



सत्यमेव जयते

भारत सरकार

Government of India

विद्युत मंत्रालय

Ministry of Power

केंद्रीय विद्युत प्राधिकरण

Central Electricity Authority

विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग- II

Power System Planning & Appraisal Division-II

सेवा में /To

As per list of Addresses

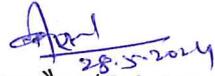
विषय: ट्रांसमिशन पर राष्ट्रीय समिति (एनसीटी) की उन्नीसवीं बैठक के कार्यवृत्त - के सम्बन्ध में ।

Subject: Minutes of the 19th Meeting of National Committee on Transmission (NCT) – regarding.

महोदया (Madam) / महोदय (Sir),

The 19th meeting of the "National Committee on Transmission" (NCT) was held on 29th April, 2024 at CEA, New Delhi. Minutes of the meeting are enclosed herewith.

भवदीय / Yours faithfully,


28.5.2024
(बी.एस. बैरवा / B.S. Bairwa)

मुख्य अभियन्ता (इंचार्ज) एवं सदस्य सचिव, एन.सी.टी. /
Chief Engineer (I/C) & Member Secretary (NCT)प्रतिलिपि / Copy to:

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

List of Addresses:

1.	Chairperson, Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	2.	Member (Power Systems), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.
3.	Member (Economic & Commercial), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	4.	Director (Trans), Ministry of Power Shram Shakti Bhawan, New Delhi-110001.
5.	Sh. Lalit Bohra, Joint Secretary Room no 602, Atal Akshay Urja Bhawan Opposite CGO Complex gate No. 2, Lodhi Road, New Delhi – 110003	6.	Chief Operating Officer, CTUIL, Saudamini, Plot No. 2, Sector-29, Gurgaon – 122 001.
7.	Sh. Rajnath Ram, Adviser (Energy), NITI Aayog, Parliament Street, New Delhi – 110 001.	8.	CMD, Grid Controller of India, B-9, Qutub, Institutional Area, Katwaria Sarai, New Delhi – 110016
9.	Sh. Ravinder Gupta Ex. Chief Engineer CEA		

Special Invitee

Chief Engineer (PCD), CEA

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Minutes of the 19th meeting of National Committee on Transmission

The 19th meeting of NCT was held on 29th April, 2024 at CEA, New Delhi. List of participants is enclosed at **Annexure-I**. Agenda wise deliberations are given below.

1 Confirmation of the minutes of the 18th meeting of National Committee on Transmission.

1.1 The minutes of the 18th meeting of NCT held on 05.03.2024 were issued vide CEA letter No. CEA-PS-12-13/3/2019-PSPA-II dated 11.03.2024. Based on the observations received from CTUIL, a corrigendum to the minutes was issued vide letter dated 15.03.2024.

1.2 Further, CTUIL submitted following amendments to the minutes:

1.2.1 In table below 4.1.5 (A) REZ Ph-IV (Part 3: 6GW) (Bikaner Complex) : Part A (Estimated Cost: Rs 5968.5 Cr), following may be mentioned as note:

“POWERGRID shall provide space for 2 Nos. of 400 kV line bays at Fatehabad (PG). Indi Grid shall provide space for 2 Nos. of 400 kV line bays (GIS) at Patran (Indi Grid) S/s”

1.2.2 In table below 4.1.5 (B) REZ Ph-IV (Part 3: 6GW) (Bikaner Complex) :Part B (Estimated Cost: Rs 5357.36 Cr), following may be mentioned as note:

“POWERGRID shall provide space for 2 Nos. of 400 kV line bays each at Jind (PG) & Sonipat (PG) S/s”

1.3 Members confirmed the minutes along with the corrigendum and amendments suggested at para 1.2 above.

2 Status of the transmission schemes noted/approved/recommended to MoP in the 18th meeting of NCT:

2.1 Status of new transmission schemes approved/recommended:

Sr. No	Name of the Transmission Scheme	Noted/ Recommended/ Approved	Mode of Implementation	BPC	Award/ Gazette notification
1.	Transmission system for evacuation of power from Rajasthan REZ Ph IV (Part 3: 6GW) (Bikaner Complex): Part A	Recommended	TBCB	RECPDCL	Gazette Notified by MoP dated 14.03.2024
2.	Transmission system	Recommended	TBCB	RECPDCL	Gazette

Sr. No	Name of the Transmission Scheme	Noted/ Recommended/ Approved	Mode of Implementation	BPC	Award/ Gazette notification
	for evacuation of power from Rajasthan REZ Ph IV (Part 3: 6GW) (Bikaner Complex): Part B	d			Notified by MoP dated 14.03.2024
3.	Transmission Scheme for integration of Davanagere / Chitradurga and Bellary REZ in Karnataka	Recommended	TBCB	PFCCL	Gazette Notified by MoP dated 14.03.2024
4.	Transmission Scheme for integration of Bijapur REZ in Karnataka	Recommended	TBCB	PFCCL	Gazette Notified by MoP dated 14.03.2024
5.	Transmission System under ISTS for evacuation of power from Kudankulam Unit - 3 & 4 (2x1000 MW)	Recommended	TBCB	PFCCL	Gazette Notified by MoP dated 14.03.2024
6.	Augmentation of 2x500 MVA, 400/230 kV transformation capacity (3rd & 4th ICTs) at Karur PS	Approved	RTM	Not applicable	Informed to CTUIL vide letter dated 11.03.2024. CTUIL further communicated to TSPs vide letter dated 12.03.2024
7.	Augmentation of transformation capacity at Jam Khambhaliya PS (GIS)	Approved	TBCB	PFCCL	Gazette Notified by CEA dated 01.04.2024
8.	Transmission Scheme for integration of Tumkur-II REZ in Karnataka	Approved	TBCB	RECPDCL	Gazette Notified by CEA dated 01.04.2024
9.	Additional FOTE for	Approved	RTM	Not	Informed to

Sr. No	Name of the Transmission Scheme	Noted/ Recommended/ Approved	Mode of Implementation	BPC	Award/ Gazette notification
	redundancy at AGC locations in ER			applicable	CTUIL vide letter dated 11.03.2024
10.	OPGW laying work on 400kV BokaroA-Kodarma line	Approved	RTM	Not applicable	CTUIL further communicated to TSPs vide letter dated 12.03.2024

2.2 Status of transmission schemes where modifications was suggested by NCT:

S. No.	Scheme where modifications was suggested	Status
1.	Modification in scope of work of Eastern Region Expansion Scheme-XXXIX (ERES-XXXIX)	Informed to BPCs vide letter dated 11.03.2024
2.	Modification in SCOD of “Transmission System for Evacuation of Power from REZ in Rajasthan (20 GW) under Phase-III Part-G”	Informed to CTUIL vide letter dated 11.03.2024
3.	Modification in SCOD of Transmission scheme for evacuation of 4.5 GW RE injection at Khavda PS under Phase II Part A	Informed to CTUIL vide letter dated 11.03.2024

2.3 Members noted the status.

3 Modifications in the earlier approved/notified transmission schemes:

3.1 Implementation of Jhatikara – Dwarka 400 kV (Quad) D/c line under Rajasthan REZ Ph-III, Part-D- Ph-II Scheme:

3.1.1 Representative of CTUIL stated that MoP vide OM dated 06/11/2023 had allocated 400 kV Jhatikara- Dwarka (Quad) D/c line (Under Rajasthan REZ Phase-III- Part-D) to POWERGRID for implementation under RTM with Implementation schedule as 18 months from the date of allocation of the project. Due to severe ROW issues, NCT in its 17th meeting held on 31.01.24 directed CTUIL to re-survey of the scheme through implementing agency so as to arrive at the optimum requirement of monopole/narrow base tower towers, and work out the revised estimated cost.

3.1.2 Accordingly, a joint site visit of representatives from CEA, CTUIL, POWERGRID and RECPDCL was done on 28.02.2024 for preliminary assessment of the requirement of monopole/narrow base towers. In the site visit, it was concluded that there is RoW issue in many places in the portion of line from Dwarka S/s upto Urban Extension Road - II (UER-II), however, at few locations narrow base tower / normal type towers could be installed subject to the approval of DDA, meeting RoW requirement. In the remaining portion of the line, from UER-II upto Jhatikara S/s, it seems that most of the line goes through the Agricultural land and narrow base tower / normal type towers could be installed subject to the approval of DDA.

3.1.3 Based on the requirement, following changes are suggested in the scope of scheme.

Earlier Scope	Revised Scope
Jhatikara-Dwarka 400 kV D/C Line (Quad)- length 20 km	Jhatikara-Dwarka 400 kV D/C Line (Twin HTLS*): length 17 km [Monopole/ Narrow base/Normal towers]
2 Nos. of 400 kV line bays each at both Jhatikara and Dwarka sub-stations; (Total 4 Nos. of 400 kV line bays)	No change
Approved cost: Rs. 145 cr.	Revised estimated cost: Rs. 240 cr @
Tentative implementation time-frame of 18 months from MOP OM-06/11/23	No change

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

@ including forest clearance, Crop and Tree compensation

3.1.4 After deliberations, NCT approved the above scope modifications in the Jhatikara – Dwarka 400 kV D/c line under Rajasthan REZ Ph-III, Part-D- Ph-II Scheme.

