



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

No. 100/1/EC (38) 2017-PSP&PA-I/156-165

Dated: 24th January, 2018

To

1.	Member (Economic & Commercial), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	2.	Joint Secretary (Transmission) Ministry of Power Shram Shakti Bhawan New Delhi-110001
3.	Adviser (Energy), NITI Ayog, Parliament Street, New Delhi – 110 001.	4.	Director (Projects), Power Grid Saudamini, Plot No. 2, Sector-29, Gurgaon – 122 001.
5.	Shri V. V. R. K. Rao Former Chairperson, CEA B-9/C, DDA Flats, Maya Puri, New Delhi -110 064.	6.	Shri Ravinder Former Member (Power System), CEA 147, Bhagirathi Apartment, Sector-9, Rohini, Delhi – 110 085.

Subject: 38th Meeting of the Empowered Committee on Transmission – Agenda for meeting

Sir/Madam,

Please find enclosed the agenda for 38th Meeting of the Empowered Committee on Transmission scheduled to be held on 5.2.2018 (Monday) at 1530hrs under the chairmanship of Member (Power System, CEA) in Conference Room of CEA, 6th Floor, Sewa Bhawan, R.K. Puram, New Delhi.

The same is also available at CEA website
<http://cea.nic.in/reports/committee/empowered/agenda/38.pdf>.

Kindly make it convenient to attend the meeting.

Yours faithfully,

(Ravinder Gupta)
Chief Engineer &

Member Secretary (Empowered Committee)

Copy to:

- (i) COO (CTU), POWERGRID, 'Saudamini', Plot No.2, Sector – 29, Gurgaon – 122 001 (Haryana)
- (ii) CEO, RECTPCL, 12-21, Upper Ground Floor, Antriksh Bhawan, 22, KG Marg, New Delhi – 110 001.
- (iii) CEO, PFC Consulting Ltd, First Floor, Urjanidhi, 1 Barakhmba Lane, New Delhi -110001 (Fax- 011-2345617)
- (iv) Chief Engineer (PSPA-II),CEA

Agenda note for the 38th meeting of the Empowered Committee on Transmission

Date and Time: 5th February 2018, 1530 hrs

Venue: Conference Room of CEA, 6th Floor, Sewa Bhawan, R.K. Puram, New Delhi

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

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 has been received on the minutes of the meeting.

1.1 The minutes of the meeting may please be confirmed.

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

2.1 The following transmission schemes were approved in the 37th meeting of EC on transmission for implementation through Tariff Based Competitive Bidding (TBCB) :

S. No	Name of Scheme	Estimated Cost as per Empowered Committee (in Crore)
1.	System strengthening Scheme in Northern Region	225.8
2.	Reactive Power Compensation in Northern Region	234.6
3.	Additional 400 kV outlets from Banaskantha 765/400 kV S/S	62.0
4.	Establishment of new substation at Vapi/Ambethi area and its associated transmission lines	198.5
5.	Additional ISTS feed to Navi Mumbai 400/220 kV substation of POWERGRID	255.3
6.	North Eastern Region Strengthening Scheme – IX	70.0
		1046.2

2.2 The schemes mentioned at sl. no. 4 & 5 above were agreed to be implemented through TBCB route after ratification in the next meeting of SCPSPWR. It was also mentioned that in case there is any modification /change in the scope of works, the same may be intimated to the EC. The above schemes were deliberated in 42nd meeting of SCPSPWR held on 17.11.2017, wherein, the scope as mentioned in the 37th EC was agreed by the constituents. Also, in the 37th meeting of EC on Transmission, it was decided that the small schemes under TBCB may be clubbed together to form a single package and the scheme may be notified accordingly. Therefore, following packages were formed and

forwarded to MoP vide CEA letter dated 21.11.2017 for notification in the Gazette of India:

Package-1:

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

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)

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 Gazette notification is yet to be issued by MoP.

- 2.3 Further, the following transmission schemes were agreed in the 37th meeting of EC on Transmission to be implemented through regulated tariff mechanism by POWERGRID.

