpur	<ul style="list-style-type: none"> • 400kV ICT bay -1 • 220kV ICT bay-1 • 220kV line bay-2

However, on the request of UPPTCL to allocate the above elements to POWERGRID for implementation due to urgency, the same were not included in Package-I by MoP.

4.2.3. He further stated that the scope of works covered under Package-1 are augmentation of transformation capacity, addition of transformer / line bays, replacement of transformer, addition of bus reactor at existing sub-stations of POWERGRID. The Package-2, interalia, also involve addition of line bays at existing sub-station of POWERGRID. POWERGRID vide its DO letter no. C/CMD/CTU dated 12.10.2017 had requested MoP for implementation of augmentation / modification works in existing ISTS substations of POWERGRID through RTM by POWERGRID. MoP vide its OM no. 15/03/2017-Trans-Pt (4) dated 8-02-2018 has sought views of CEA on the DO letter of POWERGRID under section 73 (h) of Electricity Act, 2003.

4.2.4. He added that CEA vide its letter dated 25.05.2018 has suggested MoP implementation of the augmentation works at existing sub-station, which are of minimal cost such as addition of transformer, line / transformer bays, addition of reactor, conversion of fixed line reactor into switchable reactor, measures needed to control short circuit level such as reconfiguration of lines (which may involve putting up few towers), addition of series reactor, bus splitting etc. may be exempted from TBCB on a case to case basis.

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For effecting the above following has been suggested by CEA:

1. Ministry of Power may consider to make appropriate amendments under para 7.1 (7) of the Tariff Policy, 2016 by inserting the phrase “modifications, augmentation in the existing sub-stations” before the phrase “technical upgradation”. The same is proposed to bring more clarity under the provision of Tariff Policy. In view of above the para 7.1 (7) may be modified as below:

“While all the future inter-state transmission projects shall, ordinarily, be developed through competitive bidding process, the Central Government may give exemption from competitive bidding for (a) specific category of projects of strategic importance, modifications / augmentation in the existing sub-stations, technical upgradation etc. or (b) works required to be done to cater to an urgent situation on case to case basis.”
2. The empowered Committee / National Committee on Transmission may look into the provisions of exemption from competitive bidding route for transmission works related to “modifications / augmentation in the existing sub-stations”, on case to case basis.
- 4.2.5. He informed that the issue of implementation of augmentation works in existing ISTS sub-stations through RTM was also deliberated in the 1st meeting of newly constituted Empowered Committee on Transmission (ECT) held on 20.07.2018, wherein, the ECT referred the matter for deliberations in NCT.
- 4.2.6. The members of the committee opined that implementation of augmentation of existing ISTS sub-station through TBCB may have following connotation:
 - a) Providing access to the sub-station to the developer (selected through TBCB) for 25-35 years, which may have implication on safety and security of the substations and grid.
 - b) May not be cost effective as the developer has to enter into O&M agreement for 25-35 years with existing owner of the sub-station for carrying out O&M of the augmentation works.
 - c) May result in delay and affect power supply.
 - d) There may be jurisdictional issues with regard to sharing of common facilities such as AC distribution board (ACDB), DC distribution board (DCDB), control room etc., which may jeopardize the augmentation work.
- 4.2.7. In view of above, the NCT decided that the augmentation / modification at existing ISTS sub-stations may be done by the owner of the substation.
- 4.2.8. Based on above, it was decided to recommend that scope of works covered under Package-1 notified by MoP and the transmission elements mentioned at 4.2.2 to be implemented through RTM by POWERGRID.
- 4.2.9. Regarding, Package-2, it was decided that the scheme may be implemented through the TBCB (excluding augmentation of line bays at existing ISTS sub-station to be implemented through RTM). The necessary modifications in the scope of works may be carried out at RfP stage of the bidding.
- 4.2.10. NCT also recommended that MoP may consider necessary modification in the Tariff policy to exempt augmentation / modification in existing ISTS sub-stations from TBCB.
- 5. Status of transmission schemes under bidding process - briefing by BPCs**
 - 5.1. Details of transmission projects awarded through TBCB route by RECTPCL and PFCCCL is given at **Annexure-III (A) and III (B)** respectively.

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3.2. Members noted the same.

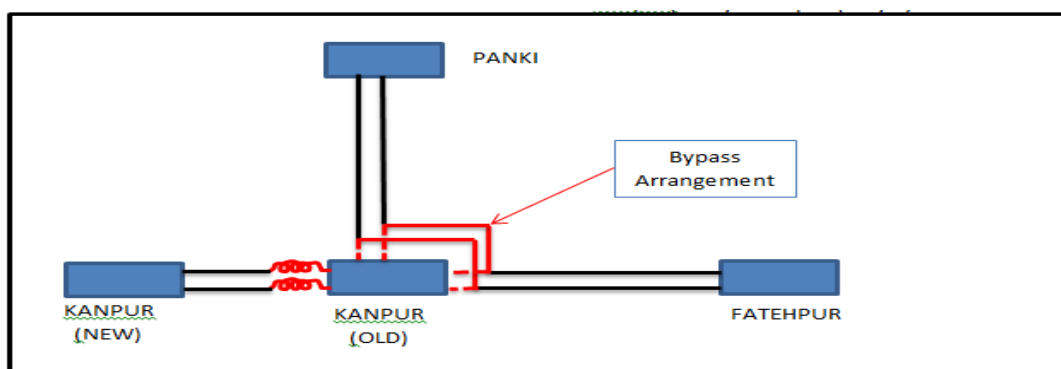
6. New Inter-State Transmission Schemes**6.1. Name of the Scheme: Scheme to control Fault Level in Northern Region (Phase-II)**

6.1.1. Chief engineer (PSPA-I), CEA stated that the “Scheme to control Fault Level in Northern Region (Phase-II)” was deliberated in 39th meeting of SCPCPNR held on 29-30th May, 2017 and seven numbers of pockets (where each pocket consists of a group of substations) having high fault level were identified. In the meeting, it was decided that initially measures to control high short circuit level in two pockets i.e. i) Kanpur, Panki and Fatehpur ii) Bhiwani, Hissar, Mohindergarh and Moga, which involve re-alignment of some lines and installation of 12 ohm bus/line reactors would be taken. The scope of the transmission scheme is as under:

Scope of Transmission Scheme	Estimated Cost (Rs. Crore)
Part-A: At Kanpur	65
i) 12ohm Series Line reactor in Kanpur (old)–Kanpur (New), 400kV D/c line at Kanpur (old) end	
ii) Fatehpur–Kanpur (old) 400kV D/c and Kanpur (old)-Panki 400kV D/c lines to be disconnected at Kanpur (old) end and connecting them directly to form Fatehpur-Panki 400 kV D/c line.	
Part-B: At Bhiwani, Hissar and Mohindergarh	110
i) 12ohm Series Bus reactor at Bhiwani (PG) substation.	
ii) 12ohm Series Line reactors in Mohindergarh–Dhanonda 400kV D/c line Ckt I & II at Mohindergarh end	
iii) Mohindergarh–Bhiwani (PG) 400kV D/c line (One of the two D/c lines) and Bhiwani (PG)- Hissar (PG) 400kV D/c line (D/c line which is Direct)) to be disconnected from Bhiwani (PG) end and directly connected to form Mohindergarh–Hissar 400kV D/c line.	
iv) The remaining Bhiwani (PG)–Hissar (PG) 400kV D/c line (one circuit via Bhiwani (BBMB) and Hissar (PG)–Moga (One circuit via Fatehbad) 400kV line to be disconnected at Hissar end and directly connected to form Bhiwani (PG)–Moga 400kV line (One circuit via Fatehbad and other circuit via Bhiwani (BBMB))	
Total Estimated Cost (Rs. Crore)	175

