254762/2018/OFFICE OF BIHARI LAL

No. 15/3/2018-Trans
Government of India
Ministry of Power
Shram Shakti Bhawan, Rafi Marg, New Delhi-110001
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Dated, 21st August, 2018

OFFICE MEMORANDUM

Subject: Minutes of the 2nd meeting of the Empowered Committee on Transmission (ECT) held on 6.8.2018- regarding.

The undersigned is directed to forward herewith the Minutes of the 2nd meeting of the Empowered Committee on Transmission (ECT) held on 6.8.2018 under the chairmanship of Secretary (Power), for information and further necessary action.

21/8/18

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To

1. The Chairperson, CEA, New Delhi.
2. Member (PS), CEA, New Delhi.
3. Joint Secretary (Trans), MoP, New Delhi.
4. CMD, POWERGRID, Gurugram.
5. COO, CTU-Plg, POWERGRID.
6. CEO, RECTPCL, New Delhi.
7. CEO, PFCCL, New Delhi.

Copy to: PPSs/PSs to Secretary(Power)/ JS(Trans)/ Director(Trans), M/o Power.

Minutes of the 2nd meeting of Empowered Committee on Transmission held under the chairmanship of Secretary(Power), Ministry of Power on 6.8.2018.

List of participants is at **Annexure-A**.

2. At the outset, Secretary (Power), Chairman of the Empowered Committee on Transmission (ECT) welcomed all the members to the 2nd meeting of the committee.

3. JS (Trans), MoP & Member Secretary (ECT) briefed the members about the status of issues discussed in the 1st meeting of ECT.

(i) As suggested by ECT, NCT examined the proposal related to replacement of 1x315 MVA ICT by a 1x500 MVA ICT at Lucknow and shifting of 1x315 MVA ICT from Lucknow to Gorakhpur in its first meeting held on 27.07.2018 and recommended implementation of the scheme by POWERGRID under the Regulated Tariff Mechanism (RTM).

(ii) The NCT was requested to review the notification of two transmission schemes (Package-1 & Package-2) which were notified by MoP vide Gazette Notification No. 15/3/2017-Trans-Pt(2) dated 04.05.2018 for implementation under TBCB Route. The NCT reviewed the two schemes and recommended that the schemes under Package 1 may be de-notified and awarded to POWERGRID for implementation under RTM. The bidding process for Package-2, however, may be continued. Modification in Package-2, if any, based on recommendations of NCT may be done at RfP stage This was further discussed in the meeting.

(iii) The Chairman, CEA was requested to discuss the issue of technical augmentation of existing substations in the first meeting of NCT and also the mode of implementation. The suggestions/recommendations of NCT were discussed in the 2nd meeting of ECT.

4. The Committee, after noting the above status pertaining to the 1st ECT, deliberated on agenda items.

4.1 Issue of Augmentation/Modification works in TBCB: As per the existing Tariff Policy, there is a provision for exemption of implementation of certain ISTS schemes (such as projects of strategic importance, technical up-gradation etc. or works required to be done to cater to an urgent situation on case to case basis) from competitive bidding. There are certain other categories of works 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. which of do not cost much and may be implemented by the existing owner of the substation. These works may be categorized as technical augmentation and may be exempted from TBCB on case to case basis. Implementation of such augmentation works through TBCB would have following implications:

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, DC distribution board, control room etc., which may jeopardize the augmentation work.

The advice of CEA in this regard (**Annexure-D**) was also to exempt implementation of augmentation works at existing ISTS substations from TBCB. ECT was in agreement with the difficulty and issues associated with implementation of augmentation/ modification works at existing substation through TBCB.

Therefore, ECT agreed with the recommendation made by NCT and advice of CEA for exemption of implementation of augmentation/modification works at the existing ISTS substations from TBCB and implementation of the same by the respective owner of the substation under RTM.

4.2 The ECT deliberated on the recommendation made by NCT (**Annexure-B**) for the transmission schemes and the following was agreed:

4.2.1 **De- notification of already notified Transmission schemes):**

(i) **Grant of connectivity and Long Term Open Access to HPPCL-450 MW Shongtong Karcham HEP**
The bidding for the scheme was completed except for handing over of the SPV as regulatory approval of CERC was required. CERC has directed CTU to review the scheme. After review with the Govt. of Himachal Pradesh and discussions held in the 40th meeting of Standing Committee on Power System Planning in Northern Region (SCPSPNR), the scheme has been dropped. Accordingly, PFCCL has to close the SPV created for the scheme and the scheme is to be de-notified.