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

The Office Memorandum for the same is yet to be issued by MoP.

3.0 Status of transmission schemes under bidding process - briefing by BPCs

- 3.1 Details of transmission projects awarded through TBCB route by PFCCCL and RECTPCL is given at **Annexure-I(A) and I(B)** respectively.
- 3.2 Members may like to note.

4.0 New Inter-State Transmission Schemes

4.1 Name of the Scheme: Scheme to control Fault Level in Northern Region (Phase-II)

The “Scheme to control Fault Level in Northern Region (Phase-II)” involves realignment of some 400kV lines at POWERGRID substations and installation of 12 ohm Series reactors at various lines and buses. The above scheme was earlier deliberated in 37th meeting of Empowered committee held on 20.9.2017, wherein, CTU 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. The brief of the scheme is as given below:

- 4.1.1 The problem of high short circuit level in Northern Region 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 12ohm 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 Dhanonda end (To be implemented by HVPNL)	
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.	

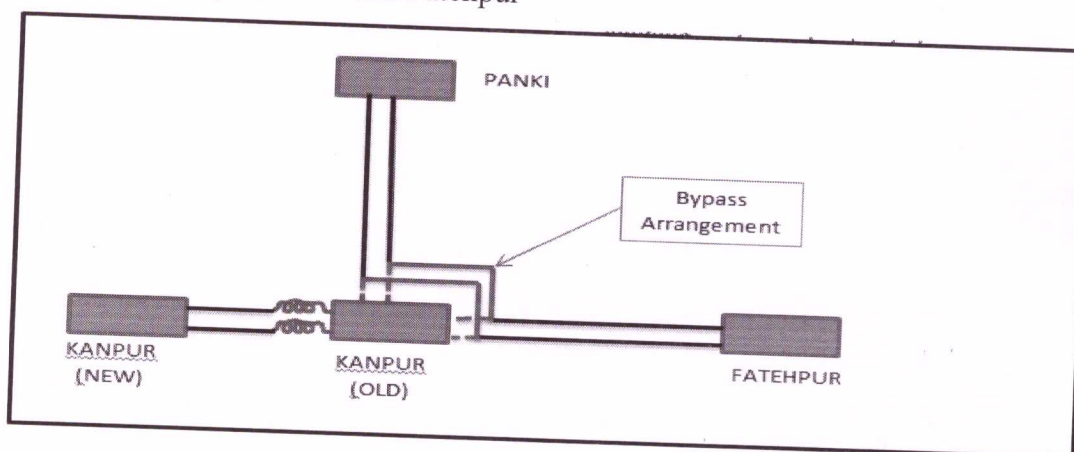
iv) The remaining Bhiwani (PG)–Hissar (PG) 400kV D/c line (one circuit via Bhiwani (BBMB) and Hissar (PG)–Moga (One circuit via Fatehbad) 400kV line to be disconnected at Hissar end and directly connected to form Bhiwani (PG)–Moga 400kV line (One circuit via Fatehbad and other circuit via Bhiwani (BBMB))	
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