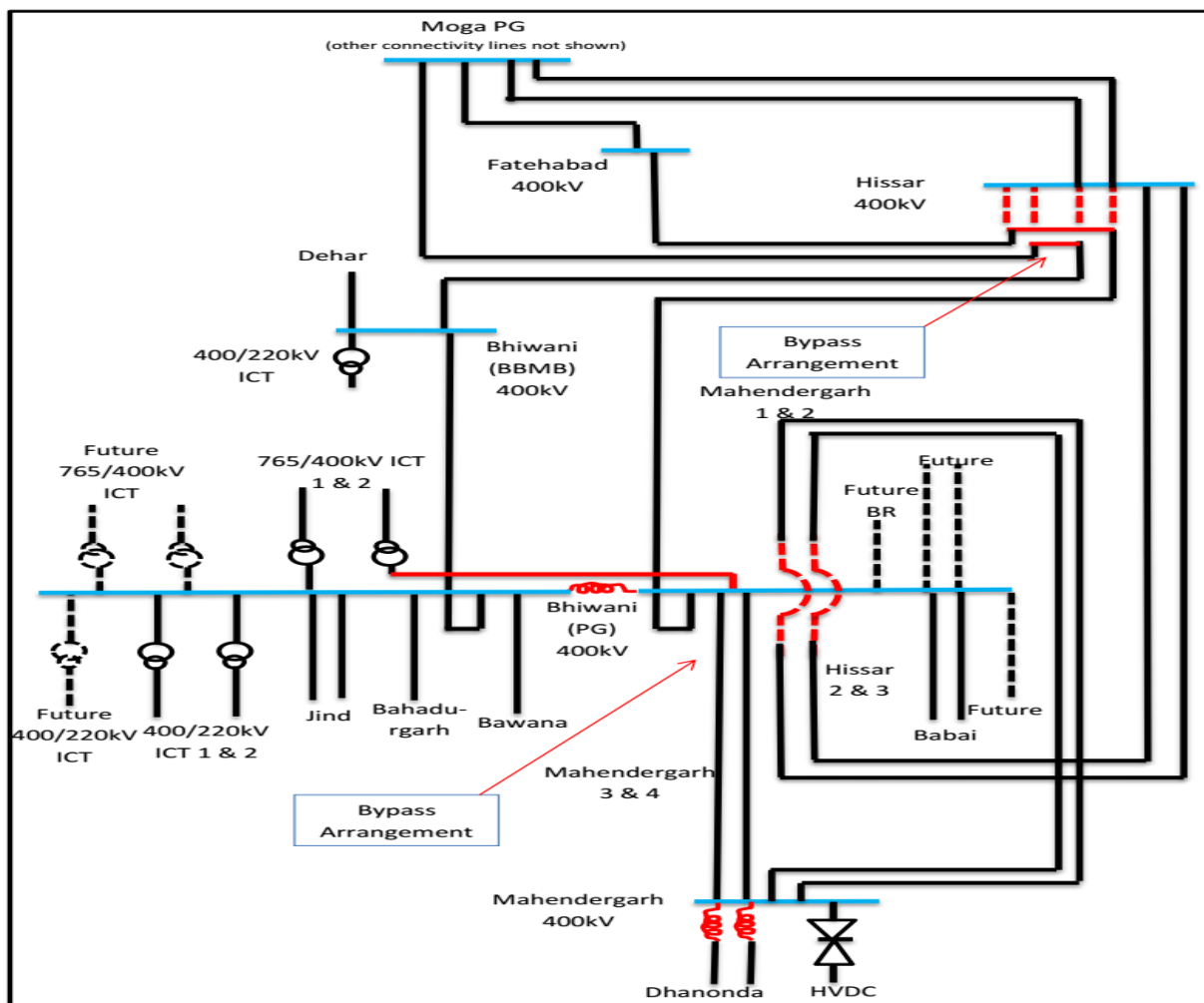
Note: For both Part-A & Part-B, Shifting/reorientation works inside substations may be required to accommodate the splitting/bypass arrangements

6.1.2. The diagrams of the schemes are shown below :

Pocket I: Kanpur, Panki and Fatehpur

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Pocket II: Bhiwani, Hissar, Mohindergarh and Moga



- 6.1.3. He further stated that the above schemes were earlier deliberated in 37th meeting of EC on Transmission held on 20.9.2017, wherein, CTU had stated that implementation of these works through TBCB would be very difficult as this involves detailed studies including TRV studies. Some existing equipment may also have to be replaced. Therefore, it was decided that POWERGRID may make a presentation in the next meeting of EC on Transmission, clearly indicating the complexities involved in the execution of the works through TBCB.
- 6.1.4. POWERGRID made the presentation highlighting description of the works involved. POWERGRID mentioned that at present there is no installation of series / bus reactors at 400kV voltage level in India. Also there are only few such installations across the world at transmission level of 400kV and above. Certain issues may surface at later stage of implementation. This may lead to modification in scope of work for the project. POWERGRID shared the experience of series line reactors under implementation at for Dadri-Mandola 400 kV D/C line and bus reactor each at Ballbgarh and Mondola 400 kV sub-stations. One such modification in scope of work was addition of TRV Capacitor to limit TRV and RRRV across CB. Detail study was carried out in consultation with supplier, which took about 4 months to determine the value of the TRV capacitor. The vendor agreed to install TRV capacitor after detail discussion only. Other problem was high noise generated during factory testing of these reactors. POWERGRID is currently working on the resolution of this problem.
- 6.1.5. POWERGRID also stated that the scheme involves realignment of some 400kV lines at POWERGRID substations and installation of 12ohm series reactors at various lines and buses. Therefore, it would be difficult to implement the scheme through TBCB route as

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the scheme may involve some modifications in the existing substations, which can only be worked out at the time of detailed engineering. Further it may not be possible to exactly identify the Bill of Quantities (BoQ), as at some locations new bay dia would have to be created and at other locations half dia would be available. At some locations, space for panels in control room would be available and in other cases control room would have to be expanded by removing some of the walls. Therefore, in case of implementation through TBCB, it would be difficult for them to provide exactly the BoQ at the time of RfP preparation.

6.1.6. On a query about reduction of the fault level through these measures, CTU stated that with implementation of the scheme, the fault level reduces to 33-36 Amp from 53-58 Amp in Kanpur area and from 62 Amp in Bhiwani to 39 Amp. The reduction in the fault level with the measures suggested has also been provided in the agenda and the measures suggested have been arrived at after detailed studies.

6.1.7. **After further deliberations, the NCT recommended the above scheme for implementation through RTM by POWERGRID / owner of the sub-station.**

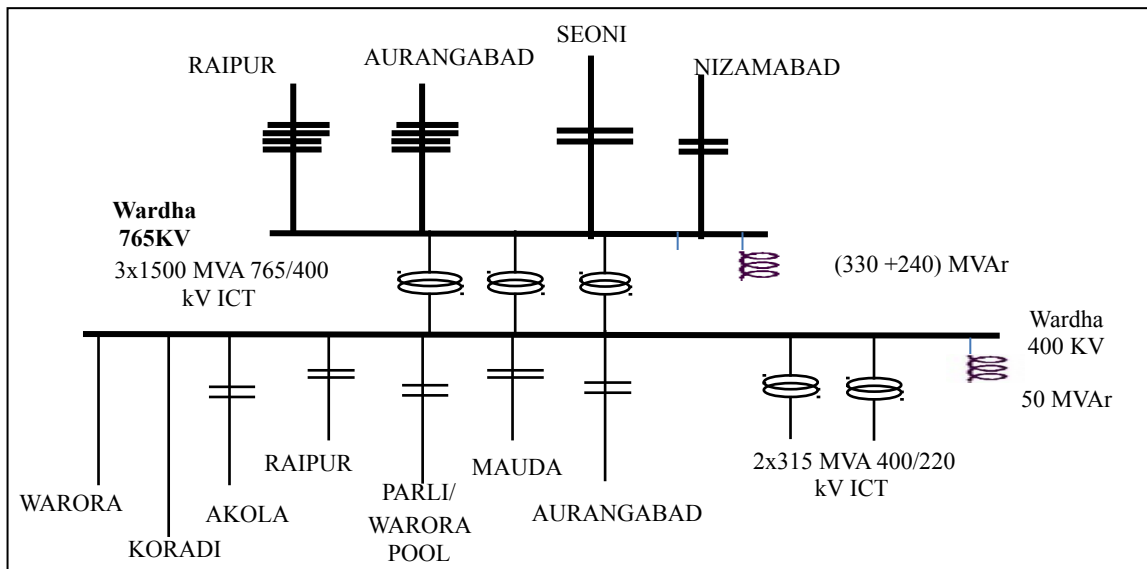
6.2. Name of the Scheme: Measures to control fault level at Wardha Substation

6.2.1. Chief engineer (PSPA-I), CEA stated that the scheme “Measures to control fault level at Wardha Substation” was discussed in the 37th, 39th, 40th & 41st meetings of SCSPWR and the following scheme involving bus splitting at Wardha with 12 Ohm fault limiting reactor to connect 400kV Bus Section A and Bus Section B of Wardha 400 kV Bus has been agreed to control the high fault level at Wardha 400 kV S/s.