(ii) **Package-1: Northern Region System strengthening Scheme –XL (NRSS-XL) with RECTPCL as the BPC for the scheme**
The scheme was notified by MoP for implementation through TBCB vide Gazette Notification dated 04.05.2018. As the scheme involves augmentation works like provision of bus reactors, 400/220 kV ICTs, bays etc. at existing substation of POWERGRID, the scheme is to be implemented under RTM by POWERGRID. Accordingly, the scheme is to be de-notified.

4.2.2 **Modification in already notified Transmission schemes:**

(i) **Package-2: Name of Scheme: Western Region Strengthening Scheme –XIX (WRSS-XIX) and North Eastern Region Strengthening Scheme – IX (NERSS-IX)**
The scheme was notified by MoP for implementation through TBCB vide Gazette Notification dated 04.05.2018. As the scope of works involves four (4) nos. of 400 kV bays (augmentation works) at the existing substation of POWERGRID, the same is to be implemented under RTM by POWERGRID. Balance scope of works to be implemented under TBCB. Modification in the scope of works is to be notified.

4.3 **Transmission schemes to be implemented through RTM/TBCB:**
The following schemes, after detailed deliberations, were approved to be implemented through RTM or TBCB.

4.3.1. **Works to cater to urgency**

(i) Scheme given below are augmentation works at ISTS substation which are required urgently for evacuation of power from Bhuj and Tuticorin. These wind power generation projects, which have been successful in SECI bids of tranche 1, 2, 3 & 4 are scheduled to be commissioned by October 2018, May 2019, November 2019 & April 2020 respectively. Therefore, to be implemented under RTM by POWERGRID.

a) Transmission system for evacuation of 4000 MW of RE power in the Bhuj area under SECI bids (Tranche I to IV) at Bhuj PS
b) Transmission system for evacuation of 950 MW of RE power under SECI bids Tranche I to IV) at Tuticorin PS of POWERGRID

(ii) Replacement of 1x315 MVA ICT by 1x500 MVA along with two nos. of 220 kV line bays at Lucknow and provision of 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.
As this scheme is required to increase the TTC (Total Transmission Capability) of drawl of power from ISTS of Uttar Pradesh, the scheme is to be implemented under RTM by POWERGRID to cater to an urgent situation.

4.3.2 **Technical up-gradation**

The following schemes are to bring the fault current within the design rating of the switchgear, thus are of technical up-gradation of existing substations of POWERGRID under RTM by POWERGRID.

(i) Scheme to control Fault Level in Northern Region (Phase-II)
(ii) Measures to control fault level at Wardha Substation

4.3.3. **Projects of strategic importance**

The following projects involving cross border interconnection between India & Bangladesh and India & Nepal are to be implemented under RTM.

(i) 500MW HVDC back -to -back station at North Comilla (Bangladesh) for transfer of power through Surjamaninagar (India)–North Comilla (Bangladesh): Indian Portion, which includes

a) 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 – implementation under RTM by POWERGRID
b) 2 nos. 400kV line bays at Surajmaninagar S/s for termination of Surajmaninagar (TSECL) – North Comilla 400kV D/c line - implementation under RTM by the owner of the ISTS substation i.e. NER II Transmission Ltd. (Sterlite) an ISTS Transmission Licensee.

(ii) 2 no. 400kV line bays at Muzaffarpur (POWERGRID) S/s for operation of Muzaffarpur-Dhalkebar 400kV D/c line (presently operated at 132kV) at rated voltage level of 400kV. It is an augmentation works at existing ISTS substation owned by POWERGRID, however its implementation would be done by Cross Border Power Transmission Company Ltd. (CPTC) as per the existing

Implementation & Transmission Service Agreement (ITSA) between CPTC and Nepal Electricity Authority.

(iii) Indian portion of Dhalkebar (Nepal)–Muzaffarpur (India) 400kV D/c (Quad Moose) line associated with 900MW Arun-3 HEP in Nepal, however, the Scheme was deferred for further deliberations with the stakeholders.