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

4.1.2 The details about the scheme is as under:

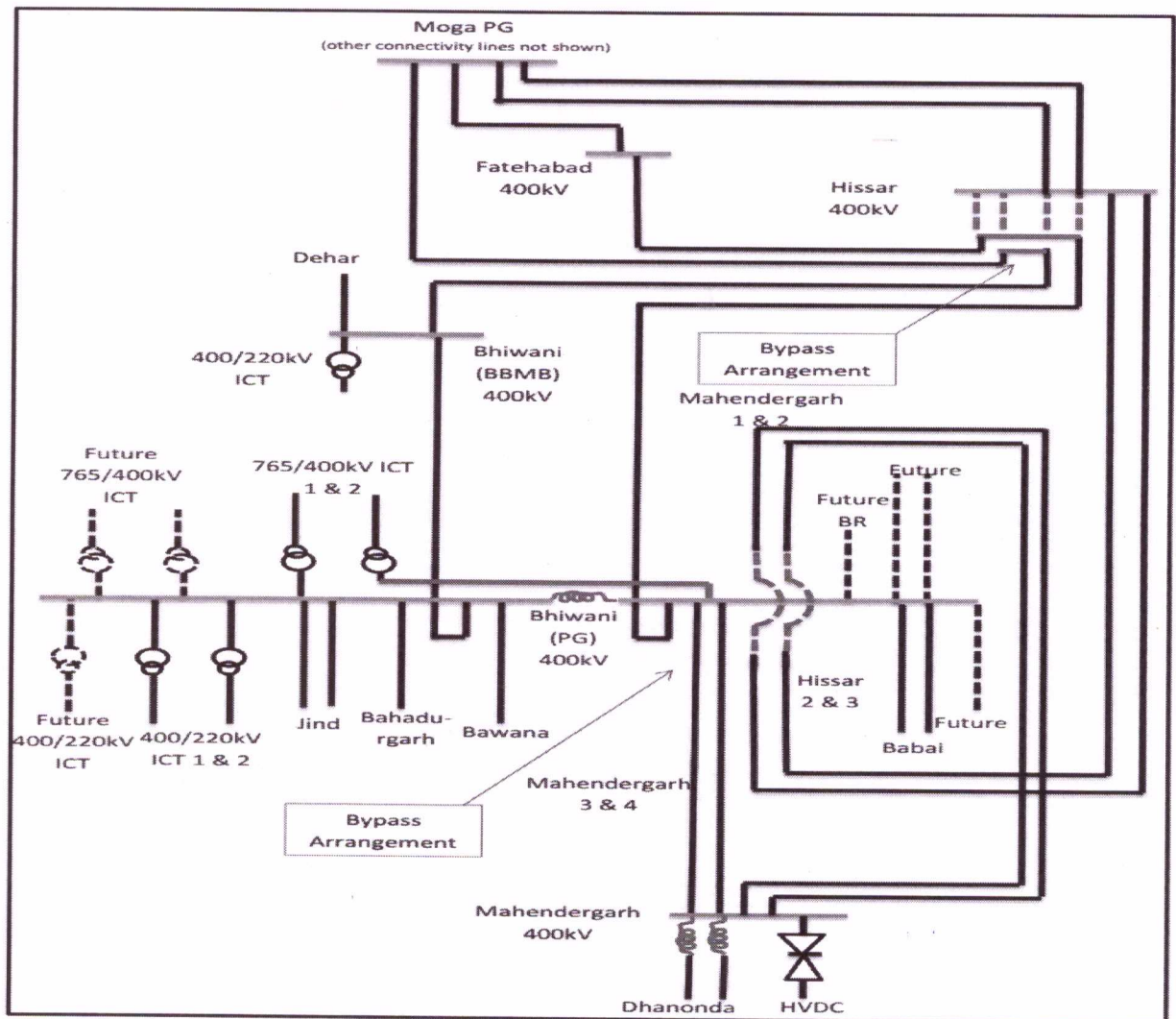
Pocket I: Kanpur, Panki and Fatehpur



After considering the above reconfiguration and series reactors at Kanpur (old), the short circuit level of Kanpur (old), Panki and Kanpur (new) is as follows:

Substation	3phase fault current
Base Case	
Kanpur (new)	53kAmp
Kanpur (old)	58kAmp
Panki	52kAmp
With proposed re-arrangement	
Kanpur(new)	33kAmp
Kanpur (old)	36kAmp
Panki	26kAmp

Pocket II: Bhiwani, Hissar, Mohindergarh and Moga



Short circuit levels at Bhiwani (PG), Hissar, Mohindergarh and Dhanonda before and after above re-arrangement are given in table below:

Substation	3phase fault current
Base Case	
Bhiwani(PG)	62kAmp
Hissar	50kAmp
Mohindergarh	53kAmp
Dhanonda	54kAmp
After proposed re- arrangement	
Bhiwani(PG) Section A	39kAmp
Bhiwani(PG) Section B	38kAmp
Hissar	33kAmp
Mohindergarh	36kAmp
Dhanonda	46kAmp

4.1.3 CTU may present. Members may like to deliberate on the mode of implementation of the above transmission schemes either through TBCB or exempt from TBCB on ground of technical upgradation to be implemented under RTM.