3.2 Delinking of EHVAC System beyond Kaithal from Transmission system for evacuation of RE power from renewable energy parks in Leh (5 GW Leh- Kaithal transmission corridor)

- 3.2.1 Chief Engineer (PSPA-II), CEA, stated that Transmission system (EHVAC+HVDC) for evacuation of RE power from renewable energy parks in Leh (5 GW Leh- Kaithal transmission corridor) was approved in 7th meeting of NCT held on 03.12.21. Same was allocated for implementation to POWERGRID under RTM route vide MOP OM dated 13.01.22 with implementation time frame of 5 years from approval i.e. approval of the Central Government for providing Central Grant for part funding of the project.
- 3.2.2 CTUIL stated that POWERGRID vide letter dated 23.02.2024 has informed that following elements have been deleted from scope of above project due to MNRE proposal in PIB meeting and EFC recommendation:
- Battery Energy Storage System (1 GWh: 250 MWx4 hr) at Pang
 - EHVAC System beyond Kaithal
- 3.2.3 CTUIL further informed that, as per POWERGRID, revised transmission system after above deletions was taken up in CCEA meeting held on 18.10.2023 and wherein the project was approved as Green Energy Corridor (GEC) Phase-II – Inter-State Transmission System (ISTS) for 13 GW Renewable Energy Project in Ladakh at an estimated cost of Rs. 20,773.70 Crore [including Central Finance Assistance (CFA) of Rs. 8309.48 Cr. with completion schedule as FY 2029-30]. In view of above, POWERGRID vide letter dated 23.02.2024 has also requested to issue suitable amendment to original scope of work of Pang – Kaithal HVDC Project. It is also to mention that POWERGRID has kept space provision at Kaithal HVDC S/s to implement EHVAC system beyond Kaithal.
- 3.2.4 In the 17th meeting of NCT held on 31.01.2024, it was opined that MoP's OM dated 13.01.2022 regarding implementation of the (EHVAC+HVDC) scheme under RTM by POWERGRID, needs to be modified to delink the EHVAC system beyond Kaithal under TBCB.
- 3.2.5 Accordingly, CTUIL proposed to delink the EHVAC System beyond Kaithal from Transmission system for evacuation of RE power from renewable energy parks in Leh (5 GW Leh- Kaithal transmission corridor) with following scope (Estimated Cost: Rs. 2099.05 Cr. as per POWERGRID DPR):

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)	Time schedule (in months)
1	➤ Kaithal – Bahadurgarh (PG) 400 kV D/c line (Twin HTLS*)	Line Length -170 km <ul style="list-style-type: none"> • 400 kV line bays at Kaithal – 2 Nos. • 400 kV line bays at Bahadurgarh (PG) – 2 Nos. 	24 months from SPV transfer [^]

2	Kaithal – Modipuram (Meerut) (UPPTCL) 765 kV D/c line along with 1x240 MVA switchable line reactor on each circuit at Kaithal end (along with 2 Nos. switching equipment for 765 kV, 240 MVA Switchable Line Reactor)	Line Length -210 km <ul style="list-style-type: none"> • 765 kV line bays at Kaithal – 2 Nos. • 765 kV line bays at Modipuram (Meerut) (UPPTCL) – 2 Nos. • 765 kV, 240 MVA switchable line reactors at Kaithal end– 2 Nos. • Switching equipment for 765 kV, 240 MVA switchable line reactors at Kaithal end – 2 Nos. 	
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^AC system would be required in the matching timeframe of the HVDC system i.e. 31.03.2030.

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

- (i) POWERGRID to provide space for 2 Nos. of 765 kV bays and 2 Nos. of 400 kV bays at Kaithal HVDC Station
- (ii) UPPTCL to provide space for 2 Nos. of 765 kV bays at Modipuram (Meerut) S/s
- (iii) POWERGRID to provide space for 2 Nos. of 400 kV bays at Bahadurgarh S/s
- (iv) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

3.2.6 Further, scope of Transmission system (EHVAC+HVDC) for evacuation of RE power from renewable energy parks in Leh (5 GW Leh- Kaithal transmission corridor) approved in 7th NCT meeting held on 03.12.21 proposed to be modified as below:

S. No.	Scope as per OM dated 13.01.2022	Revised Scope
1.	<p><u>ISTS system for RE interconnection at Pang</u></p> <ul style="list-style-type: none"> i. 400 kV PS-1 - Pang D/C (quad moose) line – 7 km ii. 400 kV PS-2 -Pang D/C (quad moose) line – 27 km iii. 400 kV PS-3 -Pang D/C (quad moose) line – 41 km <p><i>Note :400 kV GIS line bays (2 Nos.) each at PS-1, PS-2 & PS-3 (under developer scope)</i></p>	<p><u>ISTS system for RE interconnection at Pang</u></p> <ul style="list-style-type: none"> i. 400 kV PS-1 - Pang D/C (quad moose) line – 7 km ii. 400 kV PS-2 -Pang D/C (quad moose) line – 27 km iii. 400 kV PS-3 -Pang D/C (quad moose) line – 41 km <p><i>Note :400 kV GIS line bays (2 Nos.) each at PS-1, PS-2 & PS-3 (under developer scope)</i></p>
2.	<p><u>Battery Energy Storage System (1GWh: 250 MW X 4 hr) at Pang</u></p> <ul style="list-style-type: none"> i. BESS of suitable size (1 GWh: 250 MW x 4 hr) 	Deleted

S. No.	Scope as per OM dated 13.01.2022	Revised Scope
	ii. 220 kV line bay (1 no) for BESS (ISTS) interconnection at Pang	
3.	<p><u>HVDC System</u></p> <p>i. Pooling point in Pang (Leh): ± 350 kV, 2 Nos. of 2500 MW HVDC terminal Future provisions: Space for ❖ 400 kV line bays: 6 Nos. ❖ 400/220 kV ICTs along with bays: 2 Nos. ❖ 220 kV line bays: 4 Nos.</p> <p>ii. Pooling point in Kaithal (Haryana): ± 350 kV, 2 Nos. of 2500 MW HVDC terminal Future provisions: Space for ❖ 765/400 kV ICTs along with bays : 1 No. ❖ 765 kV line bays along with switchable line reactor : 2 Nos. ❖ 400kV line bays along with switchable line reactor : 4 Nos. ❖ 400/220 kV ICTs along with bays : 2 Nos. ❖ 220 kV line bay: 4 Nos.</p> <p>iii. 4 Nos. of 400 kV converter (VSC) bays at Pang</p> <p>iv. 4 Nos. of 400 kV converter (VSC) bays at Kaithal</p> <p>v. 2 Nos. of 400/220/33 kV, 315 MVA Transformers along with associated Bays at Pang</p> <p>vi. 3 Nos. of 765/400/33 kV, 1500 MVA Transformers along with associated bays at Kaithal</p> <p>vii. 2 Nos. of 400 kV line bays at Kaithal</p> <p>viii. 2 Nos. of 765 kV line bays at Kaithal</p> <p>ix. 6 Nos. of 400kV line bays at Pang for termination of lines from RE park</p>	<p><u>HVDC System</u></p> <p>i. Pooling point in Pang (Leh): ± 350 kV, 2 Nos. of 2500 MW HVDC terminal Future provisions: Space for ❖ 400 kV line bays: 6 Nos. ❖ 400/220 kV ICTs along with bays: 2 Nos. ❖ 220 kV line bays: 4 Nos.</p> <p>ii. Pooling point in Kaithal (Haryana): ± 350 kV, 2 Nos. of 2500 MW HVDC terminal Future provisions: Space for ❖ 765/400 kV ICTs along with bays : 1 No. ❖ 765 kV line bays along with switchable line reactor : 4 Nos. ❖ 400kV line bays along with switchable line reactor : 6 Nos. ❖ 400/220 kV ICTs along with bays : 2 Nos. ❖ 220 kV line bay : 4 Nos.</p> <p>iii. 4 Nos. of 400 kV converter (VSC) bays at Pang</p> <p>iv. 4 Nos. of 400 kV converter (VSC) bays at Kaithal</p> <p>v. 2 Nos. of 400/220/33 kV, 315 MVA Transformers along with associated Bays at Pang</p> <p>vi. 3 Nos. of 765/400/33 kV, 1500 MVA Transformers along with associated bays at Kaithal</p> <p>vii. Deleted</p> <p>viii. Deleted</p> <p>ix. 6 Nos. of 400kV line bays at Pang for termination of lines from RE park</p>