4.3.4 **Augmentation works at existing ISTS substations**

(i) The following schemes are the substation augmentation works providing 400 kV bays at existing ISTS substations (augmentation works) and are to be implemented under RTM by POWERGRID:

a) System strengthening Scheme in Western Region at Banaskantha and Phadge 765/400 kV substation
b) System strengthening Scheme in Northern Region at Chamera 400/220kV pooling station
c) Construction of 2 no. 400 kV line bays at 400/220 kV Kozhikode (Areekode) substation of PGCIL for terminating North Trissur (Madakkathara)-Kozhikode (Areakode) 400kV D/C line of KSEBL

(ii) These schemes include provision of additional 400/220 ICT and bays at existing ISTS substation (augmentation works) and are to be implemented under RTM by POWERGRID:

a) System strengthening Scheme in Southern Region at Cochin East (Pallikkara) 400/220kV substation
b) System strengthening Scheme in Southern Region at Gazuwaka 400/220kV substation
c) System strengthening Scheme in Northern Region at Saharanpur 400/220kV substation
d) System strengthening Scheme in Western Region at Jabalpur and Itarsi 400/220kV substation

(iii) The following schemes are basically provision of additional 400 kB bus reactors along with bays at existing ISTS substation (augmentation works) and are to be implemented under RTM by POWERGRID:

a) Provision of Bus Reactors at High Voltage Nodes in Western Region
b) Implementation of 1x125 MVAr bus reactors at 400kV sub-stations of POWERGRID for reactive power compensation in SR
c) Provision of 400 kV 1x125 MVAr Bus Reactor at Champa Pool Split Bus Section –A

(iv) Others augmentation works to be implemented under RTM by POWERGRID:

a) Conversion of 50 MVAr fixed line reactor to switchable reactors in Kankroli–Zerda 400 kV line at Kankroli S/S of POWERGRID
b) Termination of 400kV lines at Jeerat (WBSETCL) S/s under the ERSS-XV and ERSS-XVIII schemes
c) Conversion of 50MVAR (3x16.67 MVAr) bus reactor at Farakka to switchable line reactor due to space constraints in termination of Farakka – Baharampur 400kV D/c (Twin HTLS) line

4.4 **Transmission schemes to be implemented through TBCB:**

(i) **400kV Udupi (UPCL)-Kasargode D/C line**
As Package-1 allotted to RECTPCL (BPC) has been agreed to be de-notified (refer para 4.2.1(ii) above). Thus, the scheme 400 kV Udupi (UPCL)- Kasargode D/C line, agreed to be implemented through TBCB route, was allotted to RECTPCL for carrying out the bidding process.

The meeting ended with thanks to the Chair.

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Annexure-A

Date/Time of the meeting: 06.08.2018 at 12.00 PM
Venue: Conference Room, 2nd Floor,
Shram Shakti Bhawan, New Delhi -110001.

Sub: 2nd meeting of the Empowered Committee on Transmission (ECT)-reg.

List of Participants

Ministry of Power

1. Shri Ajay Kumar Bhalla, Secretary (Power) - In the chair
2. Smt. Bharati, Joint Secretary (Trans)
3. Shri Dhiraj Kumar Srivastava, Director (Trans)
4. Shri Bihari Lal, Under Secretary (Trans)

Central Electricity Authority (CEA)

5. Shri Pankaj Batra, Chairperson
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Power Grid Corporation of India Ltd. (POWERGRID)

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Annexure-B

S No.	Name of Transmission Scheme	Scope of works	Estd. cost (Rs. Cr.)	Recommd. of 1st NCT
1	Grant of connectivity and Long Term Open Access to HPPCL-450 MW ShongtongKarcham HEP	1. ShongtongKarcham – Wangtoo 400 kV D/c Line (Quad HTLS Conductor Equivalent to about 3000MW on each ckt). 2. 400 kV line bays at Wangtoo- 2 nos.	272	De-notification of the scheme
2	Package-1: Northern Region System strengthening Scheme –XL (NRSS-XL) – RECTPCL (BPC) 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	Given at **Annexure-C**	395.2	RTM by POWERGRID To be de-notified as the scheme has already been notified for implementation through TBCB
3	Replacement of 1x315 MVA ICT by 1x500 MVA along with two nos. of 220 kV line bays at Lucknow	i) 400/220kV ICT 500MVA, ii) 220kV line bay-2	27.2	RTM by POWERGRID
4	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	i) 400kV ICT bay -1 ii) 220kV ICT bay-1 iii) 220kV line bay-2	23.8	RTM by POWERGRID
5	Package-2: Name of Scheme : Western Region Strengthening Scheme – XIX (WRSS-XIX) and North	Given at **Annexure-E**	586	TBCB - scheme already notified