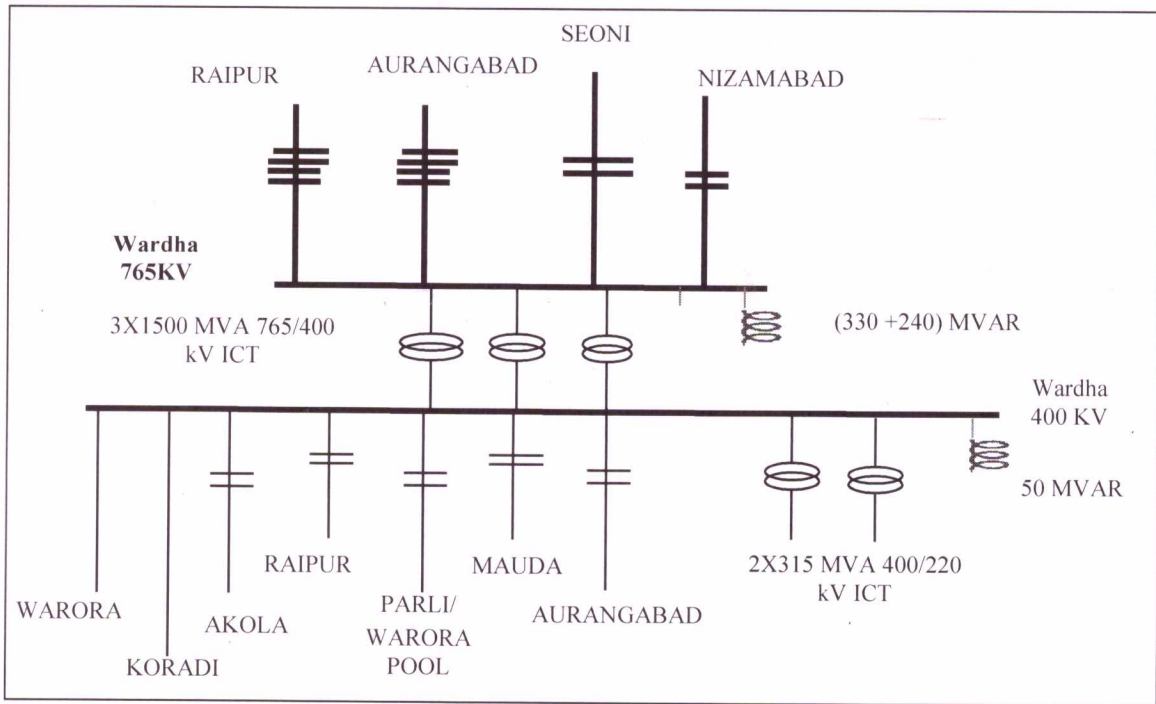
4.2 Name of the Scheme: Measures to control fault level at Wardha Substation

The Scheme “Measures to control fault level at Wardha Substation” splitting of 400kV bus & insertion of series reactor between the split bus sections of the existing substation of POWERGRID. The above 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:

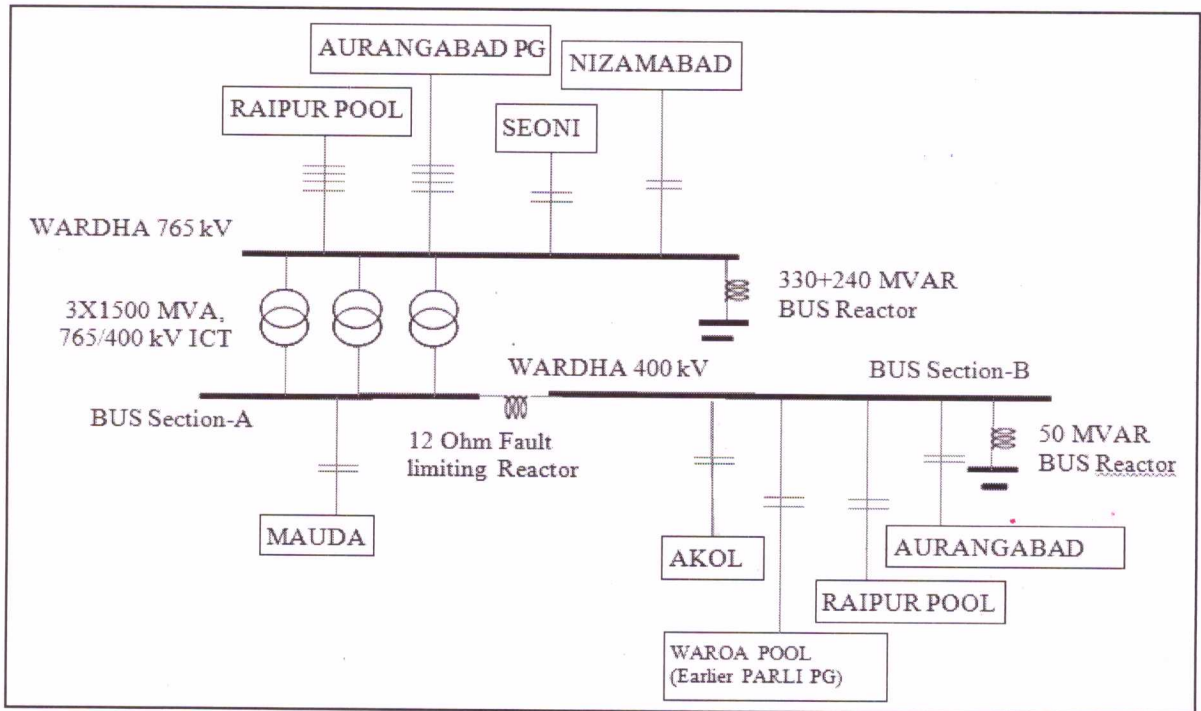
- 4.2.1. The scheme has been discussed in the 37th, 39th, 40th & 41st meeting of SCPSW and the following scheme involving bus splitting at Wardha with 12 Ohm fault limiting reactor to connect 400kV BUS Section A and BUS Section B of Wardha 400 kV BUS has been agreed to control the high fault level at 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)	2 X 63MVAR 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



Existing 765/400 kV Wardha substation



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

CTU may present. Members may like to deliberate on the mode of implementation of the above transmission schemes either through TBCB or exempt from TBCB on ground of technical upgradation to be implemented under RTM.

4.3 System strengthening Scheme in Southern Region:

The above scheme was agreed in the 41st meeting of the Standing Committee on Power System Planning of Southern Region (SCPSPSR) held on 22nd September, 2017. The scheme 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.