S. No.	Scope as per OM dated 13.01.2022	Revised Scope
	<p>DC GIS/ AIS</p> <p>i. DC GIS / AIS at Pang and DC AIS at Kaithal</p> <p>ii. 4 Nos. of transition stations with DC GIS/ AIS</p> <p>HVDC Line (OHL and UG Cable)</p> <p>i. HVDC Line (OHL and UG Cable): 480 kms of ± 350 kV HVDC line between Pang & Kaithal PS (combination of 465 km overhead line (Quad) and 15 km underground cable)</p>	<p>DC GIS/ AIS</p> <p>i. DC GIS / AIS at Pang and DC AIS at Kaithal</p> <p>ii. 4 Nos. of transition stations with DC GIS/ AIS</p> <p>HVDC Line (OHL and UG Cable)</p> <p>i. HVDC Line (OHL and UG Cable): 480 kms of ± 350 kV HVDC line between Pang & Kaithal PS (combination of 465 km overhead line (Quad) and 15 km underground cable)</p>
4.	<p><u>EHVAC System beyond Kaithal</u></p> <p>i. Kaithal – Bahadurgarh (PG) 400 kV D/c Line (Twin HTLS*) – 170 km</p> <p>ii. Kaithal – Modipuram (Meerut) (UPPTCL) 765 kV D/c Line along with 1x240 MVAr switchable line reactor on each circuit at Kaithal end (along with 2 Nos. switching equipment for 765 kV, 240 MVAR Switchable line reactor) – 210 km</p> <p>iii. **Augmentation of 765/400 kV, 1500 MVA transformer of Bhiwani S/s (one section has 2x1000 MVA ICT wherein 1500 MVA augmentation will take place, whereas other has 1x1000 MVA ICT through series reactor) along with associated bays incl. 500 MVA spare transformer unit (1-Phase)</p> <p>iv. 2 Nos. of 400 kV line bays at Bahadurgarh (PG)</p> <p>v. 2 Nos. of 765 kV line bays at Modipuram (Meerut) (UPPTCL)</p>	<p><u>EHVAC System beyond Kaithal</u></p> <p>Deleted (Proposed to be delinked and formed as separate scheme)</p>
5.	<p>ISTS system to provide reliable power supply to Ladakh:</p> <p>i. 220 kV Pang – Leh (Phyang) (PG) S/C line (Deer conductor) (S/C line on D/c tower) along with 220 kV line bay each at Pang & Leh (Phyang) for line termination 151</p>	<p>ISTS system to provide reliable power supply to Ladakh:</p> <p>i. 220 kV Pang – Leh (Phyang) (PG) S/C line (Deer conductor) (S/C line on D/c tower) along with 220 kV line bay each at Pang & Leh (Phyang) for line termination 151</p>

S. No.	Scope as per OM dated 13.01.2022	Revised Scope
	km + 7 km underground cable.	km + 7 km underground cable.
Notes	<p>❖ With minimum capacity of 2100 MVA on each circuit at nominal voltage</p> <p>i. UPPTCL to provide space for 2 Nos. of 765 kV bays at Modipuram (Meerut) S/s</p> <p>ii. POWERGRID to provide space for 2 Nos. of 400 kV bays at Bahadurgarh S/s</p> <p>iii. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey</p> <p>iv. implementation Time-frame: 5 years from approval</p>	<p>❖ Deleted</p> <p>i. Deleted</p> <p>ii. Deleted</p> <p>iii. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey</p> <p>iv. Completion Schedule: FY 2029-30 (by 31st March 2030).</p>

*** due to urgent requirement of 1500 MVA, 765/400 kV ICT at Bhiwani S/s, this element was delinked from earlier RTM scope in 15th NCT meeting and MOP vide OM dated 06/11/23 allocated the implementation of the ICT to POWERGRID in RTM*

3.2.7 After deliberations, NCT recommended delinking of EHVAC system beyond Kaithal from Transmission system for evacuation of RE power from renewable energy parks in Leh (5 GW Leh- Kaithal transmission corridor) with the scope as under:

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/no. of bays etc.)	Time schedule (in months)
1	➤ Kaithal – Bahadurgarh (PG) 400 kV D/c line (Twin HTLS*)	Line Length -170 km <ul style="list-style-type: none"> • 400 kV line bays at Kaithal – 2 Nos. • 400 kV line bays at Bahadurgarh (PG) – 2 Nos. 	24 months from SPV transfer [^]
2	Kaithal – Modipuram (Meerut) (UPPTCL) 765kV D/c line along with 1x240 MVAR switchable line reactor on each circuit at Kaithal end (along with 2 Nos. switching equipment for 765kV, 240 MVAR Switchable Line	Line Length -210 km <ul style="list-style-type: none"> • 765 kV line bays at Kaithal – 2 Nos. • 765 kV line bays at Modipuram (Meerut) (UPPTCL) – 2 Nos. • 765 kV, 240 MVAR 	

	Reactor)	switchable line reactors at Kaithal end– 2 Nos. • Switching equipment for 765 kV, 240 MVAR switchable line reactors at Kaithal end – 2 Nos.	
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^AC system would be required in the matching timeframe of the HVDC system i.e. 31.03.2030.

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

- (i) POWERGRID to provide space for 2 Nos. of 765 kV bays and 2 Nos. of 400 kV bays at Kaithal HVDC Station
- (ii) UPPTCL to provide space for 2 Nos. of 765 kV bays at Modipuram (Merrut) S/s
- (iii) POWERGRID to provide space for 2 Nos. of 400 kV bays at Bahadurgarh S/s
- (iv) The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey

3.2.8 Further, NCT opined that the above delinked EHVAC system would be required in the matching timeframe of the HVDC system i.e. by 31.03.2030. Accordingly, considering the implementation time frame difference between HVDC (about 4.5 years) & EHVAC system (about 2 yrs), the agenda for implementation of EHVAC system may be brought up to NCT in due course.

3.3 **Change in Scope of transmission scheme "Eastern Region Expansion Scheme-XXXIV (ERES-XXXIV)"**

3.3.1 Chief Engineer (PSPA-II), CEA, stated that the transmission scheme "Eastern Region Expansion Scheme-XXXIV (ERES-XXXIV)" was agreed in the 12th meeting of NCT held on 24.03.2023. The scheme inter alia includes establishment of 2 Nos. of 400 kV line bays at Paradeep (OPTCL) S/s for termination of Paradeep (ISTS) – Paradeep (OPTCL) 400 kV D/c (Quad) ISTS line (also being implemented under same ISTS scheme). As the bus scheme of Paradeep (OPTCL) GIS S/s is one and half breaker scheme, 2 Nos. full diameter i.e. 4 Nos. of GIS bays were required to be implemented in the scheme for requirement of 2 Nos. GIS bays for termination of Paradeep (OPTCL) – Paradeep 400 kV D/c (Quad) line in two different diameters. The space provision for future was slightly modified in the 13th meeting of NCT.

3.3.2 During preparation of RfP, BPC observed that in the layout provided of Paradeep (OPTCL) S/s, OPTCL has indicated the use of 2 Nos. 400 kV GIS bays of ISTS diameters being implemented under this scheme at Paradeep for termination of Paradeep (OPTCL) – Paradeep 400 kV D/c (Quad) line and other 2 Nos. of GIS bays for installation of their own 400/220 kV ICTs. However, utilisation of other 2 Nos. ISTS GIS bays of these diameters were planned to be identified in future as per ISTS requirement.

3.3.3 Subsequently, a meeting was held amongst CEA, CTUIL, BPC and OPTCL on 08.01.2023 under the chairmanship of Member (PS), wherein it was agreed that one existing bay at Paradeep GIS (OPTCL) S/s would be utilized for termination of one circuit of Paradeep (ISTS) – Paradeep (OPTCL) 400 kV D/c line and for the second circuit, one full Dia will be implemented under ISTS at 400 kV Paradeep GIS (OPTCL). Further, remaining bay of the Dia (to be implemented under ISTS) will be utilized by OPTCL for future requirement in lieu of the existing bay (of OPTCL) being utilized under ISTS. Accordingly, in the 17th meeting of NCT, it was decided to implement only one GIS Dia of 400 kV at Paradeep (OPTCL) under ISTS.

3.3.4 OPTCL vide letter dated 20-03-2024 informed CTU that they are now not agreeable with arrangement agreed in the meeting held at CEA on 08-01-2024 and suggested to go ahead with implementation of original plan of implementation of 2 Nos. full diameter i.e. 4 Nos. of GIS bays under ISTS at Paradeep (OPTCL) S/s.

3.3.5 On request of CTUIL, a meeting was held at CEA on 15-04-2024, wherein it was decided that a joint visit may be carried out by CEA, CTU, OPTCL and PFCCL. The visit was held on 23-04-2024. The committee, keeping in view the progress of works at the ground, has recommended that 2 Nos. 400 kV GIS diameters may be implemented under ISTS through TBCB, which may be used for connecting transmission line/reactor/ICT as per requirement. This necessitates reverting the scope of the extension works at Paradeep (OPTCL) S/s under this scheme to original plan i.e. withdrawal of modification agreed in the 17th meeting of NCT.