	Eastern Region Strengthening Scheme – IX (NERSS-IX)	Scope of augmentation works at existing POWERGRID sub-stations to be excluded from TBCB scope i) 400 kV line bays at Banaskantha (PG) PS – 2 no. ii) 400 kV GIS bays at (POWERGRID) Phadge 765/400 kV (GIS) - 2 nos.	38	RTM by POWERGRID Modification in scope of works of Package-2 to be notified.
6	Scheme to control Fault Level in Northern Region (Phase-II)	Given at **Annexure-F**	175	RTM by POWERGRID
7	Measures to control fault level at Wardha Substation	Given at **Annexure-G**	75	RTM by POWERGRID
8	System strengthening Scheme in Southern Region	i) 220kV line bays at Cochin East (Pallikkara) 400/220kV substation) of POWERGRID - 2 no. ii) Additional 1x500 MVA 400/220kV ICT at Gazuwaka S/S with associated bays • 1x500 MVA 400/220kV ICT -1 no. • 400kV ICT bay -1 no. • 220kV ICT bay -1 no.	41.4	RTM by POWERGRID
9	400kV Udupi (UPCL)-Kasargode D/C line	Given at **Annexure-H**	620	TBCB
10	Construction of 2 no. 400kV GIS bays at 400/220 kV Chamera PoolingStation of PGCIL under Northern Region SystemStrengthening scheme	i) 400 kV GIS bays at 400/220 kV Chamera Pooling Station of PGCIL - 2 no	21	RTM by POWERGRID
11	Additional 1x500 MVA, 400/220kV ICT at Saharanpur (PG) 400/220kV substation	400/220kV ICT 500MVA ICT - 1 no. 400kV ICT bay -1 no. 220kV ICT bay-1 no.	34	RTM by POWERGRID

12	Provision of Bus Reactors at High Voltage Nodes in Western Region	Given at **Annexure-I**	143	RTM by POWERGRID
13	Augmentation of transformation capacity in Western Region	A) Jabalpur 400/220 kV S/S of POWERGRID i) 400/220kV 500MVA ICT – 1 no. ii) 400kV ICT bay – 1 no. iii) 220kV ICT bay- 1 no. B) Itarsi 400/220 kV S/S of POWERGRID i) 400/220kV 500MVA ICT - 1 no., ii) 400kV ICT bay - 1 no. iii) 220kV ICT bay- 1 no.	68	RTM by POWERGRID
14	Provision of 400 kV 1x125 MVAr Bus Reactor at Champa Pool Split Bus Section –A	400 kV, 1x125MVAR 400kV bay -1	16	RTM by POWERGRID
15	Conversion of 50 MVAr Fixed line reactor to Switchable reactors in Kankroli–Zerda 400 kV line at Kankroli S/S of POWERGRID	400 kV bay – 1 no.	9	RTM by POWERGRID
16	Transmission system for evacuation of 4000 MW of RE power in the Bhuj area under SECI bids (Tranche I to IV) at Bhuj PS	Given at **Annexure-J**	356	RTM by POWERGRID
17	Transmission system for evacuation of 950 MW of RE power under SECI bids Tranche I to IV) at Tuticorin PS of POWERGRID	i) 1x500 MVA 400/230kV ICT (3rd) – 1 no. ii) 400kV ICT bay (GIS) - 1 no. iii) 230kV ICT bay (GIS) - 1 no.	37	RTM by POWERGRID
18	Construction of 2 no. 400 kV line bays at 400/220 kV Kozhikode (Areekode) substation of PGCIL for terminatingNorth Trissur (Madakkathara)-Kozhikode (Areakode) 400kV D/C line of KSEBL	i) 400 kV line bays – 2 no.	18	RTM by POWERGRID