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*

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

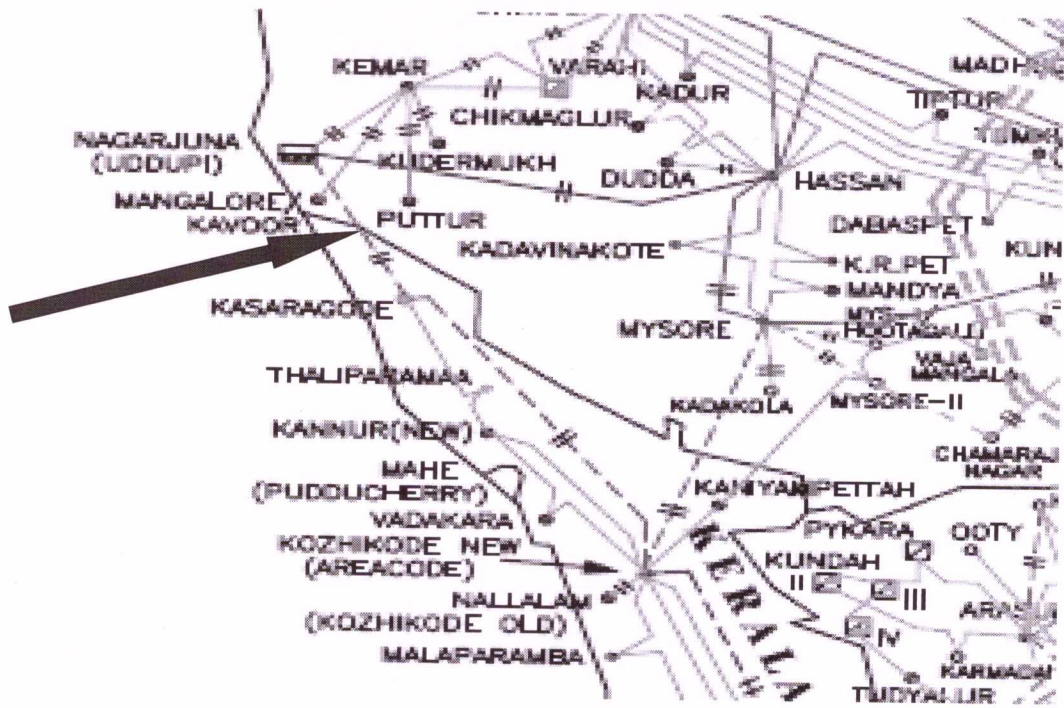
Implementation of the scheme 'Mangalore (UPCL)-Kasargode-Kozhikode 400 kV link' through TBCB was agreed in 31st meeting of the Empowered Committee on Transmission held on 18.02.2013 subject to commitment from the Kerala Government for payment of compensation only for the tower footing as is practice in other parts of the country. Therefore, the notification of the scheme was not published in the Gazette of India.

Further, for implementation of the scheme, CTU had to provide 2 no. of 400 kV line bays at Kozhikode S/S and UPCL had to provide 2 no. of 400 kV bays at Mangalore (UPCL) switchyard. EC suggested that firm commitment from UPCL for providing 400 kV bays at Mangalore (UPCL) switchyard may be obtained, otherwise the bays may be included in the scope of the bidder.

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. However, UPCL informed about the non-availability of space to erect two additional bays and also informed that as per their PPA, any additional expenditure on account of maintenance of the above bays needs to be approved by their buyers.

In the 39th meeting of SCPSPSR held on 28th & 29th December, 2015, 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 to be implemented by Kerala state.

In the 41st meeting of SCPSPSR held on 22.09.2017, after getting confirmation of availability of space for 2 no. 400 kV bays at Udapi, members agreed for construction of already approved Udupi PCL (Manglore)-Kasargode 400 kV D/C Line (with Quad Moose ACSR conductor) along with Kasargode 400/220kV, 2x500MVA substation under ISTS and drop Kasargode-Kozhikode (Areekode) 400kV D/c line.



Accordingly, revised scope of the scheme will be as follows:

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA)	Estimated Cost (Rs.) Cr.
1.	Mangalore (Udupi PCL)–Kasargode, 400kV quad D/C line	110km	440
2.	Establishment of 2x500 MVA, 400/220 kV GIS substation at Kasargode 400kV 400/220 kV ICTs : 2 no – Bus Reactor (63 MVAR): 2 no. – Line Bays: 4 – ICT bays : 2 – Space for bays : 4 220 kV – Line Bays : 6 – ICT bays : 2 – Space for bays : 6	1000MVA	170
3.	2 nos. of 400kV line bays at UPCL switchyard		20
Total Rs (in Crore)			630

Note:

Udupi PCL to provide space for 2 nos. 400kV line bays at UPCL switchyard

5.0 Change / modification in the scope of works of transmission schemes under TBCB – for kind information of the EC

5.1 Modification in the agreed scope for “Transmission system for Ultra Mega Solar Park in Fatehgarh, distt. Jaisalmer, Rajasthan”