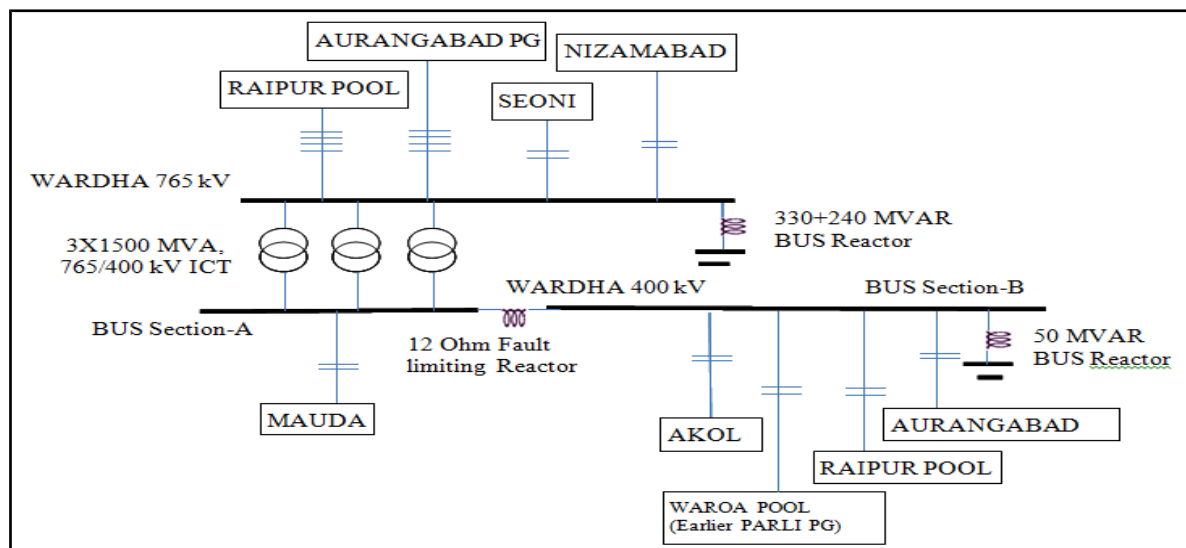
The scope of the transmission scheme is as under:

Sl. No.	Scope of the Transmission Scheme	Estimated Cost (Rs. Crore)
i)	Split of 400 kV Wardha substation into two sections, Section –A and Section-B as per diagram, with necessary switching arrangement	75
ii)	Interconnecting Wardha - Koradi II 400 kV quad with Warora – Wardha 400 kV (Quad) line at outskirts of Wardha substation so as to form Warora – Koradi II 400 kV (Quad) line	
iii)	All necessary arrangement for Change in termination of Warora Pool -Wardha 400 kV D/C (Quad) line by disconnecting it from Wardha 400kV BUS Section A and terminating in vacant 400 kV bays of Warora and Koradi II 400 kV (Quad) lines at Wardha 400kV BUS Section B.	
iv)	12 Ohm fault limiting reactor to connect 400kV BUS Section A and BUS Section B of Wardha 400 kV BUS.	
v)	2x63MVA line reactors at Wardha end of Wardha – Warora Pool 400 kV D/C (quad) line to be used as bus reactors at Wardha S/s - section A (by using the two nos. of 400 kV bays which shall be vacant in Wardha Bus Section-A after shifting of Warora pool - Wardha 400 kV D/C line from Section - A to Section-B)	
vi)	Necessary modification at Wardha sub-station like change of some elements including CTs if those are not designated for 50 kA fault level	
	Total (in Crore)	75

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Existing 765/400 kV Wardha substation



765/400 kV Wardha substation after bus splitting and line reconfiguration

- 6.2.2. He further stated that the scheme was earlier deliberated in 37th meeting of Empowered committee held on 20.9.2017, wherein CTU stated that the scheme would involve shifting of lines from one split section to other as well as change of some existing equipment including CTs if they are not designed for 50kA. Therefore, it was decided that POWERGRID may make the presentation in the next meeting of EC on Transmission, so as to take the decision regarding implementation of the scheme through TBCB or RTM by POWERGRID. The brief on the scheme is given as under
- 6.2.3. POWERGRID made the presentation giving description of the works involved and stated that the scheme involves splitting of 400kV bus, insertion of series reactor between the split bus sections of the existing substation of POWERGRID and reorientation of feeders.
- 6.2.4. **After deliberations, NCT recommended the above scheme for implementation through RTM by POWERGRID.**
- 6.3. **System strengthening Scheme in Southern Region:**
- 6.3.1. **Chief Engineer (PSPA-I), CEA stated that the scheme 'System strengthening Scheme in Southern Region' involves construction of 2 no. of 220kV bays at 400/220kV substation at Cochin East (Pallikkara) of POWERGRID for connecting Cochin East (Pallikkara)-Aluva 220kV D/C line (to be implemented by KSEBL) and additional 400/220kV, 1x500 MVA ICT at Gazuwaka due to overloading of existing 400/220kV, 2x315 MVA ICTs at Gazuwaka. The scheme was agreed in the**

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41st meeting of the Standing Committee on Power System Planning of Southern Region (SCPSPSR) held on 22nd September, 2017. The scope of works are as follows:

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA)	Estimated Cost (Rs.) Cr.
1	2 no. of 220kV bays at 400/220kV substation at Cochin East (Pallikkara) of POWERGRID	-	10.1
2	Additional 400/220kV, 1x500 MVA ICT at Gazuwaka substation with associated bays 400/220kV ICT -1 no. 400kV ICT bay -1 no. 220kV ICT bay -1 no.	500MVA	31.3
Total Rs (in Crore)			41.4

Note:

- a. POWERGRID to provide space for 2 nos. 220kV line bays at Cochin East (Pallikkara)
- b. POWERGRID to provide space for ICT at Gazuwaka substation with associated bays

6.3.2. After deliberations, it was opined that the scheme involves augmentation works at existing substations of POWERGRID, therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID. It was suggested POWERGRID would ensure implementation of the 220 kV bays in matching time frame of Cochin East (Pallikkara)-Aluva 220kV D/C line (to be implemented by KSEBL).

6.4. Name of the scheme: 400kV Udupi (UPCL)-Kasargode D/C line

6.4.1. Chief Engineer (PSPA-I), CEA stated that the scheme '400kV Udupi (UPCL)-Kasargode D/C line' was agreed in the 39th meeting and 41st meeting of SCPSPSR held on 28-29.12.2015 and 22.09.2017 respectively. The detailed scope of scheme s as under:

Sl. No.	Scope of the Transmission Scheme	Route length (km) / Capacity (MVA)	Estimated Cost (Rs.) Cr.
1.	Mangalore (Udupi PCL)-Kasargode 400kV Quad D/C line	110 km	421*
2.	Establishment of 2x500 MVA, 400/220 kV GIS substation at Kasargode <u>400kV</u> 400/220 kV 500 MVA ICTs: 2 no - Bus Reactor (63 MVAR): 2 no. - Line Bays: 4 - ICT bays : 2 - Space for line bays : 4 - Space for ICT bays : 2 <u>220 kV</u> - Line Bays : 6 - ICT bays : 2 - Space for line bays : 6	1000 MVA	181

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3.	2 nos. of 400kV line bays at UPCL switchyard		18
Total Cost Rs (Crore)			620

**As line route would be through forest, 1 cr. per km has been included as forest compensation in the cost.*

Note:

- i) Udupi PCL to provide space for 2 nos. 400kV line bays at UPCL switchyard
- ii) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.

6.4.2. He said that earlier, the scheme 'Mangalore / Udupi (UPCL)–Kasargode-Kozhikode 400 kV link' through TBCB was recommended in 31st meeting of the EC on Transmission held on 18.02.2013 subject to commitment from the Kerala Government for payment of compensation only for the tower footing as is practice in other parts of the country. Therefore, the notification of the scheme was not published in the Gazette of India. During the 36th meeting of SCPSPSR held on 4.9.2013, it was informed that Government of Kerala had given the commitment for compensation of RoW as suggested in EC meeting.

6.4.3. He added that in the 39th meeting and 41st meeting of SCPSPSR held on 28th-29th December, 2015 and 22.09.2017, it was agreed that only Udupi–Kasargode 400kV D/C line will be implemented as per tariff policy of Government of India as ISTS project. Further, it was also agreed that Kasargode–Kozhikode (Areekode) 400kV D/c line would be implemented as intra-state transmission project by Kerala state.