19	Implementation of 1x125 MVAr bus reactors at 400kV sub-stations of POWERGRID for reactive power compensation in SR	(i) Hosur 400kV - 1x125 MVAr (ii) Madhugiri (GIS) 400kV - 1x125 MVRr (iii) Dharampuri 400kV - 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 (incl. 3 no. GIS bays)	117	RTM by POWERGRID
20	Termination of 400kV lines at Jeerat (WBSETCL) S/s under the ERSS-XV and ERSS-XVIII schemes	(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). a. Jeerat (WBSETCL) – Baharampur/Farakka 400kV S/c line of POWERGRID b. Jeerat (WBSETCL)– Rajarhat/Subhashgram 400kV S/c line of POWERGRID c. Jeerat (WBSETCL)– Barkeshwar (WBSETCL) 400kV S/c line of WBSETCL d. 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.	26.3	RTM by POWERGRID

21	500MW HVDC back to back station at North Comilla (Bangladesh) for transfer of power through Surjamaninagar (India)– North Comilla (Bangladesh) : Indian Portion	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	23	RTM by POWERGRID
		ii) 2 nos. 400kV line bays at Surajmaninagar S/s for termination of Surajmaninagar (TSECL) – North Comilla 400kV D/c line	17	RTM by owner of the S/S i.e. NER II Transmission Ltd. (Sterlite)
22	2 no. 400kV line bays at Muzaffarpur (POWERGRID) S/s for operation of Muzaffarpur-Dhalkebar 400kV D/c line (presently operated at 132kV) at rated voltage level of 400kV	i) 2 no. of 400 kV line bays atMuzaffarpur (POWERGRID) S/s	18	RTM by POWERGRID
23	Indian portion of Dhalkebar (Nepal)–Muzaffarpur (India) 400kV D/c (Quad Moose) line associated with 900MW Arun-3 HEP in Nepal	i) Dhalkebar-Muzaffarpur 400 kV D/C quad line – 100 km (in Indian territory)	306	RTM by CPTC or by POWERGRID
		ii) 2 nos. of 400 kV bays atMuzaffarpur	18	RTM by POWERGRID
24	Conversion of 50MVAR (3x16.67 MVAr) bus reactor at Farakka to switchable line reactor due to space constraints in termination of Farakka – Baharampur 400kV D/c (Twin HTLS) line	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	RTM by POWERGRID

Annexure-C

Package -1:

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 Northeren Region		
i)	1x500MVA, 400/220kV ICT along with ICT bays and 1 no. of 220kV line bay at 400kV Roorkee (PG) S/s	i) 400/220kV ICT, 500MVA ii) 400kV ICT bay -1 iii) 220kV ICT bay-1 iv) 220kV line bay-1
ii)	1x500MVA, 400/220kV ICT along with ICT bays and 2 nos. of 220kV line bays at 400kV Sonepat (PG) S/s	i) 400/220kV ICT, 500MVA ii) 400kV ICT bay -1 iii) 220kV ICT bay-1 iv) 220kV line bay-2
iii)	2 nos. of 220kV bays at 400 kV Abdullapur (PG) S/s	i) 220kV line bay-2
iv)	1x500MVA, 400/220kV ICT along with 2 nos of 220kV line bays at 400kV Fatehpur (PG) S/s	i) 400/220kV ICT 500MVA, ii) 400kV ICT bay -1 iii) 220kV ICT bay-1 iv) 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 for grant of LTA to M/s Essel Saurya Urja Company of Rajasthan Ltd		
(i)	1x500MVA, 400/220kV ICT along with ICT bays at Bhadla pooling station *Note: The 1X500MVA, 400/220kV ICT at Bhadla is to be provided for grant of LTA to M/s EsselSauryaUrja 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) 400/220kV ICT 500MVA, ii) 400kV ICT bay -1 iii) 220kV ICT bay-1
Total Estimated Cost of the Scheme (Part A+B+C) (Rs Crore)		**395.2**

Annexure-D

Advice of CEA

CEA has suggested the following:

a. 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 in proposed to bring more clarity under the provision of Tariff Policy. In view of above the para 7.1 (7) may be modifies 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."

b. 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.

