

Agenda for 2nd meeting of Empowered Committee on Transmission (ECT)

Following schemes have been recommended by the NCT for consideration of ECT.

S. No.	Name of Transmission Scheme	Scope of works	Estimated cost (Rs. Cr.)	Recommendation of 1 st NCT
1	Grant of connectivity and Long Term Open Access to HPPCL-450 MW Shongtong Karcham HEP	<ol style="list-style-type: none"> 1. Shongtong Karcham – 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. 	272.0	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-I	395.2	RTM by POWERGRID To be de-notified as the scheme has already been notified for implementation through TCB
3	Replacement of 1x315 MVA ICT by 1x500 MVA along with two nos. of 220 kV line bays at Lucknow	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> i. 400kV ICT bay -1 ii. 220kV ICT bay-1 iii. 220kV line bay-2 	23.8	RTM by POWERGRID

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	nos. of 220 kV line bays at Gorakhpur			
5	Package-2: Name of Scheme : Western Region Strengthening Scheme –XIX (WRSS-XIX) and North Eastern Region Strengthening Scheme – IX (NERSS-IX)	Given at Annexure-II	586.0	TBCB - scheme already notified
		Scope of augmentation works at existing POWERGRID sub-stations to be excluded from TBCB scope	38.0	RTM by POWERGRID Modification in scope of works of Package-2 to be notified.
		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.		
6	Scheme to control Fault Level in Northern Region (Phase-II)	Given at Annexure-III	175.0	RTM by POWERGRID
7	Measures to control fault level at Wardha Substation	Given at Annexure-IV	75.0	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 Udipi (UPCL)-Kasargode D/C line	Details at Annexure-V	620.0	TBCB
10	Construction of 2 no. 400 kV GIS bays at 400/220 kV Chamera Pooling Station of PGCIL under Northern Region System Strengthening scheme	i. 400 kV GIS bays at 400/220 kV Chamera Pooling Station of PGCIL - 2 no	21.0	RTM by POWERGRID

11	Additional 1x500 MVA, 400/220kV ICT at Saharanpur (PG) 400/220kV substation	<ul style="list-style-type: none"> i. 400/220kV ICT 500MVA ICT - 1 no. ii. 400kV ICT bay -1 no. iii. 220kV ICT bay-1 no. 	34.0	RTM by POWERGRID
12	Provision of Bus Reactors at High Voltage Nodes in Western Region	Details at Annexure-VI	143.0	RTM by POWERGRID
13	Augmentation of transformation capacity in Western Region	<p>A. Jabalpur 400/220 kV S/S of POWERGRID</p> <ul style="list-style-type: none"> i. 400/220kV 500MVA ICT – 1 no. ii. 400kV ICT bay – 1 no. iii. 220kV ICT bay- 1 no. <p>B. Itarsi 400/220 kV S/S of POWERGRID</p> <ul style="list-style-type: none"> i. 400/220kV 500MVA ICT - 1 no., ii. 400kV ICT bay -1 no. iii. 220kV ICT bay-1 no. 	68.0	RTM by POWERGRID
14	Provision of 400 kV 1x125 MVar Bus Reactor at Champa Pool Split Bus Section –A	<ul style="list-style-type: none"> i. 400 kV, 1x125MVAR ii. 400kV bay -1 	16.0	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	<ul style="list-style-type: none"> i. 400 kV bay – 1 no. 	9.0	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	Details at Annexure-VII	356.0	RTM by POWERGRID
17	Transmission system for evacuation of 950 MW of RE power under SECI bids (Tranche I to IV) at	<ul style="list-style-type: none"> i. 1x500 MVA 400/230kV ICT (3rd) – 1 no. ii. 400kV ICT bay (GIS) -1 no. iii. 230kV ICT bay (GIS) -1 no. 	37.0	RTM by POWERGRID

	Tuticorin PS of POWERGRID			
18	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	i. 400 kV line bays – 2 no.	18.0	RTM by POWERGRID
19	Implementation of 1x125 MVAR bus reactors at 400kV sub-stations of POWERGRID for reactive power compensation in SR	<ul style="list-style-type: none"> 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) 	117.0	RTM by POWERGRID
20	Termination of 400kV lines at Jeerat (WBSETCL) S/s under the ERSS-XV and ERSS-XVIII schemes	<ul style="list-style-type: none"> 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). <ul style="list-style-type: none"> 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 	26.3	RTM by POWERGRID

		(WBSETCL) through GIS duct as ISTS and inclusion of the same in the approved scope of ERSS-XV being implemented 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	<p>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</p> <p>ii. 2 nos. 400kV line bays at Surajmaninagar S/s for termination of Surajmaninagar (TSECL) – North Comilla 400kV D/c line</p>	23.0	RTM by POWERGRID
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 at Muzaffarpur (POWERGRID) S/s	18.0	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	<p>i. Dhalkebar-Muzaffarpur 400 kV D/C quad line – 100 km (in Indian territory)</p> <p>ii. 2 nos. of 400 kV bays at Muzaffarpur</p>	306.0	RTM by CPTC or 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	i. 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	9.0	RTM by POWERGRID

Annexure-I

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 Northern 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 Sonapat (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 <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>	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-II

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>*LILO of other circuit of Zerda – Ranchodpura 400kV D/c line at Sankhari(GETCO) is already under implementation by GETCO.</p> <p><u>Note:</u></p> <p>a. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.</p> <p>POWERGRID to provide space for 2 nos. 400kV line bays at Banaskantha(PG)</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 / Ambheti (Vapi – II)	<p>iii. ICTs :2x500MVA, 400/220kV</p> <p><u>400kV</u></p> <p>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.</p> <p><u>220kV</u></p> <p>ix. ICT bays: 2 nos. x. Line bays: 6 nos. (2 for Sayali(DNH) and 4 nos. for GETCO)</p>

		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.	<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>	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 Apta Taloja 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

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|-----|---|--|
| 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**)

Annexure-III

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
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

Annexure-IV

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
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

Annexure-V

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 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
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.

Annexure-VI

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
2	Solapur 765kV	1x240 along with 765 kV bay	35
3	Rajgarh 400kV	1x125 along with 400 kV bay	16
4	Wardha 765kV	1x330 along with 765 kV bay	41
5	Aurangabad 765kV	1x240 along with 765 kV bay	35
Total Rs (in Crore)			143

Annexure-VII

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 (3 rd , 4 th & 5 th) 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
2	Installation of additional 3x500MVA, 400/220kV (6 th , 7 th & 8 th) 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
3	Installation of additional 2x1500MVA, 765/400kV (3 rd & 4 th) 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
Total Rs. (Crore)			356