6.4.4. After deliberations, NCT recommended the above scheme for implementation through TBCB.

6.5. Name of the scheme: Construction of 2 no. 400 kV GIS bays at 400/220 kV Chamera Pooling Station of PGCIL under Northern Region System Strengthening scheme

6.5.1. Chief Engineer (PSPA-I), CEA stated that the transmission scheme "Construction of 2 no. 400 kV GIS bays at 400/220 kV Chamera Pooling Station of PGCIL" was agreed in the 40th meeting of SCPSPNR held on 22.06.2018. These bays are required for Lahal–Chamera 400kV D/c line under implementation by HPPTCL. The scope of work is as under:

Transmission Scheme	Estimated Cost (Rs. Crore)
Construction of 2 no. 400 kV GIS bays at 400/220 kV Chamera Pooling Station of PGCIL	21

Note: Chamera Pooling Station has double main bus switching arrangement.

6.5.2. After deliberations, it was opined that the scheme involves augmentation works at existing substations of POWERGRID, therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID.

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

6.6.1. Chief Engineer (PSPA-I), CEA stated that UPPTCL's proposal of augmentation of transformation capacity at 400/220kV Saharanpur (PG) substation by 1x500 MVA ICT under Northern Region System Strengthening scheme was agreed in the 40th meeting of SCPSPNR held on 22.06.2018 to meet n-1 contingency criteria with following scope of works:

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Transmission Scheme	Detailed scope of works	Estimated Cost (Rs. Crore)
Additional 1x500 MVA, 400/220kV ICT at Saharanpur (PG) 400/220kV substation	<ul style="list-style-type: none"> 400/220kV ICT 500MVA, 400kV ICT bay -1 220kV ICT bay-1 	34

6.6.2. After deliberations, it was opined that the scheme involves augmentation works at existing substations of POWERGRID, therefore the NCT recommended the scheme for implementation through RTM by POWERGRID.

6.7. Name of the scheme: Provision of Bus Reactors at High Voltage Nodes in Western Region

6.7.1. Chief Engineer (PSPA-I), CEA stated that reactive power compensation through provision of bus reactors at the following 400 kV / 765 kV ISTS substation has been agreed in 42nd meeting of SCPSPWR to control high voltages in the time frame of 2021 – 22. The scope of scheme is as under:

Sl. No.	Scope of the Transmission Scheme	Proposed Bus Reactor Capacity (MVA)	Estimated Cost (Rs.) Cr.
1	Khandwa 400kV	1x125	16
2	Solapur 765kV	1x240	35
3	Rajgarh 400kV	1x125	16
4	Wardha 765kV	1x330	41
5	Aurangabad 765kV	1x240	35
Total Rs (in Crore)			143

6.7.2. After deliberations, it was opined that the scheme involves augmentation works at existing substations of POWERGRID, therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID.

6.8. Name of the scheme: Augmentation of transformation capacity in Western Region

6.8.1. Chief Engineer (PSPA-I), CEA stated that transformation capacity augmentation at following 400 kV S/s in Western Region was agreed in the 42nd & 43rd meeting of SCPSPWR to fulfill (n-1) contingency criteria in 2021–22 timeframe:

Sl. No.	Scope of the Transmission Scheme	Existing / Already planned MVA	Proposed ICT (MVA)
1	Jabalpur 400/220kV S/S	2x315	1x500
2	Itarsi 400/220kV	1x315+1x500	1x500

6.8.2. The proposed scheme is as given below:

Transmission Scheme	Detailed scope of works	Estimated Cost (Rs. Crore)
Augmentation of transformation capacity in Western Region	Jabalpur 400/220 kV S/S <ul style="list-style-type: none"> 400/220kV ICT 500MVA 400kV ICT bay – 1 no. 	34

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	<ul style="list-style-type: none"> 220kV ICT bay- 1 no. 	
	Itarsi 400/220 kV S/S <ul style="list-style-type: none"> 400/220kV 500MVA ICT - 1 no., 400kV ICT bay -1 no. 220kV ICT bay-1 no. 	34
Total Rs (in Crore)		68

6.8.3. **After deliberations, it was opined that the scheme involves augmentation works at existing substations of POWERGRID, therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID.**

6.9. **Name of the scheme: Provision of Bus Reactor at Champa Pool Split Section –Part A**

6.9.1. Chief Engineer (PSPA-I), CEA stated that in the 39th meeting of SCSPWR held on 30.11.2015, the bus splitting arrangement was agreed at Champa Pooling Station and subsequently 1x125 MVAR bus reactor at 400 kV bus section A of Champa PS was agreed in 42nd meeting of SCSPWR. POWERGRID is carrying out the bus splitting at Champa Pooling Station. The scope of the scheme is as under:

Transmission Scheme	Detailed scope of works	Estimated Cost (Rs. Crore)
Provision of Bus Reactor at Champa Pool Split Bus Section –A 400 kV, 1x125 MVAR Bus reactor Champa Pool Split Section –Part A	<ul style="list-style-type: none"> 400 kV, 1x125MVAR 400kV bay -1 	16

6.9.2. **After deliberations, it was opined that the scheme involves augmentation works at existing substations of POWERGRID, therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID.**

6.10. **Name of the scheme: Conversion of Fixed line reactors in Switchable reactors in Kankroli – Zerda line at Kankroli end:**

6.10.1. Chief Engineer(PSPA-I), CEA stated that during the 39th meeting of SCSPNR the proposal of converting the fixed Line reactors of some of the lines to switchable line reactors was agreed, which inter-alia involved conversion of fixed line reactor (420 kV, 50MVA) at both ends of Zerda–Kankroli 400kV line into switchable line reactor., Subsequently, POWERGRID proposed to drop the proposal of conversion of fixed line reactors to switchable line reactors of Zerda–Kankroli 400kV line due to space constraints at Zerda substation. In the 37th meeting of EC on Transmission held on 20.9.2017, following scheme was agreed to be implemented through RTM.

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

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iii)	Abdullapur-Panchkula I	Abdullapur	50	Panchkula I	--
iv)	Abdullapur-Panchkula II	Abdullapur	50	Panchkula II	--
Note: Provision should be kept to use these line reactors as bus reactors in case the line is not in operation					

6.10.2. He further stated that in the 42nd meeting of SCSPWR held on 17-11-2017, the scheme of conversion of fixed line reactor (420 kV, 50MVA) at Kankroli end of Zerda-Kankroli 400kV line into switchable line reactor was agreed. The scope of the transmission scheme is as under:

Sl. No.	Name of the Line	S/S (sending end)	Reactor (MVA)	S/S (receiving end)	Line Reactor (MVA)	Estimated Cost (Rs. Crore)
1.	Zerda – Kankroli 400kV line	Zerda	-	Kankroli	50	9
Total Estimated Cost (Rs Crore)						9

6.10.3. After deliberations, it was opined that the scheme involves modification at existing substation of POWERGRID, therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID.

6.11. Name of the scheme: Installation of 400/220 kV ICT along with associated bays at M/s CGPL Switchyard

6.11.1. Director (PSPA-I), CEA stated that in the 43rd meeting of SCSPWR held on 11.05.2018, , members agreed to install 1x500 MVA 400/220 kV ICT at M/s CGPL Switchyard to provide the startup power during the black start. The startup power would be provided through Nanikhakhar-CGPL 220 kV S/C line. The line would remain open from CGPL end. The scope of work to be implemented under ISTS is:

- 1x500 MVA, 400/220 kV ICT at CGPL Mundra to be installed at CGPL Switchyard along with one no. of 400 kV bay and one no. of 220 kV bay at CGPL Mundra.

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA)	Estimated Cost (Rs.) Cr.
1	400/220kV, 1x500 MVA ICT at CGPL Mundra substation with associated bays: 400/220kV ICT -1 no. 400kV ICT bay -1 no. 220kV ICT bay -1 no. 220 kV line bay- 1 no.	500MVA	39
Total Rs (in Crore)			39

6.11.2. Chairperson, CEA stated that the utility of the transformer is only to provide the startup power during the black start and already the CGPL generation is connected to the grid, therefore it was opined that the scheme may be reviewed.

6.11.3. After deliberations, members agreed that the scheme 'Installation of 400/220 kV ICT along with associated bays at M/s CGPL Switchyard' may be reviewed in next meeting of WRST.

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6.12. **Name of the scheme: Transmission system plan for evacuation of 4000 MW of RE power in the Bhuj area under SECI bids (Tranche I to IV) at Bhuj PS:**

6.12.1. Director (PSPA-I), CEA stated that transmission system for evacuation of power from 4000 MW of RE projects under SECI bids was discussed in 43rd meeting of SCPSPWR and it was agreed to hold a joint study meeting amongst CEA, CTU, POSOCO & GETCO for further deliberations and finalization of the transmission system taking into consideration the suggestions made by the members during the meeting.