Annexure - E

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 2nd 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
**LILO of other circuit of Zerda–Ranchodpura 400kV D/c line at Sankhari(GETCO) is already under implementation by GETCO.* Note: a. *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 Banaskantha(PG)*		
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 / Ambheti (Vapi – II)	iii) ICTs :2x500MVA, 400/220kV 400kV iv) ICT bays: 2 nos. v)Line bays: 4 nos. vi) Space for 2x500MVA, 400/220kV ICTs (future) vii) Space for 400/220kV ICT bays (future): 2 nos. viii) Space for Line bays along with Line Reactors (future): 4 nos. 220kV ix) ICT bays: 2 nos. x)Line bays: 6 nos. (2 for Sayali(DNH) and 4 nos. for GETCO) xi) Space for 400/220kV ICT bays (future): 2 nos. xii) Space for Line bays (future): 6 nos.
ii)	LILO of KAPP – Vapi 400 kV D/C line at Vapi – II	Route length- 10km

iii)	125 MVAr bus reactor at Vapi – II Substation	xiii) 125 MVAr bus reactor-1 xiv) Bus Reactor Bay: 1 no xv) Space for 420kV additional Bus Reactor 1 no
iv)	• 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)	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) 2 nos. of 400 kV bays at (POWERGRID) Phadge 765/400 kV (GIS)	xvi) Route length 60km xvii) 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 AptaTaloja 220kV lines) at Navi Mumbai (PG)	Route length 2km

Note:

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

b. *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.

c. *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)*

d. *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)	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 ***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 North Lakhimpur (AEGCL) S/s and this line will be constructed from LILO portion.*	
(ii)	LILO of one circuit of Pare HEP – North Lakhimpur (AEGCL) 132kV D/c line (with ACSR Zebra) at Nirjuli (POWERGRID) substation	

Note:

a. *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)*

b. ***NEEPCO would implement following:***

(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*

(ii) *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**)*

Total Estimated Cost of the Scheme (Rs Crore): 586 Cr.

Annexure-F

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

Scope of Transmission Scheme		**Estimated Cost (Rs. Crore)**
Part-A: At Kanpur		**65.0**
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		**110.0**
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)		**175.0**

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

Annexure-G

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

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	75.0
ii)	Interconnecting Wardha - Koradi II 400 kV quad with Warora – Wardha 400 kV (Quad) line at outskirt 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)	2x63MVAr 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)	**75.0**

Annexure-H

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	421.0*
2.	Establishment of 2x500 MVA, 400/220 kV GIS substation at Kasargode **400kV** 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 **220 kV** – Line Bays : 6 – ICT bays : 2 – Space for line bays : 6	1000 MVA	181.0
3.	2 nos. of 400kV line bays at UPCL switchyard		18.0
		Total Cost Rs (Crore)	**620.0**

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

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.

Annexure-I

Sl. No.	Scope of the Transmission Scheme	Proposed Bus Reactor Capacity (MVA)	Estimated Cost (Rs.Cr.)
1	Khandwa 400kV	1x125 along with 400 kV bay	16.0
2	Solapur 765kV	1x240 along with 765 kV bay	35.0.0
3	Rajgarh 400kV	1x125 along with 400 kV bay	16.0
4	Wardha 765kV	1x330 along with 765 kV bay	41.0
5	Aurangabad 765kV	1x240 along with 765 kV bay	35.0
		Total Rs (in Crore)	**143.0**

Annexure-J

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

S. No.	Scope of the Transmission Scheme	Capacity (MVA)	Estimated Cost (Rs.) Cr.
1.	Installation of additional 3x500MVA, 400/220kV (3rd , 4th & 5th) ICTs along with 400kV AIS & 220kV AIS bays	i) 400/220 kV 1x500 MVA ICT – 3 no. ii) 400 kV ICT bays – 3 no. iii) 220 kV ICT bays – 3 no.	102 .0
2	Installation of additional 3x500MVA, 400/220kV (6th , 7th & 8th) ICTs along with 400kV GIS & 220kV AIS bays	i) 400/220 kV 1x500 MVA ICT – 3 no. ii) 400 kV ICT bays (GIS) – 3 no. iii) 220 kV ICT bays – 3 no.	107.0
3	Installation of additional 2x1500MVA, 765/400kV (3rd & 4th) ICTs along with 765kV AIS & 400kV GIS bays	i) 765/400 kV 1x1500 MVA ICT – 2 no. ii) 765 kV ICT bays) – 2 no. iii) 400 kV ICT bays (GIS) – 2 no.	147.0
		Total Rs. (Crore)	356.**0**