3.3.6 After deliberations, NCT approved the change in scope of Eastern Region Expansion Scheme-XXXIV (ERES-XXXIV) without change in completion schedule. The revised scope is as under:

As agreed in 17 th meeting of NCT		Modifications w.r.t. 17 th meeting of NCT	
Scope of the transmission scheme	Capacity (MVA) / line length (km)/ Nos.	Scope of the transmission scheme	Capacity (MVA) / line length (km)/ Nos.
Establishment of Paradeep 765/400kV, 2x1500 MVA GIS substation Future Provisions: Space for - 765/400 kV, 4x1500 MVA ICTs (12x500 MVA single phase units including one spare) along with associated ICT bays at both	- 765/400kV, 1500MVA ICTs: 2 Nos. (7x500 MVA single phase units including one spare) - 765 kV ICT bays: 2 Nos. - 400 kV ICT bays: 2 Nos. - 765 kV, 330MVAr Bus reactor: 2 Nos. (7x110 MVAr single phase units including one	Establishment of Paradeep 765/400kV, 2x1500 MVA GIS substation Future Provisions: Space for - 765/400 kV, 4x1500 MVA ICTs (12x500 MVA single phase units including one spare) along with associated ICT bays at both	- 765/400kV, 1500 MVA ICTs: 2 Nos. (7x500 MVA single phase units including one spare) - 765 kV ICT bays: 2 Nos. - 400 kV ICT bays: 2 Nos. - 765 kV, 330 MVAr Bus reactor: 2 Nos. (7x110MVAr single phase units including one

<ul style="list-style-type: none"> - voltage levels - 400/220 kV, 5x500 MVA ICTs along with associated ICT bays at both voltage levels - 765 kV, 2x330 MVar (6x110 MVar single phase units including one spare) bus reactor along with associated bays - 420 kV, 2x125 MVar bus reactor along with associated bays - 10 Nos. of 765 kV line bays (along with space for switchable line reactor) for future lines - 12 Nos. of 400 kV line bays (along with space for switchable line reactor) for future lines - 12 Nos. of 220 kV line bays for future lines - 765 kV bus sectionaliser bay: 1 set - 400 kV bus sectionaliser bay: 1 set - 220 kV bus sectionaliser bay : 1 set - 220 kV bus coupler bay: 2 Nos. 	<ul style="list-style-type: none"> spare unit for both bus and line reactors) - 420 kV, 125 MVar Bus reactor: 2 Nos. - 765 kV Bus reactor bays: 2 Nos. - 400 kV Bus reactor bays: 2 Nos. - 765 kV line bays: 2 Nos. [for termination of Angul (POWERGRID) – Paradeep 765 kV D/c line along with 765 kV, 1x330 MVar switchable line reactor at Paradeep end in both circuits] - 765 kV, 330 MVar (3x110 MVar single phase units) switchable line reactor along with associated bay and 500 ohm NGR (with NGR bypass arrangement): 2 Nos. [at Paradeep end in both circuits of Angul (POWERGRID) – Paradeep 765 kV D/c line] - 400 kV line bays: 2 Nos. [for termination of Paradeep – Paradeep (OPTCL) 400 kV 	<ul style="list-style-type: none"> voltage levels - 400/220 kV, 5x500 MVA ICTs along with associated ICT bays at both voltage levels - 765 kV, 2x330 MVar (6x110 MVar single phase units including one spare) bus reactor along with associated bays - 420 kV, 2x125 MVar bus reactor along with associated bays - 10 Nos. of 765 kV line bays (along with space for switchable line reactor) for future lines - 12 Nos. of 400 kV line bays (along with space for switchable line reactor) for future lines - 12 Nos. of 220 kV line bays for future lines - 765 kV bus sectionaliser bay: 1 set - 400 kV bus sectionaliser bay: 1 set - 220 kV bus sectionaliser bay : 1 set - 220 kV bus coupler bay: 2 Nos. 	<ul style="list-style-type: none"> spare unit for both bus and line reactors) - 420 kV, 125 MVar Bus reactor: 2 Nos. - 765 kV Bus reactor bays: 2 Nos. - 400 kV Bus reactor bays: 2 Nos. - 765 kV line bays: 2 Nos. [for termination of Angul (POWERGRID) – Paradeep 765 kV D/c line along with 765 kV, 1x330 MVar switchable line reactor at Paradeep end in both circuits] - 765 kV, 330 MVar (3x110 MVar single phase units) switchable line reactor along with associated bay and 500 ohm NGR (with NGR bypass arrangement): 2 Nos. [at Paradeep end in both circuits of Angul (POWERGRID) – Paradeep 765 kV D/c line] - 400 kV line bays: 2 Nos. [for termination of Paradeep – Paradeep (OPTCL) 400kV
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	<i>D/c (Quad) line]</i>		<i>D/c (Quad) line]</i>
Angul (POWERGRID) – Paradeep 765 kV D/c line along with 765 kV, 1x330 MVAR switchable line reactor with 500 ohm NGR (with NGR bypass arrangement) at Paradeep end in both circuits	Route length: 190 km	Angul (POWERGRID) – Paradeep 765 kV D/c line along with 765 kV, 1x330 MVAR switchable line reactor with 500 ohm NGR (with NGR bypass arrangement) at Paradeep end in both circuits	Route length: 190 km
Paradeep – Paradeep (OPTCL) 400 kV D/c (Quad) line	Route length: 10 km	Paradeep – Paradeep (OPTCL) 400 kV D/c (Quad) line	Route length: 10 km
Extension at Angul (POWERGRID) S/s	765 kV line bays (along with space for future switchable line reactor): 2 Nos. [for termination of Angul (POWERGRID) – Paradeep 765 kV D/c line along with 765 kV, 1x330 MVAR switchable line reactor at Paradeep end in both circuits]	Extension at Angul (POWERGRID) S/s	765 kV line bays (along with space for future switchable line reactor): 2 Nos. [for termination of Angul (POWERGRID) – Paradeep 765 kV D/c line along with 765 kV, 1x330 MVAR switchable line reactor at Paradeep end in both circuits]
#Extension at Paradeep (OPTCL) GIS S/s	400 kV GIS line bay: 2 no. (one GIS diameter)	#Extension at Paradeep (OPTCL) GIS S/s	400 kV GIS line bays: 2 Nos. 400 kV GIS diameters [2 no. of bays in different diameter for termination of Paradeep – Paradeep (OPTCL) 400 kV D/c (Quad) line and utilization of balance 2 Nos. shall be identified in future for connecting transmission line/reactor/ICT as per ISTS requirement]
#As the bus scheme of Paradeep (OPTCL) GIS S/s is one and half breaker scheme. For termination of Paradeep – Paradeep (OPTCL) 400 kV D/c (Quad) line, 2 Nos. of line bays in		#As the bus scheme of Paradeep (OPTCL) GIS S/s is one and half breaker scheme, 2 Nos. full diameter i.e. 4 Nos. of GIS bays needs to be implemented in the scheme for requirement of 2	

<p><i>different diameters are required. One GIS diameter (2 no. line bays) is planned to be implemented in this scheme. One bay of the ISTS diameter shall be used for termination of one circuit of Paradeep (OPTCL) – Paradeep 400kV D/c (Quad) line. The other circuit of this line shall be terminated in bay in immediately adjacent diameter of OPTCL. The other bay of the ISTS diameter will be utilized by OPTCL for future requirement in lieu of their bay being utilized under ISTS.</i></p>	<p><i>Nos. GIS bays for termination of Paradeep (OPTCL) – Paradeep 400 kV D/c (Quad) line in two different diameters. Utilisation of other 2 Nos. GIS bays of these diameters shall be identified in future for connecting transmission line/reactor/ICT as per ISTS requirement.</i></p>
<p>Note:</p> <p>(a) <i>POWERGRID shall provide space at Angul (POWERGRID) 765/400 kV S/s for implementation of 2 Nos. of 765 kV line bays (along with space for future switchable line reactor) for termination Angul (POWERGRID) – Paradeep 765 kV D/c line.</i></p> <p>(b) <i>OPTCL shall provide space at under implementation Paradeep (OPTCL) 400/220 kV GIS S/s (expected by Dec 2024) for implementation of 2 Nos. of 400kV GIS line bays i.e. 1 No. full diameter.</i></p> <p>(c) <i>OPTCL shall provide one no. 400 kV line bay in their diameter immediately adjacent to ISTS diameter being implemented for termination of one circuit of Paradeep – Paradeep (OPTCL) 400 kV D/c (Quad) line. One bay of ISTS diameter shall be provided to OPTCL in lieu of usage of their bay.</i></p>	<p>Note:</p> <p>(a) <i>POWERGRID shall provide space at Angul (POWERGRID) 765/400 kV S/s for implementation of 2 Nos. of 765 kV line bays (along with space for future switchable line reactor) for termination Angul (POWERGRID) – Paradeep 765 kV D/c line.</i></p> <p>(b) <i>OPTCL shall provide space at their under-implementation Paradeep (OPTCL) 400/220 kV GIS S/s (expected by Dec 2024) for implementation of 2 Nos. of 400 kV GIS diameters i.e. 4 Nos. of bays. 2 Nos. of bays in different diameters shall be used for termination of Paradeep – Paradeep (OPTCL) 400 kV D/c (Quad) line and utilization of balance 2 no. of bays shall be identified in future for connecting transmission line/reactor/ICT as per ISTS requirement.</i></p>

3.4 Change in implementation timeframe of Eastern Region Generation Scheme-I (ERGS-I)

3.4.1 Representative of CTUIL stated that in the 16th meeting of NCT held on 30-11-2023, ERGS-I scheme [ATS of NLC Talabira (3x800 MW)] was agreed to be implemented with completion schedule of 01-05-2027. As per latest bidding calendar, the last date for bid submission is 31-05-2024. Now, NLC Ltd. vide letter dated 26-04-2024 has requested to change the start date of connectivity from 01-05-2027 to 28-03-2028 considering the present progress of their plant. Further, in the 30th Consultation meeting of ER (CMETS-ER), the stakeholders have agreed to change in the start date of connectivity and also the completion schedule of ATS i.e. ERGS-I scheme to 28-03-

2028. He stated that keeping in view the bidding timelines i.e. last date of bid submission in May 2024, change in the completion schedule of ERGS-I scheme from 01-05-2027 to 28-03-2028 is urgently required.