Accordingly, a joint study meeting has been convened on 05.06.2018 & 06.06.2018 and the following transmission system was agreed:

“Transmission system for injection of power from 4000MW RE projects under SECI bids (Tranche I to IV) at Bhuj PS (by Apr’2020)”

- i) In addition to under implementation 400/220 kV 2x500MVA & 765/400 kV 2x1500MVA ICTs at Bhuj, following augmentation in transformation capacity would be required for evacuation of power from about 4000MW of RE projects under SECI bids (Tranche-I to IV)
 - 6x500MVA 400/220kV ICTs
 - 2x1500MVA 765/400kV
- ii) For any additional RE injection at Bhuj PS (other than the above 4000MW), 1x500MVA 400/220kV (9th) ICT would be required.
- iii) Bhachau–Varsana 400kV D/c line remains critically loaded. It was observed that the line remains loaded even without the RE injection at Bhuj PS. Further, the Short Circuit levels at Bhachau and Varsana exceed 40kA (design rating), because of contribution from each other.
- iv) On account of space constraints at Bhuj PS, all future 220kV as well as 400kV line / ICT bays at Bhuj PS need to be implemented as GIS.

6.12.2. In view of space constraints at 400 kV voltage level at Bhuj Pool, the following scheme is proposed :

Name of the scheme: Transmission system for injection of power from 4000MW RE projects under SECI bids (Tranche I to IV) at Bhuj PS

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA)	Estimated Cost (Rs.) Cr.
1	Installation of additional 3x500MVA, 400/220kV ICTs along with 400kV AIS & 220kV AIS bays	3x500MVA 400/220kV	102
2	Installation of additional 3x500MVA, 400/220kV ICTs along with 400kV GIS & 220kV AIS bays	3x500MVA 400/220kV	107
3	Installation of additional 2x1500MVA, 765/400kV ICTs along with 765kV AIS & 400kV GIS bays	2x1500MVA, 765/400kV	147
Total Rs (in Crore)			356

6.12.3. Chief Engineer (PSPA-I), CEA stated that the above scheme is required urgently for evacuation of power from 4000MW RE projects at Bhuj PS as the wind power generation projects, which have been successful in SECI bids of tranche 1, 2, 3 & 4 are scheduled to be commissioned by Oct, 2018, May, 2019, Nov, 2019 & April 2020 respectively.

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6.12.4. After deliberations, it was opined that the scheme involves augmentation works at Bhuj pooling station of POWERGRID and scheme is urgently required for evacuation of RE power. Therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID under compressed time schedule.

6.13. **Name of the scheme: Transmission system plan for evacuation of 950 MW of RE power under SECI bids (Tranche I to IV) at Tuticorin PS**

6.13.1. Director (PSPA-I), CEA stated that out of 6050 MW of wind power bid by SECI (Bid-I to IV), the successful bidders has opted for 950 MW injection at Tuticorin-II GIS pooling station. For evacuation of power the following scheme has already been agreed the in 42nd meeting of SCPSR held on 27.04.2018.

Name of the scheme: Transmission system plan for evacuation of 950 MW of RE power under SECI bids (Tranche I to IV) at Tuticorin PS:

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA)	Estd. Cost (Rs.) Cr.
1	Installation of 1x500 MVA, 3 rd 400/230 kV ICT along with 400kV GIS & 230kV GIS bays	<ul style="list-style-type: none"> • 400/230kV 500MVA ICT – 1no. • 400kV ICT bay -1 no. • 230kV ICT bay-1 no. 	37
Total Rs (in Crore)			37

6.13.2. Chief Engineer (PSPA-I), CEA stated that the scheme is also urgent in nature as the transformation capacity is required for evacuation of power from RE projects in Tuticorin area of Tamil Nadu.

6.13.3. **After deliberations, the NCT recommended the above scheme for implementation through RTM by POWERGRID under compressed time schedule.**

6.14. **Name of the scheme: 2 nos. of 400kV bays at Kozhikode in SR**

6.14.1. Chief Engineer (PSPA-I), CEA stated that North Trissur (Madakkathara)-Kozhikode (Areakode) 400kV D/C line (with Quad Moose ACSR conductor) was approved in the 30th meeting of SCPSR as ISTS. In the 39th meeting of SCPSR, it was decided that the line will be implemented by KSEBL. In 42nd SCPSR, it was decided that for termination of North Trissur (Madakkathara)-Kozhikode (Areakode) 400kV D/C line, two nos. of 400kV bays at Kozhikode (Areakode) substation will be implemented under ISTS. The scope of scheme is as under:

Transmission Scheme	Estimated Cost (Rs. Crore)
Construction of 2 No. 400 kV bays at 400/220 kV Kozhikode (Areakode) substation of PGCIL	18

6.14.2. **After deliberations, it was opined that the scheme involves augmentation works at Kozhikode (Areakode) substation of POWERGRID, therefore NCT recommended the above scheme for implementation through RTM by POWERGRID.**

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6.15. Name of the scheme: **Implementation of 400kV reactor for reactive power compensation in SR**

6.15.1. Director (PSPA-I), CEA stated that in the 42nd meeting of SCPSPSR, the following reactors at 6 nos. at ISTS sub-stations to control high voltage were agreed based on reactive compensation studies carried out for 2021-22 time frame. The scope of scheme is as under:

Transmission Scheme	Estimated Cost (Rs. Crore)
400kV reactor at the following substations: (i) Hosur 400kV - 1x125 Mvar (ii) Madhugiri (GIS)400kV - 1x125 Mvar (iii) Dharampuri400kV - 1x125 Mvar (iv) Hiriyur 400kV - 1x125 Mvar (v) Pugalur 400kV - 1x125 Mvar (vi) Pugalur HVDC Stn (GIS)400kV - 2x125 Mvar (vii) 7 nos of 400kV reactor bays	117 crores

6.15.2. Chief Engineer (PSPA-I),CEA stated that the above reactors were agreed based on the NLDC operational feedback on Transmission constraints for Quarter 1, 2 & 3 of 2017-18 regarding persistent high voltage situation being experienced 20-70% of time in the off-peak period at number of 765/400 kV substations in the Southern Regional grid .

6.15.3. **After deliberations, it was opined that the scheme involves augmentation works at Kozhikode (Areekode) substation of POWERGRID, therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID.**

6.16. **Termination of 400kV lines at Jeerat (WBSETCL) S/s under the ERSS-XV and ERSS-XVIII schemes**

6.16.1. Chief Engineer (PSPA-I), CEA stated that ERSS-XV and ERSS-XVIII are under implementation, which inter-alia includes the following works at Jeerat (WBSETCL) S/s:

- (i) *LILO of Sagardighi–Subhashgram 400kV S/c line at Jeerat (WBSETCL): as a part of ERSS-XV by POWERGRID under RTM*
- (ii) *Jeerat (New)–Jeerat (WBSETCL) 400kV D/c line (Quad): as a part of ERSS-XVIII being implemented under TBCB by POWERGRID Medinipur-Jeerat Transmission Ltd.*

6.16.2. He added that to address space constraints, it was decided to dismantle the dead end towers and terminate existing 400kV lines of POWERGRID and WBSETCL at Jeerat (WBSETCL) through GIS duct by POWERGRID as an additional scope under ERSS-XV in a meeting held on 14.12.2016 between CEA, CTU and WBSETCL. However, in the 19th meeting of SCPSPER held on 01-09-2017, it was decided that the additional scope of works may be implemented under ISTS.

6.16.3. He further stated that keeping in view the time schedule of ERSS-XVIII by POWERGRID under TBCB and already delayed ERSS-XV by POWERGRID under RTM, POWERGRID has proposed to include the following as additional scope in already approved ERSS-XV scheme being implemented by POWERGRID under RTM.

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- (i) Dismantling of dead end towers and termination of following existing lines at Jeerat (WBSETCL) through GIS duct to the existing 400kV Jeerat AIS S/s (WBSETCL).
- Jeerat (WBSETCL) – Baharampur/Farakka 400kV S/c line of POWERGRID
 - Jeerat (WBSETCL)–Rajarhat/Subhashgram 400kV S/c line of POWERGRID
 - Jeerat (WBSETCL)–Barkeshwar (WBSETCL) 400kV S/c line of WBSETCL
 - Jeerat (WBSETCL)–Kolaghat (WBSETCL) 400kV S/c line of WBSETCL
- (ii) Termination of the existing WBSETCL lines to the existing 400kV Jeerat AIS S/s (WBSETCL) through GIS duct as ISTS and inclusion of the same in the approved scope of ERSS-XV being implemented by POWERGRID.