The transmission scheme “Transmission system for Ultra Mega Solar Park in Fatehgarh, Distt Jaisalmer Rajasthan” was agreed for evacuation of power from M/s AREPRL’s solar park of 1000 MW. The scheme was recommended for implementation through TBCB in the 36th meeting of Empowered committee on transmission on 26-07-2016. Subsequently, CTU in 39th meeting of Standing Committee of Power System Planning of NR informed that they have received new connectivity applications for about 2100 MW from various wind/solar developers viz. M/s Suzlon and M/s Green Infra located around Fatehgarh. To provide connectivity to these developers, the scope of the scheme was revised in a meeting held on 26.7.2017 in CEA and same was intimated to Empowered Committee on Transmission in its 37th meeting held on 20.9.2017. The revised scope of the scheme, interalia, included the following:

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

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

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

The revised scope of the scheme is as under:

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

1. Establishment of 400kV Pooling Station at Fatehgarh
2. Fatehgarh Pooling station-Bhadla (PG) 765 kV D/C line (to be operated at 400 kV).
3. 2 Nos. of 400kV line bays at Fatehgarh Pooling station.
4. 1x125 MVAR Bus reactor at 400kV Fatehgarh Pooling station along with associated bay
5. Space for future 220 kV (12 Nos.) line bays.
6. Space for future 400kV (8 Nos.) line bays along with line reactors at Fatehgarh Pooling station.
7. Space for future 220/400kV transformers **(05 Nos.)** along with associated transformer bays at each level.
8. Space for future 400kV bus reactor (2 Nos.) along with associated bays.
- 9.

Note:

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

PFCCCL has issued RfP document on 21.11.2017 and subsequently issued the amendment as per the above scope.

Members may kindly note.

6.0 Any other item.

Any other item with the permission of Chair.

Annexure-I (A)

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

Sr. No.	Transmission Project	Status
1.	a) Additional 400kV feed to Goa b) Additional System for Power Evacuation from Generation Projects pooled at Raigarh (Tamnar) Pool	LoI issued to the successful bidder. SPV yet to be transferred very shortly.
2.	Connectivity and Long Term Access (LTA) to HPPCL 450 MW from Shongtong Karcham HEP	RfP evaluation under process. LoI is likely to be issued by end of January and SPV to be transferred by end of February.
3.	Transmission system for Ultra Mega Solar Park in Fatehgarh, distt. Jaisalmer Rajasthan	RfP initiated on 21.11.2017 with the last date of submission on 22.01.2018. LoI is likely to be issued by mid of February and SPV to be transferred by end of March.
4.	a) Connectivity System for Lanco Vidarbha Thermal Power Pvt. Ltd. (LVTPPL) b) Inter State Transmission system strengthening in Chhatarpur area in Madhya Pradesh	On the advice of CEA the bid process of the scheme was kept on hold.

Annexure-I (B)

**Progress of Transmission Projects Awarded Through Tariff Based Competitive Bidding
Route to REC Transmission Projects Company Limited**

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 Eastern Region Strengthening Scheme –XXI (ERSS-XXI)	M/s Power Grid Corporation of India Limited	January 12, 2018

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

S. No.	Name of Transmission Project	Present Status
1.	New WR- NR 765 kV Inter-Regional Corridor	RFQ issued on 21.11.2016, 10 bidders participated and all are shortlisted to participate in RFP stage RFP issued w.e.f 27.02.2017 6 bidders participated at RFP stage Non-Financial bids opened on 25.09.2017 & is under evaluation Facing significant difficulty in getting TSA signed from MSEDCL, CSPDCL & PSPCL.

Projects for which bidding process is on hold:

S. No.	Name of Transmission Project	Present Status
1.	Transmission System for Phase – I generation projects in Arunachal Pradesh	<ul style="list-style-type: none">• Empowered Committee in its 37th meeting has recommended CEA to review the scope of the project and take up in next Standing Committee meeting for finalization.• The Standing Committee meeting is yet to happen• After finalization of the scope and Empowered Committee recommendation, bidding process will be re-initiated from RFQ stage.