3.4.2 After deliberations, NCT approved the change in the completion schedule of ERGS-I scheme from 01-05-2027 to 28-03-2028.

4 New Transmission and Communications Schemes:

4.1 Transmission system strengthening to facilitate evacuation of power from Bhadla/Bikaner complex

4.1.1 Representative of CTUIL stated that comprehensive Transmission scheme for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex) is under implementation for power transfer of 7.7 GW including 4 GW from Bikaner-III PS. The scheme comprises 765 kV EHVAC corridor from Bikaner-III PS towards load centers of Delhi/Uttar Pradesh (UP). As part of the above scheme, 765 kV Bikaner-III - Neemrana 2xD/c and Neemrana-II – Bareilly (PG) D/c lines are being implemented.

4.1.2 To facilitate evacuation of power from Bhadla/Bikaner complex as well as to meet N-1 criteria (beyond 765 kV Bareilly S/s), CTUIL proposed additional 400 kV corridor i.e. 400 kV Bareilly (765/400 kV) – Bareilly (PG) D/c line (Quad) (2nd) along with augmentation of 765/400 kV, 1x1500 MVA ICT (3rd) at Bareilly (765/400 kV) S/s. The proposed strengthening shall also form part of connectivity system of various RE applications granted at Bikaner-III.

4.1.3 Representative of Grid-India stated that there are 02 Nos. of lines from Bareilly PG to Bareilly UP. He enquired whether the loading of this D/C line is within limits with the proposed system augmentation. CTUIL confirmed that the line loadings are within limits.

4.1.4 After deliberations, NCT decided implementation of the Transmission system strengthening to facilitate evacuation of power from Bhadla/Bikaner complex to be undertaken under TBCB.

4.1.4.1 Summary of the scheme is given below:

SI No.	Name of the scheme and tentative implementation timeframe	Estimated Cost (₹ Crores)	Remarks
1.	Transmission system strengthening to facilitate evacuation of power from Bhadla/Bikaner complex Tentative implementation timeframe : 18 months from the date of SPV transfer	198.75	Recommended under TBCB route with PFCCL as BPC

4.1.4.2 Detailed scope of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme	Item Description
1.	400 kV Bareilly (765/400 kV) – Bareilly (PG) D/c line (Quad) (2 nd)	<p>Line length : 4 kms</p> <ul style="list-style-type: none"> • 400 kV line bays -2 Nos. (at Bareilly (765/400 kV) S/s) • 400 kV line bays - 2 Nos. (at Bareilly (PG) S/s)
2.	Augmentation with 1x1500 MVA, 765/400 kV ICT (3 rd) at Bareilly (765/400 kV) S/s	<ul style="list-style-type: none"> • 765/400 kV, 1500 MVA ICT - 1 No. • 765 kV ICT bay - 1 No. • 400 kV ICT bay - 1 No.

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. of 400 kV line bays each at Bareilly (765/400 kV) and 400 kV Bareilly (PG) S/s*
- *POWERGRID to provide space for 1500 MVA ICT at Bareilly (765/400 kV) along with its associated bays.*

4.2 Transmission system for evacuation of power from Fatehgarh/Barmer Complex as part of Rajasthan REZ Ph-IV (Part-4 :3.5 GW) [Fatehgarh/Barmer Complex]

4.2.1 Representative of CTUIL stated that considering grant of connectivity to RE generators in Fatehgarh/Barmer complex as well as for evacuation of power beyond above complex, following transmission scheme for evacuation of power from Fatehgarh/Barmer Complex as part of Rajasthan REZ Ph-IV (Part-4 :3.5GW) has been envisaged. The scheme shall also facilitate evacuation of additional RE power evacuation from Nagaur complex (2 GW) which will require some immediate transmission system requirement i.e. 400/220 kV ICTs and 220 kV line bays along with NR-WR inter regional corridors.

4.2.2 CTU also informed that they are not in receipt of any application in Nagaur (Merta) complex. However, in view of RE potential indicated at Nagaur complex (2 GW) as part of 500 GW RE report, a bare minimum system may be kept at 220 kV level to facilitate immediate connectivity to RE generation developers i.e. 2 Nos. of 400/220 kV ICTs along with 3 Nos. of 220 kV line bays as part of present scheme.

4.2.3 CTUIL also stated that earlier, space for HVDC terminal was included in future scope of Merta-II S/s, however due to inadequate SCR at Merta-II S/s as well as

power evacuation requirement from Bhadla/Bikaner complexes, space for HVDC terminal may be deleted from future scope of Merta-II S/s. The Committee agreed for inclusion of 220 kV scope (400/220 kV ICTs and 220 kV line bays) for RE injection as well as deletion of space for HVDC terminal at Merta-II S/s.

Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4: 3.5 GW) [Fatehgarh/Barmer] Complex - Fatehgarh-IV: 1 GW (Solar), Barmer-I: 2.5 GW (Solar)

- **Establishment of 765/400 kV, 2x1500 MVA & 2x500 MVA, 400/220 kV S/s at suitable location near Merta (Merta-II Substation) along with 2x125 MVar & 2x240 MVar bus reactor at Merta-II* S/s**

Future Provisions: Space for

- 765/400 kV ICTs along with bays- 4
- 765 kV line bays along with switchable line reactors – 8
- 765 kV Bus Reactor along with bay: 1 Nos.
- 400 kV line bays along with switchable line reactor –8
- 400 kV line bays – 2 Nos.
- 400 kV Bus Reactor along with bays: 1 No.
- 400 kV Sectionalizer bay: 2 sets
- 400/220kV ICT along with bays -4 Nos.
- 220 kV line bays for RE injection -5 Nos.
- 220 kV Sectionalizer bay: 2 set
- 220 kV BC (2 Nos.) bays and 220 kV TBC (2 Nos.) bays
- STATCOM (2x+300MVar, 4x125MVar MSC, 2x125MVar MSR) along with 400 kV bays (2 Nos.)

****along with provision of 80 MVar & 110 MVar spare reactors (Single phase) & 500 MVA spare transformer unit (Single phase)***

- 220 kV line bays (3 Nos.) for RE connectivity at Merta-II S/s
- 220 kV BC (1 Nos.) bay and 220 kV TBC (1 Nos.) bay at Merta-II S/s
- STATCOM (2x+300MVar) along with MSC (4x125 MVar) & MSR (2x125 MVar) along with 2 Nos. 400kV bays at Barmer-I PS
- Augmentation with 765/400 kV, 2x1500 MVA Transformer (4th & 5th) at Barmer-I PS
- Augmentation of 5x500 MVA (5th to 9th), 400/220 kV ICTs at Barmer-I PS
- 220 kV line bays (6 Nos.) for RE connectivity at Barmer-I PS
- 220 kV Sectionalizer bay (1 set) along with 220 kV BC (1 Nos.) bay and 220 kV TBC (1 Nos.) bay at Barmer-I PS
- 400 kV Sectionalizer bay (1 set) at Barmer-I S/s
- 110MVar spare reactor unit (1 no.) at Barmer-I PS (single phase)
- Fatehgarh-IV PS (Sec-2) – Barmer-I PS 400kV D/c line (Quad) (~45km)
- Barmer-I PS – Merta-II 765 kV D/c line along with 330MVar switchable line reactor for each circuit at each end of Barmer-I PS – Merta-II 765 kV D/c line (~345 km)
- Merta-II – Beawar 400 kV D/c line (Quad) (~55 km)
- Merta-II – Dausa 765 kV D/c line along with 240 MVar switchable line reactor for each circuit at each end of Merta-II – Dausa 765 kV D/c line line (~250 km)

Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Ghiror (Distt. Mainpuri) along with 2x125 MVar & 2x240 MVar bus reactor at Ghiror S/s (UP):

Future provisions at Ghiror S/s (excl. scope for present scheme) Space for:

- 765/400 kV ICTs along with bays- 4
- 765 kV line bays along with switchable line reactors – 6
- 765kV Bus Reactor along with bay: 1 Nos.
- 400 kV line bays along with switchable line reactor –6
- 400 kV Bus Reactor along with bays: 1 No.
- 400kV Sectionalizer bay: 1 set
- 400/220kV ICT along with bays -4 Nos.
- 220 kV line bays for drawl -6 Nos.
- 220kV Sectionalizer bay: 1 set
- 220 kV BC (2 Nos.) bay and 220 kV TBC (2 Nos.) bay
- STATCOM (2x±300MVar, 4x125MVar MSC, 2x125MVar MSR) along with 400kV bays (2 Nos.)