6.16.4. CTU informed that the estimated cost of the scheme is about Rs 26.3 crores.

6.16.5. **After deliberations, the NCT recommended the above scheme for implementation through RTM by POWERGRID.**

6.17. 500MW HVDC back to back station at North Comilla (Bangladesh) for transfer of power through Surjamaninagar (India)–North Comilla (Bangladesh) : Indian Portion

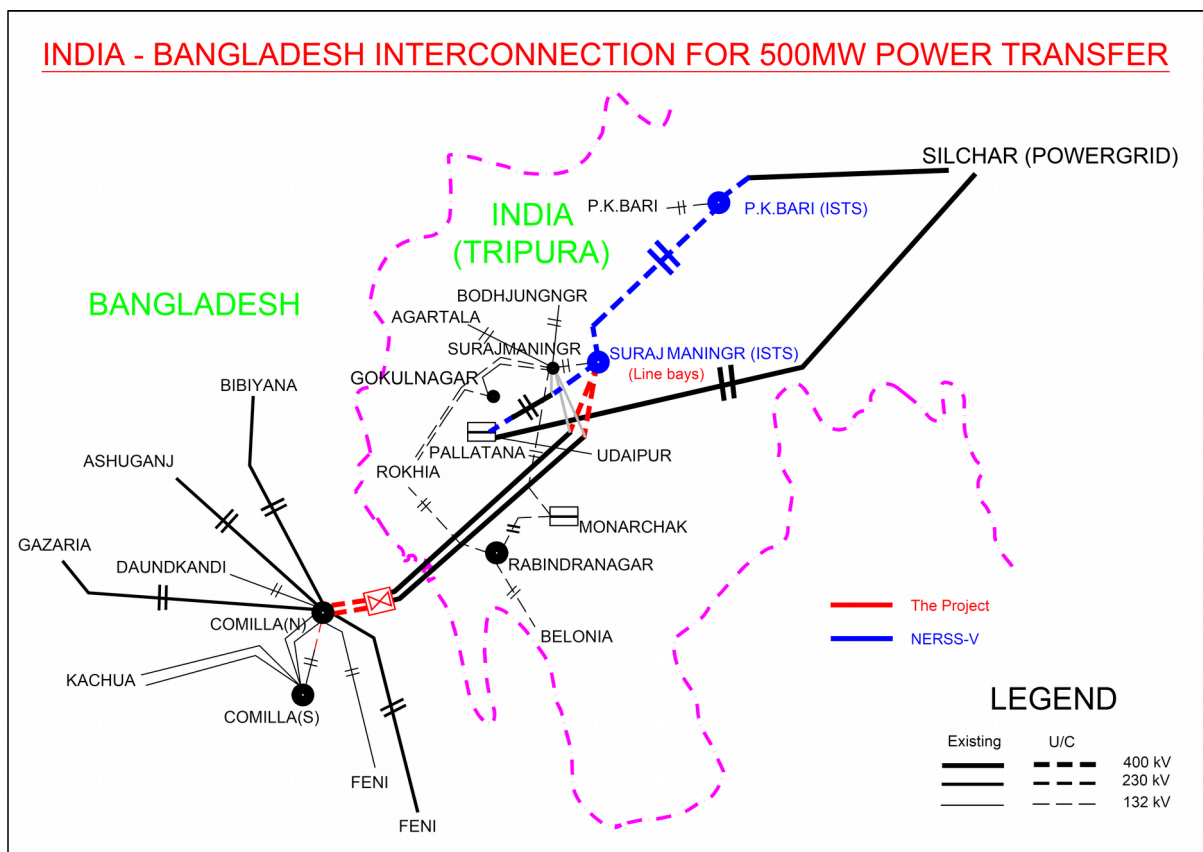
6.17.1. Chief Engineer (PSPA-I), CEA stated that in the 13th Joint Working Group (JWG) and Joint Steering Committee (JSC) meetings on Indo-Bangladesh Cooperation in Power Sector held on 27th-28th Sept 2017, it was decided to undertake implementation of 500MW HVDC back to back station at North Comilla (Bangladesh) for transfer of 500MW power through Surjamaninagar (India) – North Comilla (Bangladesh). It was also decided that POWERGRID and Power Grid Company of Bangladesh (PGCB) shall implement the Indian and Bangladesh portion respectively. In the 14th JWG/JSC meetings held on 30th-31st Jan 2018, Bangladesh informed that the expected commissioning schedule of the project is Dec 2020. Further, with regard to sharing of transmission charges for Indian portion by Bangladesh, it was agreed in the 14th JWG/JSC meetings that the existing Bulk Power Transmission Agreement (BPTA) for this interconnection may be amended / supplemented for the additional scope of works, if required.

6.17.2. He further stated that in order to facilitate 500MW power transfer, following upgradation in the Indian Grid is required to be implemented:

- Operation of Surajmaninagar (TSECL) – North Comilla 400kV D/c line (presently operated at 132kV) at 400kV through termination at 400kV bus of *Surajmaninagar S/s.
- 2 nos. 400kV line bays at *Surajmaninagar S/s for termination of Surajmaninagar (TSECL) – North Comilla 400kV D/c line

*Note: * Surajmaninagar 400/132kV ISTS S/s is being implemented under NERSS-V scheme through TBCB route: expected commissioning schedule as per RfP is July 2020.*

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6.17.3. **After deliberations, the NCT recommended the above scheme for implementation through RTM.**

- i) Operation of Surajmaninagar (TSECL) – North Comilla 400kV D/c line (presently operated at 132kV) at 400kV through termination at 400kV bus of Surajmaninagar S/s – by POWERGRID
- ii) 2 nos. 400kV line bays at Surajmaninagar S/s for termination of Surajmaninagar (TSECL) – North Comilla 400kV D/c line – by owner of the S/S.

6.18. **2 no. 400kV line bays at Muzaffarpur (POWERGRID) S/s operation of Muzaffarpur-Dhalkebar 400kV D/c line (presently operated at 132kV) at rated voltage level of 400kV**

6.18.1. CTU stated that in the 5th meeting of the Joint Steering Committee (JSC) on India-Nepal Cooperation in Power Sector held on 17th April 2018, it has been decided that 2 no. of 400kV line bays at Muzaffarpur (POWERGRID) substation for 400kV operation of Muzaffarpur-Dhalkebar line are to be implemented by the Cross Border Power Transmission Company Ltd. (CPTC) as per the existing Implementation & Transmission Service Agreement (ITSA) between CPTC and Nepal Electricity Authority (NEA). CPTC had implemented the Muzaffarpur-Dhalkebar 400kV line (presently operating at 132kV level). The estimated cost of the scheme is about Rs. 18 crores.

6.18.2. **After deliberations, it was opined that the scheme involves augmentation works at existing Muzaffarpur substation of POWERGRID, therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID.**

6.19. **Indian portion of Dhalkebar (Nepal)–Muzaffarpur (India) 400kV D/c (Quad Moose) line associated with 900MW Arun-3 HEP in Nepal**

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- 6.19.1. CTU stated that in a meeting held in Ministry of Power under the chairpersonship of JS (Transmission), MoP on 27-03-2018 to discuss the issues related to Associated Transmission System (ATS) of 900MW Aurn-3 HEP in Nepal following was decided:
- “(i) The cross border nature of the Indian portion of the transmission line may be considered to be of strategic importance and is required to be constructed in a synergistic manner so as to match with the commissioning of the generation as well as the Nepal portion of the transmission line.*
- (ii) In order to achieve the above objective, this line may be constructed by POWERGRID under the Regulated Tariff Mechanism (RTM) on cost plus basis.*
- (iii) As already recorded in the 4th JWG/JSC meeting, SJVN will be bearing the wheeling charges of the Indian portion of the transmission line till the other project users seek the utilization of the line. All the due modalities in this regard will be followed by SJVN and POWERGRID.”*
- 6.19.2. In view of the above, member may approve implementation of the Indian portion of Dhalkebar (Nepal)–Muzaffarpur (India) 400kV D/c (Quad Moose) line associated with Arun-3 HEP in Nepal by POWERGRID through Regulated Tariff Mechanism (RTM) on cost plus basis. SJVN will be bearing the wheeling charges of the Indian portion of the transmission line till the other project users seek the utilization of the line. All the due modalities in this regard will be followed by SJVN and POWERGRID.

Sl. No.	Scope of the Transmission Scheme	Details	Estd. Cost (Rs.) Cr.
1	Dhalkebar-Muzaffarpur 400 kV D/C quad line (about 100 km line in Indian territory)	<ul style="list-style-type: none"> • 100 km – 400 kV D/C quad line • 2 nos. of 400 kV bays at Muzaffarpur 	306 18
Total Rs (in Crore)			324

- 6.19.3. **After deliberations, it was opined that the scheme involves augmentation works at existing Muzaffarpur substation of POWERGRID, therefore the NCT recommended implementation of 400 kV bays at Muzaffarpur S/S through RTM by POWERGRID. With regard to implementation of Dhalkebar-Muzaffarpur 400 kV D/C quad line NCT recommended its implementation either through CPTC or by POWERGRID under RTM.**
- 6.20. **Name of Scheme: Conversion of 50MVAR (3x16.67MVAR) bus reactor at Farakka to switchable line reactor due to space constraints in termination of Farakka – Baharampur 400kV D/c (Twin HTLS) line**
- 6.20.1. CTU stated that ERSS-XV scheme, interalia, includes construction of Farakka–Baharampur 400kV D/c (Twin HTLS) line. One spare future bay has been selected for termination of one circuit of Farakka–Baharampur D/c line at 400kV bus at Farakka generation switchyard, however, due to non-availability of adjacent bay for termination of the other circuit, it is proposed to terminate the second circuit in the existing 50MVAR bus reactor bay along with conversion of this reactor to switchable line reactor. This arrangement would result in connection of 50MVAR switchable line reactor in one circuit of Farakka–Baharampur 400kV D/c line at Farakka end, which can be utilised as bus reactor.
- 6.20.2. He further stated that in the 19th meeting of SCMPSPER, members agreed for conversion of 50MVAR (3x16.67MVAR) bus reactor at Farakka to switchable line

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reactor to be installed in one circuit of Farakka–Baharampur 400kV D/c line as ISTS. The scope of the scheme is as under:

Sl. No.	Scope of the Transmission Scheme	Estimated Cost (Rs.) Cr.
1	conversion of 50MVAR (3x16.67 MVAR) bus reactor at Farakka to switchable line reactor to be installed in one circuit of Farakka – Baharampur 400kV D/c line	9

6.20.3. **After deliberations, it was opined that the scheme involves augmentation works at Farakka substation of POWERGRID, therefore the NCT recommended the above scheme for implementation through RTM by POWERGRID.**

6.21. **Limiting fault current level at 400kV bus at Farakka TPS (NTPC)**

6.21.1. Chief Engineer (PSPA-I), CEA stated that the scheme ‘**Limiting fault current level at 400kV bus at Farakka TPS (NTPC)**’ was agreed in the 19th meeting of SCSPER. The scheme involves bypassing of Durgapur–Farakka (150km) 400kV D/c and Farakka – Kahalgaon (95km) 400kV 1st D/c (ckt-1 & 2) lines outside the Farakka switchyard so as to form Durgapur – Kahalgaon 400kV D/c line.

6.21.2. CTU stated that it was observed that with implementation of above scheme, there is no substantial reduction of the fault level at Farakka substation. Therefore, CTU proposed that the scheme may be reviewed.

6.21.3. After deliberations, NCT advised to review the scheme.

Meeting ended with thanks to the chair.

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Annexure-I**List of Participants of Ist Meeting of National committee on Transmission held on dated 27.07.2018 in CEA**

S. No	Name (S/Shri)	Designation
I CEA		
1	Pankaj Batra	Chairperson
2	P.S. Mhaske Dr. Somit Das	Member (PS)
3	Gupta S.K. Ray	Member (E&C)
4	Mohapatra	Chief Engineer (PSPA-II)
5	Ravinder Gupta Awdhesh Kumar	Chief Engineer (PSPA-I)
6	Yadav	Director (PSPA-I)
7	B.S. Bairwa Manjari	Director (PSPA-II)
8	Charturvedi	Dy. Director(PSPA-I)
9	U.M.Rao Bhogi	Dy. Director(PSPA-II)
10	Vikas Sahu	SE
11	Vikas Sachan Kanhaiya Singh	Asstt. Director
12	Kushwaha	Asstt. Director
II NITI AAYOG		
13	Surinder Singh SVR	Joint Adviser (Energy)
III EXPERT		
14	P.K. Pahwa	Ex. Member(GO&D), CEA Ex. Director(Project),
15	P. Singh	Powergrid
IV POWERGIRD		
16	Subir Sen	COO(CTU-Plg)
17	Ashok Pal	GM (CTU-Plg)
18	Mukesh Khanna	GM (CTU-Plg)
19	Dibyendu Khan	Engineer
V PFCCL		
20	Sanjay Nayak	AVP
VI RECTPCL		
21	Vivek Agarwal	Chief Manager

Name of Scheme : Northern Region System strengthening Scheme –XL (NRSS-XL)

S.No.	Transmission Scheme	Detailed scope of works
Part-A :System strengthening Scheme in Northern Region		
(i)	1x500MVA, 400/220kV ICT along with ICT bays and 1 no. of 220kV line bay at 400kV Roorkee (PG) S/s	<ul style="list-style-type: none"> • 400/220kV ICT, 500MVA • 400kV ICT bay -1 • 220kV ICT bay-1 • 220kV line bay-1
(ii)	1x500MVA, 400/220kV ICT along with ICT bays and 2 nos. of 220kV line bays at 400kV Sonapat (PG) S/s	<ul style="list-style-type: none"> • 400/220kV ICT, 500MVA • 400kV ICT bay -1 • 220kV ICT bay-1 • 220kV line bay-2
(iii)	2 nos. of 220kV bays at 400 kV Abdullapur (PG) S/s	220kV line bay-2
(iv)	Replacement of 1x315 MVA ICT by 1x500 MVA along with two nos. of 220 kV line bays at Lucknow	<ul style="list-style-type: none"> • 400/220kV ICT 500MVA, • 400kV ICT bay -1 • 220kV ICT bay-1 • 220kV line bay-2
Part-B: Reactive Power Compensation in Northern Region		
I) 220kV bus reactor		
i)	Jind (PG)	25
ii)	Fatehabad (PG)	25
iii)	Kishenpur (PG)	25
iv)	Jalandhar (PG)	2x25
v)	Amritsar (PG)	25
vi)	Mandola(PG)	25
II) 400kV bus reactor		
i)	Maharanibagh (PG)	125
ii)	Mandola(PG)	125
iii)	Hissar(PG)	125
iv)	Kala Amb (TBCB)	125
v)	Chamera Pooling Station. (PG)	125
vi)	Kishenpur(PG)	125
vii)	Jullandhar(PG)	125
viii)	Moga(PG)	125
ix)	Patiala(PG)	125
x)	Sikar (PG)	125
xi)	Allahabad(PG)	125
xii)	Meerut(PG)	125
Part-C :System strengthening Scheme in Northern Region		
(i)	1x500MVA, 400/220kV ICT along with ICT bays at Bhadla pooling station	<ul style="list-style-type: none"> • 400/220kV ICT 500MVA,

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	<p><i>Note: The 1X500MVA, 400/220kV ICT at Bhadla is to be provided for grant of LTA to M/s Essel Saurya Urja Company of Rajasthan Ltd. So, it is proposed to take up the above mentioned ICT at Bhadla Pooling Station separately after fulfilling regulatory requirements by the LTA applicant.</i></p>	<ul style="list-style-type: none"> • 400kV ICT bay -1 • 220kV ICT bay-1
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Name of Scheme : Western Region Strengthening Scheme –XIX (WRSS-XIX) and North Eastern Region Strengthening Scheme – IX (NERSS-IX)

Sl. No.	Scope of the Transmission Scheme	Details
Part A: Additional 400 kV outlets from Banaskantha 765/400 kV S/S		
i)	LILO of 2 nd circuit of 400 kV Zerda – Ranchodpura D/C line at Banaskantha (PG) PS*	Route length- 30km
ii)	400 kV line bays at Banaskantha (PG) PS	400kV line bays -2
<p><i>*LILO of other circuit of Zerda – Ranchodpura 400kV D/c line at Sankhari(GETCO) is already under implementation by GETCO.</i></p> <p><u>Note:</u></p> <p>c. <i>The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.</i></p> <p><i>POWERGRID to provide space for 2 nos. 400kV line bays at Banaskantha(PG)</i></p>		
Part B: Establishment of new substation at Vapi/Ambethi area and its associated transmission lines		
i)	Establishment of 2x500MVA, 400/220 kV S/s near Vapi / Ambethi (Vapi – II)	<ul style="list-style-type: none"> • ICTs :2x500MVA, 400/220kV <u>400kV</u> • ICT bays: 2 nos. • Line bays: 4 nos. • Space for 2x500MVA, 400/220kV ICTs (future) • Space for 400/220kV ICT bays (future): 2 nos. • Space for Line bays along with Line Reactors (future): 4 nos. <u>220kV</u> • ICT bays: 2 nos. • Line bays: 6 nos. (2 for Sayali(DNH) and 4 nos. for GETCO) • Space for 400/220kV ICT bays (future): 2 nos. • Space for Line bays (future): 6 nos.
ii)	LILO of KAPP – Vapi 400 kV D/C line at Vapi – II	Route length- 10km