****along with provision of 80 MVar & 110 MVar spare reactor (Single phase) & 500 MVA spare transformer unit (Single phase)***

- Dausa - Ghiror 765 kV D/c line along with 330MVar switchable line reactor at Ghiror end and 240 MVar switchable line reactor at Dausa end for each circuit of Dausa - Ghiror 765 kV D/c line (~305 km)
- LILO of both ckt of 765 kV Aligarh (PG) -Orai (PG) D/c line (~15 km) at Ghiror S/s along with 240 MVar switchable line reactor for each circuit at Ghiror end of 765 kV Ghiror -Orai (PG) D/c line
- LILO of one ckt of 765kV Agra (PG) – Fatehpur (PG) 2xS/c line at Ghiror S/s along with 240 MVar switchable line reactor at Ghiror end of 765 kV Ghiror -Fatehpur (PG) line (~30 kms)
- 400kV Ghiror-Firozabad (UPPTCL) D/c line (Quad) (~50 kms)

4.2.4 The estimated cost of the proposed scheme is about Rs. 12,240.87 Cr

4.2.5 The transmission scheme was discussed and technically approved in the 71st NRPC meeting held on 29.01.2024 and recommended to NCT. Further, reactive compensation of some of the lines was modified and the same was approved in 49th TCC/72nd NRPC meeting held on 29th-30th March 2024. In the meeting it was also agreed that OPGW installation on 765 kV Agra (PG) – Fatehpur (PG) D/c line (335 kms.) may be considered as a separate scheme with implementation schedule of 24 months [preferably matching timeframe with Ph-IV (Part-4: 3.5 GW) scheme]

4.2.6 CMD, Grid-India stated that system strengthening in other regions also needs to be taken up while planning of RE evacuation schemes in NR, WR and SR. e.g. in the 2027 scenario planning case (solar period), ER is observed to be importing around 22,500 MW of power from NR and WR combined. Due to this, high loading is observed in 765 kV Ranchi - Dharamjaigarh D/C and other EHV lines towards ER.

Angular separation after N-1 is also on higher side (>26 deg). Voltages are also very low < 725 kV at Medinipur, Jeerat, New Ranchi etc. He further stated that possibility of reversing the power order of HVDCs from ER viz. HVDC Gajuwaka and HVDC Talcher – Kolar is also low due to availability of cheaper generation in pit head plants. Same may be factored in during the system augmentation studies.

4.2.7 CMD, Grid-India also stated that the availability of dynamic reactive reserves is critical for transient and voltage stability as well as for effective fault ride through of the RE plants. However, the switching logic of MSC/MSRs in the recently commissioned STATCOMs is based on STATCOM current. In this type of arrangement, MSC/MSRs can't be operated as an independent element. Therefore, the fixed compensation (MSC/MSR) cannot be used unless a part of the dynamic reactive reserve is utilized first. This logic constraints the complete availability of the dynamic component in case of contingencies. It is, therefore, desirable that the operation of MSC/MSR is delinked with the VSC output or STATCOMs may be installed with only the dynamic part. The issue may also be discussed with the OEMs for feasibility/revision in technical specifications, if possible.

4.2.8 CE (PSETD), CEA stated that there is a need to study the use of fully dynamic range STATCOM vis-à-vis that STATCOM with VSC and MSC/ MSR combination, as with the fully dynamic STATCOM, the capacity of STATCOM (MVar) would be reduced and at the same time this would provide fully dynamic support to the Grid operator in real-time operation. Further, this is in line with the recommendations of the Committee constituted under the Member (GO&D), CEA based on the issues highlighted by Grid India.

4.2.9 CTUIL stated that the intent behind providing MSC and MSR in the proposed STATCOM at Barmer-I is to preserve the dynamic part (VSC) for contingencies.

4.2.10 Chairperson, CEA advised to review the specifications of STATCOM in three months i.e. fully dynamic VSC vis-a-vis combination of VSC with MSC and MSR in future schemes.

4.2.11 It was opined that considering the size of the scheme, it may be implemented in two parts/packages. However, the two parts/packages should have same matching implementation schedule

4.2.12 After deliberations, NCT recommended implementation of the Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4: 3.5 GW): Part A and Part B to be undertaken under TBCB.

4.2.13 Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4: 3.5 GW): Part A

4.2.13.1 Summary of the scheme is given below:

SI No.	Name of the scheme and tentative implementation timeframe	Estimated Cost (₹ Crores)	Remarks
1.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4: 3.5 GW): Part A Tentative implementation timeframe: 24 months from the date of SPV transfer	5,845.93	Recommended under TBCB route with RECPDCL as BPC

4.2.13.2 Detailed scope of the scheme

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/No. of bays etc.)
1	Augmentation with 765/400 kV, 2x1500 MVA Transformer (4 th & 5 th) at Barmer-I PS	<ul style="list-style-type: none"> 765/400 kV 1500 MVA ICTs- 2 Nos. 765 kV ICT bays-2 Nos. 400 kV ICT bays- 2 Nos.
2	Augmentation of 5x500 MVA (5 th to 9 th), 400/220 kV ICTs at Barmer-I PS	<ul style="list-style-type: none"> 400/220 kV 500 MVA ICTs- 5 Nos. 400 kV ICT bays-5 Nos. 220 kV ICT bays- 5 Nos.
3	220 kV line bays (6 Nos.) for RE connectivity at Barmer-I PS	<ul style="list-style-type: none"> 220 kV line bays- 6 Nos.
4	400 kV Sectionalizer bay (1 set), 220kV Sectionalizer bay (1 set) along with 220kV BC (1 Nos.) and 220 kV TBC (1 Nos.) at Barmer-I PS	<ul style="list-style-type: none"> 400 kV Sectionalizer bay: 1 set 220 kV Sectionalizer bay: 1 set 220 kV BC (1 Nos.) bay and 220 kV TBC (1 Nos.) bay
5	STATCOM (2x+300MVA) along with MSC (4x125 MVA) & MSR (2x125 MVA) along with 2 Nos. 400 kV bays at Barmer-I PS	<ul style="list-style-type: none"> STATCOM (2x+300MVA) MSC (4x125 MVA) & MSR (2x125 MVA) 400kV bays at Barmer-I PS – 2 Nos.
6	Fatehgarh-IV PS (Sec-2) – Barmer-I PS 400kV D/c line (Quad)	<p>Line Length ~45 km (Quad)</p> <ul style="list-style-type: none"> 400 kV line bays at Fatehgarh-IV PS (Sec-2) – 2 Nos. 400 kV line bays at Barmer-I PS – 2 Nos.
7	Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Ghiror (Distt. Mainpuri) along with 2x240 MVA (765kV) & 2x125 MVA (420kV) bus reactor at Ghiror S/s (UP)	<p>Ghiror S/s- AIS</p> <ul style="list-style-type: none"> 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit) 765 kV ICT bays-2 Nos. 400 kV ICT bays- 2 Nos. 765kV line bays: 8 Nos. (for LILO of

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/No. of bays etc.)
	<p>Future provisions at Ghiror S/s:</p> <p>Space for</p> <ul style="list-style-type: none"> • 765/400kV ICTs along with bays- 4 • 765 kV line bays along with switchable line reactors – 6 • 765kV Bus Reactor along with bay: 1 Nos. • 400 kV line bays along with switchable line reactor –6 • 400 kV Bus Reactor along with bays: 1 No. • 400kV Sectionalizer bay: 1 set • 400/220kV ICT along with bays -4 Nos. • 220 kV line bays for drawl -6 Nos. • 220kV Sectionalizer bay: 1 set • 220 kV BC (2 Nos.) bays and 220 kV TBC (2 Nos.) bays • STATCOM (2x±300MVA_r, 4x125MVA_r MSC, 2x125MVA_r MSR) along with 400kV bays (2 Nos.) 	<p>Aligarh (PG)-Orai (PG) D/c, LILO of Agra (PG) – Fatehpur (PG) S/c & 765 kV interconnection with Dausa S/s)</p> <ul style="list-style-type: none"> • 400 kV line bays: 2 Nos. (for 400 kV interconnection with Firozabad (UPPTCL) S/s) • 240 MVA_r Bus Reactor-2 Nos. (7x80 MVA_r, including one spare unit) • 765 kV Bus reactor bays-2 Nos. • 125 MVA_r Bus Reactor-2 Nos. • 400 kV Bus reactor bays- 2 Nos. • 110 MVA_r spare reactor unit (single phase)-1 No.
8	Dausa - Ghiror 765 kV D/c line along with 330MVA _r switchable line reactor at Ghiror end and 240 MVA _r switchable line reactor at Dausa end for each circuit of Dausa - Ghiror 765 kV D/c line	<p>Line Length -305 km</p> <ul style="list-style-type: none"> • 765 kV, 240 MVA_r switchable line reactors at Dausa S/s end– 2 Nos. • 765 kV, 330 MVA_r switchable line reactors at Ghiror S/s S/s end– 2 Nos. • Switching equipment for 765kV, 240 MVA_r switchable line reactors at Dausa S/s end – 2 Nos. • Switching equipment for 765 kV, 330 MVA_r switchable line reactors at Ghiror S/s end – 2 Nos.
9	LILO of both ckt of 765 kV Aligarh (PG) -Orai (PG) D/c line at Ghiror S/s along with 240 MVA _r switchable line reactor for each circuit at Ghiror S/s end of 765 kV Ghiror -Orai (PG) D/c line	<p>Length -15 km (LILO length)</p> <ul style="list-style-type: none"> • 765 kV, 240 MVA_r switchable line reactors at Ghiror S/s end– 2 Nos. • Switching equipment for 765 kV, 240 MVA_r switchable line reactors at Ghiror S/s end – 2 Nos.
10	LILO of one ckt of 765kV Agra (PG) – Fatehpur (PG) 2xS/c line at Ghiror along with 240 MVA _r switchable line reactor at Ghiror end of 765 kV Ghiror -Fatehpur (PG) line	<p>Length -30 km (LILO length)</p> <ul style="list-style-type: none"> • 765 kV, 240 MVA_r switchable line reactors at Ghiror S/s end– 1 No. • Switching equipment for 765kV, 240 MVA_r switchable line reactor at Ghiror S/s end – 1 No.