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iii)	125 MVAr bus reactor at Vapi – II Substation	<ul style="list-style-type: none"> • 125 MVAr bus reactor-1 • Bus Reactor Bay: 1 no • Space for 420kV additional Bus Reactor 1 no
iv)	<ul style="list-style-type: none"> • Vapi-II – Sayali D/C 220kV line (From Vapi-II upto LILO point of one circuit of Vapi(PG) – Khadoli 220kV D/C line at Sayali substation with ampacity equivalent to twin zebra conductor). • Interconnection with LILO section (of LILO of one circuit of Vapi(PG) –Khadoli 220kV D/C line at Sayali substation) so as to establish Vapi-II – Sayali 220 kV D/C line and Vapi- Khadoli 220 kV D/C line. The LILO section is with zebra conductor 	Route length: 30 km

Part C: Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID

i)	<p>Padghe (PG)–Kharghar 400 kV D/C quad line to be terminated into one ckt. of Kharghar–Ghatkopar 400 kV D/C line (thus forming Padghe (PG)–Kharghar 400 kV S/C quad line, Padghe (PG)- Ghatkopar 400 kV S/C quad line)</p> <p>2 nos. of 400 kV bays at (POWERGRID) Phadge 765/400 kV (GIS)</p>	<ul style="list-style-type: none"> • Route length 60km • 400kV Line bays: 2 nos.
ii)	LILO of Padghe (PG) – Ghatkopar 400kV S/C line at Navi Mumbai GIS (PG)	Route length 10km
iii)	LILO of Apta – Kalwa/Taloja 220 kV D/C line (i.e. Apta – Kalwa and Apta Taloja 220kV lines) at Navi Mumbai (PG)	Route length 2km

Note:

- The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.*
- POWERGRID to provide space for 2 nos. 400kV line bays at 765/400kV Padghe (PG) for Padghe (PG) – Kharghar 400 kV D/C (quad) line termination.*
- POWERGRID to provide 2 nos. 400kV line bays at Navi Mumbai (GIS) (PG) for LILO of Padghe (PG) – Ghatkopar 400kV S/C line and 4 nos. 220kV line bays at Navi Mumbai 400/220kV substation for LILO of Apta – Taloja and Apta- Kalwa sections of the Apta-Taloja/Kalwa 220 kV D/c line (already constructed by POWERGRID under WRSS 5)*
- TSP/BPC to coordinate with MSETCL regarding point of termination of Padghe (PG) – Kharghar 400 kV D/C (quad) line into one ckt. of Kharghar – Ghatkopar 400 kV D/c (quad) line and LILO of Apta – Taloja and Apta – Kalwa section of the Apta-Taloja/Kalwa 220 kV D/c line at Navi Mumbai (PG).*

Part D:North Eastern Region Strengthening Scheme – IX

(i)	<p>Pare HEP (NEEPCO) (from LILO point) – North Lakhimpur (AEGCL) 132kV D/c line (with ACSR Zebra conductor) along with 2 no. 132kV line bays at North Lakhimpur end</p> <p><i>Note: Two bays at pare HEP would be spare due to Bypassing of LILO of Ranganadi (NEEPCO) - Naharlagun / Nirjuli (POWERGRID) at Pare HEP (NEEPCO). It will be used for connecting with</i></p>	
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	<i>North Lakhimpur (AEGCL) S/s and this line will be constructed from LILO portion.</i>	
(ii)	<i>LILO of one circuit of Pare HEP – North Lakhimpur (AEGCL) 132kV D/c line (with ACSR Zebra) at Nirjuli (POWERGRID) substation</i>	
<p>Note:</p> <p>a. <i>CTU (POWERGRID) to provide 2 no. 132 kV line bays at Nirjuli S/S for termination of LILO of one circuit of Pare HEP – North Lakhimpur (AEGCL) 132kV D/c line (with ACSR Zebra)</i></p> <p>b. NEEPCO would implement following:</p> <p>(i) <i>Bypassing of LILO of Ranganadi (NEEPCO) - Naharlagun (Arunachal Pradesh) / Nirjuli (POWERGRID) at Pare HEP (NEEPCO) so as to form direct Ranganadi - Naharlagun / Nirjuli 132 kV S/C line</i></p> <p>(ii) <i>Re-conductoring of LILO portion at Pare end (of Ranganadi (NEEPCO) – Naharlagun / Nirjuli (POWERGRID) 132kV S/c line) with HTLS (HTLS equivalent to ACSR Zebra) along with modification of 132kV bay equipment at Pare HEP (NEEPCO)</i></p>		

Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route to PFC Consulting Limited

Projects for which bidding has been completed till date are as under:

Sl.No	Name of Transmission Project	Name of Selected Bidder	Date of Transfer of SPV
1	Additional 400kV feed to Goa and Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool	M/s Sterlite Grid 5 Limited	March 14, 2018
2	Transmission system for Ultra Mega Solar Park in Fatehgarh, distt. Jaisalmer Rajasthan	M/s Adani Transmission Limited	March 14, 2018

Projects for which bidding process is on-going are as under:

Sl.No	Name of Transmission Project	Present Status
1	Connectivity and Long Term Access (LTA) to HPPCL 450 MW from Shongtong Karcham HEP	<ul style="list-style-type: none"> LoI issued to Essel Infraprojects Limited on 21.02.2018. MoP vide letter dated 09.03.2018 accorded approval for transfer of SPV. The SPV could not be transferred to the successful bidder as the regulatory approval from CERC was not available Further, CERC vide its order dated 19.03.2018 with respect to regulatory approval for execution of the transmission system associated with Shongtong Karcham HEP has directed CTU to discuss the scheme in the Standing Committee Meeting of Northern Region again in consultation with CEA and to approach Commission for regulatory approval. In 40th SCSPNR, the constituents agreed to drop the implementation of the scheme as ISTS
2.	Connectivity System for Lanco Vidarbha Thermal Power Pvt. Ltd. (LVTPPL) and Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh	<ul style="list-style-type: none"> RfQ Inputs awaited from CTU. Empowered Committee in its 37th Meeting held on 20.09.2017 decided that the bidding process for the scheme may be taken up after resolution of financial issue and after ascertaining the progress of the project.
3.	Western Region Strengthening Scheme- XIX (WRSS-XIX) and North	<ul style="list-style-type: none"> MoP vide gazette Notification dated 04.05.2018 appointed

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	Eastern Region Strengthening Scheme-IX (NERSS-IX)	<p>PFCCL as the Bid Process Coordinator.</p> <ul style="list-style-type: none"> • PFCCL vide letter May 10, 2018 and June 07, 2018 requesting CTU to provide the RfQ inputs. • CTU vide letter dated June 20, 2018 has informed that implementation modality of augmentation/bay extension works in existing Powergrid substations including de-notification of LILO of 2nd circuit of Zerda - Ranchodpura 400 kV D/C line at Banaskantha (PG) is already taken up with MoP. Based on the outcome, RfQ inputs shall be forwarded. • PFCCL vide letter dated June 27, 2018 requested that MoP may advice CTU to provide the RfQ inputs at the earliest so that RfQ document can be finalized and the RfQ bid process can be initiated.
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Annexure III(B)**Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding Route to REC Transmission Projects Company Limited**

1. Projects for which bidding has been completed from 1st April, 2017 to till date are as under:

Sl. No	Name of Transmission Project	Name of Selected Bidder	Date of Transfer of project specific SPV
1.	Transmission System For New WR- NR 765 kv Inter Regional	M/s Power Grid Corporation of India Limited	27.03.2018
2.	Transmission System For Eastern Region Strengthening Scheme -XXI (ERSS-XXI)	M/S Power Grid Corporation of India Limited	12.01.2018

2. Projects for which bidding process is on-going are as under:

Sr. No.	Name of Transmission Project	Present Status
-NIL-		