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/km/No. of bays etc.)
11	400kV Ghiror-Firozabad (UPPTCL) D/c line (Quad)	Line Length ~50 km (Quad)
12	2 Nos. 765kV line bays at Dausa S/s	• 765 kV line bays at Dausa S/s – 2 Nos.
13	2 Nos. 400 kV line bays at Firozabad (UPPTCL) S/s	• 400 kV line bays at Firozabad (UPPTCL) S/s – 2 Nos.

Note:

- The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- Developer of Fatehgarh-IV PS (Sec-2) & Barmer-I PS shall provide space for 2 Nos. of 400 kV line bays each at Fatehgarh-IV PS (Sec-2) & Barmer-I PS
- Developer of Barmer-I PS shall provide space for 765/400 kV ICTs(2x1500 MVA), 400/220 kV ICTs (5x500 MVA), 220 kV line bays(6 Nos.), 400 kV Sectionalizer bay (1 set), 220 kV Sectionalizer bay (1 set), 220kV BC (1 Nos.), 220 kV TBC (1 Nos.), STATCOM & associated 2 Nos. of 400 kV bays at Barmer-I PS
- UPPTCL shall provide space for 2 Nos. of 400 kV line bays at Firozabad S/s
- POWERGRID shall provide space for 2 Nos. of 765 kV line bays at Dausa S/s along with space for 2 Nos. of 240 MVAR switchable line reactors

4.2.14 Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4: 3.5 GW): Part B

4.2.14.1 Summary of the scheme is given below:

SI No.	Name of the scheme and tentative implementation timeframe	Estimated Cost (₹ Crores)	Remarks
1.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4 :3.5 GW): Part B Tentative implementation timeframe: 24 months from the date of SPV transfer	6,394.94	Recommended under TBCB route with RECPDCL as BPC

4.2.14.2 Detailed scope of the scheme

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/ km/No. of bays etc.)
1	<p>➤ Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Merta (Merta-II Substation) along with 2x240 MVar (765 kV) & 2x125 MVar (420 kV) bus reactor at Merta-II S/s</p> <p>Future provisions at Merta-II S/s:</p> <p>Space for</p> <ul style="list-style-type: none"> • 765/400kV ICTs along with bays- 4 • 765 kV line bays along with switchable line reactors – 8 • 765kV Bus Reactor along with bay: 1 Nos. • 400 kV line bays along with switchable line reactor –8 Nos. • 400 kV line bays – 2 Nos. • 400 kV Bus Reactor along with bays: 1 No. • 400kV Sectionalizer bay: 2 sets • 400/220kV ICTs along with bays -4 Nos. • 220 kV line bays for RE injection -5 Nos. • 220 kV Sectionalizer bay: 2 set • 220 kV BC (2 Nos.) bays and 220 kV TBC (2 Nos.) bays • STATCOM (2x±300MVar, 4x125MVar MSC, 2x125MVar MSR) along with 400kV bays (2 Nos.) 	<p>Merta-II S/s -AIS</p> <ul style="list-style-type: none"> • 765/400 kV 1500 MVA ICTs- 2 Nos. (7x500 MVA including one spare unit) • 400/220 kV 500 MVA ICTs -2 Nos. • 765 kV ICT bays-2 Nos. • 400 kV ICT bays- 4 Nos. • 220 kV ICT bays- 2 Nos. • 765kV line bays: 4 Nos. (for 765kV interconnection with Dausa S/s & Barmer-I PS) • 400 kV line bays: 2 Nos. (for 400 kV interconnection with Beawar S/s) • 240 MVar Bus Reactor-2 Nos. (7x80 MVar, including one spare unit) • 765 kV Bus reactor bays-2 Nos. • 125 MVar Bus Reactor-2 Nos. • 400 kV Bus reactor bays- 2 Nos. • 220 kV line bays: 3 Nos. (for RE connectivity) • 220 kV BC (1 No.) bay and 220 kV TBC (1 No.) bay • 110 MVar spare reactor unit (single phase)-1 No.
2	<p>Barmer-I PS – Merta-II 765 kV D/c line along with 330 MVar switchable line reactor for each circuit at each end of Barmer-I PS – Merta-II 765 kV D/c line</p>	<p>Line Length -345 km</p> <ul style="list-style-type: none"> • 765 kV, 330 MVar switchable line reactors at Barmer-I PS end– 2 Nos. • 765 kV, 330 MVar switchable line reactors at Merta-II S/s end– 2 Nos. • Switching equipment for 765 kV, 330 MVar switchable line reactors at Barmer-I PS end – 2 Nos. • Switching equipment for 765 kV, 330 MVar switchable line reactors at Merta-II S/s end – 2 Nos. • 110 MVar spare reactor unit at Barmer-I

Sl. No.	Description of Transmission Element	Scope of work (Type of Substation/Conductor capacity/ km/No. of bays etc.)
		PS (single phase)-1 No.
3	Merta-II – Beawar 400 kV D/c line (Quad)	Line Length ~55 km (Quad)
4	Merta-II – Dausa 765 kV D/c line along with 240 MVAR switchable line reactor for each circuit at each end of Merta-II – Dausa 765kV D/c line line	Line Length -250 km <ul style="list-style-type: none"> • 765 kV, 240 MVAR switchable line reactors at Dausa S/s end– 2 Nos. • 765 kV, 240 MVAR switchable line reactors at Merta-II S/s end– 2 Nos. • Switching equipment for 765 kV, 240 MVAR switchable line reactors at Dausa S/s end – 2 Nos. • Switching equipment for 765 kV, 240 MVAR switchable line reactors at Merta-II PS end – 2 Nos.
5	2 Nos. 765kV line bays each at Barmer-I PS & Dausa S/s	<ul style="list-style-type: none"> • 765 kV line bays at Barmer-I PS – 2 Nos. • 765 kV line bays at Dausa S/s – 2 nos
6	2 Nos. 400kV line bays at Beawar S/s	<ul style="list-style-type: none"> • 400 kV line bays at Beawar S/s – 2 Nos.

Note:

- The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
- Developer of Barmer-I PS shall provide space for 2 Nos. of 765 kV line bays along with space for 2 Nos. of 330 MVAR switchable line reactor and space for spare reactor unit (110 MVAR) at Barmer -I PS
- Sterlite shall provide space for 2 Nos. of 400 kV line bays at Beawar S/s
- POWERGRID shall provide space for 2 Nos. of 765 kV line bays at Dausa S/s along with space for 2 Nos. of 240 MVAR switchable line reactor

4.3 System strengthening at Koppal-II and Gadag-II for integration of RE generation projects

- 4.3.1 Representative of CTUIL stated that Koppal-II 765/400/220 kV PS is being established as part of 500 GW RE capacity by 2030 and presently is under construction with implementation schedule of 24 months i.e. Dec'2025. Presently, 2x1500 MVA, 765/400 kV ICTs, 2x500 MVA, 400/220 kV ICTs and 04 Nos. of 220 kV line bays under Koppal-II Phase-A and augmentation with 2x1500 MVA, 765/400 kV ICTs, 2x500 MVA, 400/220 kV ICTs and 04 Nos. of 220 kV additional line bays under Koppal-II Phase-B are under implementation.
- 4.3.2 He further stated that Gadag-II PS is being established as part of 500 GW RE capacity by 2030 and presently is under construction with implementation schedule of 24 months i.e. Dec'2025. Presently, 2x500 MVA, 400/220 kV ICTs and 04 Nos. of 220 kV line bays under Gadag-II Phase-A are under implementation.
- 4.3.3 CTUIL informed that connectivity of about 4127 MW has been granted / agreed for grant at 220 kV level of Koppal-II PS and connectivity of about 5276 MW (3476 MW at 220 kV and 1800 MW at 400 kV level) has been granted / agreed for grant at Gadag-II PS. Further, as RE potential in Gadag area is being integrated with Koppal-II PS through Gadag-II PS – Koppal-II PS 400kV (Quad Moose) D/c lines and evacuation of power from Gadag-II PS is contingent upon Koppal-II PS. Accordingly, augmentation of transformation capacity at Koppal-II and Gadag-II for evacuation of power from RE generation projects has been identified in a progressive manner as per the receipt of applications.
- 4.3.4 CMD, Grid-India stated that the power injected at Gadag-II would also be pooled at Koppal-II, thereby resulting in pooling of around 9000 MW power at Koppal-II. Pooling of such large quantum of power at a single station is not desirable from resiliency point of view. He further suggested to explore the possibility of providing independent evacuation lines from Gadag-II towards Narenda.
- 4.3.5 Director (SO), Grid-India stated that 7x1500 MVA, 765/400 kV ICTs have been proposed at Koppal-II whereas as per Transmission Planning Criteria, 2023, transformation capacity of any single sub-station of 765/400kV level shall not normally exceed 9000 MVA.

- 4.3.6 Representative of CTUIL stated that declared RE potential in Koppal and Gadag area of Karnataka has been exhausted and CTU have received Connectivity applications much beyond the declared RE potential. Further CTU have not received any application from BESS developers, as has been considered under the CEA's report on 500 GW RE capacity by 2030. The proposed transmission system strengthening scheme, shall facilitate in evacuation of above Connectivity applications at Koppal-II PS / Gadag-II PS. It was informed that Koppal-II PS / Gadag-II PS has been closed for further consideration of new applications for grant of Connectivity. It was also informed that the above Connectivity quantum considered at Koppal-II PS / Gadag-II PS includes 900 MW PSP generation project. In view of the above, in place of establishment of new pooling station in the vicinity, augmentation of Koppal-II PS with 7th 1500 MVA 765/400kV ICT was proposed for optimal utilisation of transmission system. Further this shall be the most suited techno-economical transmission system for integration of above RE generation projects at Koppal-II PS / Gadag-II PS.
- 4.3.7 The proposal was discussed in 50th SRPC meeting held on 16.03.2024 wherein the SR constituents opined that as these additional ICTs are approved based on the connectivity granted to RE generation projects, hence implementation & CoD of these ICTs should be linked with the commissioning of RE generation projects. In case of any mismatch in commissioning of transmission and RE generation, the transmission charges are to be billed directly to RE generation projects. In this regard, NCT opined that any mismatch in the commissioning of transmission and RE generation shall be dealt as per the CERC Regulations.
- 4.3.8 Representative of CTUIL also informed that during SRPC meeting, constituents have also suggested to reduce the Connectivity quantum of 900 MW Saundatti PSP (of M/s Greenko) for calculation of margins or grant of Connectivity to RE generation projects. Further constituents have also suggested that the despatch factors, as provided in the Planning Criteria, 2023, may be considered for immediate integration and evacuation of power RE generation projects. CTU further informed that is under obligation to grant connectivity for full quantum as per application(s) under CERC GNA Regulations, 2022. Therefore, CTU is required to consider the connectivity quantum for grant and determination of margins for immediate connectivity. There may be instances when the PSP may be under shut down for any reason and in this case, the RE generator should be able to inject power corresponding to the quantum of connectivity granted to it. Therefore, connectivity quantum of 900 MW Saundatti PSP (of M/s Greenko) may not be reduced during peak RE scenario for the time being for determination of margins at any pooling station.
- 4.3.9 After deliberations NCT recommended implementation of the System strengthening at Koppal-II and Gadag-II for integration of RE generation projects under TBCB.

4.3.9.1 Summary of the scheme is given below:

Sl. No.	Name of the scheme and tentative implementation timeframe	Estimated Cost (₹ Crores)	Remarks
1.	System strengthening at Koppal-II and Gadag-II for integration of RE generation projects Implementation timeframe : specified in detailed scope	1354.4	Recommended under TBCB route with PFCCL as BPC

4.3.9.2 Detailed scope of the scheme is given below:

Sl. No.	Scope of the scheme	Scope of Works	Schedule
1.	<ul style="list-style-type: none"> Augmentation of 3x1500 MVA 765/400 kV ICTs (5th, 6th & 7th) at Koppal-II PS 	<ul style="list-style-type: none"> 3x1500 MVA, 765/400kV ICT 765 kV ICT bay – 3 Nos. 400 kV ICT bay – 3 Nos. 	Dec'25
		<ul style="list-style-type: none"> 5x500 MVA, 400/220kV ICTs 400 kV ICT bay – 5 Nos. 220 kV ICT bay – 5 Nos. 	Dec'25
	<ul style="list-style-type: none"> 6 nos. of 220kV line bay at Koppal-II PS for termination of dedicated Connectivity transmission line of RE developers 	<ul style="list-style-type: none"> 220 kV line bays – 2 Nos. 	30.12.2025
		<ul style="list-style-type: none"> 220 kV line bays – 2 Nos. 	01.03.2026
		<ul style="list-style-type: none"> 220 kV line bays – 1 No. 	31.01.2026
		<ul style="list-style-type: none"> 220 kV line bays – 1 No. 	31.12.2026
2.	<ul style="list-style-type: none"> Augmentation of 7x500 MVA 400/220 kV ICTs (3rd, 4th, 5th, 6th, 7th, 8th & 9th) at Gadag-II PS 	<ul style="list-style-type: none"> 3x500 MVA, 400/220kV ICTs 400 kV ICT bay – 3 Nos. 220 kV ICT bay – 3 Nos. 	Dec'2025
		<ul style="list-style-type: none"> 400 kV line bays – 1 No. & 220 kV line bays - 2 Nos. 	30.12.2025
	<ul style="list-style-type: none"> Gadag-II PS – Koppal-II PS 400 kV (Quad) 2nd D/c line 	<ul style="list-style-type: none"> 4x500 MVA, 400/220kV ICTs 400 kV ICT bay – 4 Nos. 220 kV ICT bay – 4 Nos. 	24 Months
		<ul style="list-style-type: none"> ~ 45 km 400 kV line bays – 2 Nos. (at Koppal-II PS) 400 kV line bays – 2 Nos. (at Gadag-II PS) 	24 Months
	<ul style="list-style-type: none"> 1 No. of 400 kV line bay at Gadag-II PS for termination of dedicated transmission line of RE developers 	<ul style="list-style-type: none"> 220 kV line bays – 1 No. 	31.07.2026
		<ul style="list-style-type: none"> 220 kV line bays – 1 No. 	31.03.2027
		<ul style="list-style-type: none"> 220 kV line bays – 1 No. 	01.06.2027

Note:

- The line length mentioned above is approximate as the exact length shall be obtained after the detailed survey
- Developer of Koppal-II PS / Gadag-II PS shall provide space for implementation of above system strengthening works at Koppal-II PS / Gadag-II PS

4.4 OPGW installation on existing 400 kV Kurukshetra - Malerkotla line alongwith FOTE at both ends.

4.4.1 Representative of CTUIL stated that OPGW installation on 400 kV Kurukshetra - Malerkotla D/c line (140 kms.) was approved in the 39th, 40th and 47th NRPC meetings held on 02.05.2017, 28.10.2017 & 11.12.2019 respectively as part of reliable communication scheme to provide Reliable and Redundant communication to the ISTS wide band nodes of Northern Region. 400 kV Kurukshetra - Malerkotla D/c transmission line is owned by M/s NRSS-XXXI (B) Trans Ltd (M/s NTL) (M/s Sekura) and was implemented under TBCB route.

4.4.2 Due to ownership issues OPGW work could not be completed on this line under reliable communication scheme of NR awarded to POWERGRID. In this regard, a petition vide No. 94/MP/2021 had been filed by CTU before Hon'ble Central Electricity Regulatory Commission (CERC) seeking directions regarding installation of OPGW on the 400 kV Kurukshetra - Malerkotla transmission line. CERC has issued the order of the said petition on 27.12.23. As per CERC order OPGW work to be awarded to Transmission line asset owner and FOTE to be awarded to the Bay Kisok Owners.

4.4.3 M/s NRSS-XXXI (B) Transmission Ltd. (M/s NTL) is the asset owner of transmission line in this case and Bay owner at both end i.e. Kurukshetra and Malerkotla is POWERGRID. Scheme was deliberated in the 71st NRPC. Where scheme was agreed as OPGW installation by M/s NTL under change in law of TSA and FOTE by POWERGRID at both end i.e. Kurukshetra and Malerkotla under RTM mode.

4.4.4 Accordingly, CTUIL proposed that the scheme is bifurcated into two parts as below for OPGW and FOTE:

- a) OPGW installation on existing 400 kV Kurukshetra - Malerkotla D/c line alongwith FOTE at both ends – Part-A
- b) OPGW installation on existing 400 kV Kurukshetra - Malerkotla D/c line alongwith FOTE at both ends – Part-B

4.4.5 After deliberations, both the schemes, i.e. OPGW installation on existing 400 kV Kurukshetra - Malerkotla D/c line alongwith FOTE at both ends – Part-A and OPGW installation on existing 400 kV Kurukshetra - Malerkotla line alongwith FOTE at both ends – Part-B were approved by the NCT.

4.4.6 Details of the Schemes are given below:

SI No.	Name of the scheme and tentative implementation timeframe	Scope of the Transmission Scheme	Estimated Cost (₹ Crores)	Remarks

a)	OPGW installation on existing 400 kV Kurukshetra - Malerkotla line D/c alongwith FOTE at both ends – Part-A Tentative implementation timeframe: 18 months from the date of allocation	Supply and installation of 24 Fibre OPGW on 400 kV Kurukshetra - Malerkotla D/c line (140 kms)	9	Approved for implementation by M/s NRSS-XXXI (B) Transmission Ltd
b)	OPGW installation on existing 400 kV Kurukshetra - Malerkotla D/c line alongwith FOTE at both ends – Part-B Tentative implementation timeframe: 18 months from the date of allocation (with matching time frame of OPGW on 400 kV Kurukshetra - Malerkotla transmission line)	FOTE (STM-16) at Kurukshetra & Malerkotla locations (2 Nos.)	0.6	Approved under RTM route to be implemented by POWERGRID

4.5 OPGW installation on existing 400 kV Kota – Merta line along with LILO portion at Shree Cement

4.5.1 Representative of CTUIL stated that 400 kV Kota – Merta line (256 kms.) was constructed without OPGW by POWERGRID and this line is also LILOed at Shree Cement (Captive Merchant Generator). LILO portion of approx. 55 kms. was constructed by M/s Shree Cement. This line is further proposed to be LILOed at 765/400 kV Beawar (ISTS) S/s under TBCB scheme, where OPGW & FOTE has been considered on LILO portion at Beawar under TBCB scheme.

4.5.2 As per feedback received from Grid-India, data of Shree Cement is intermittent at present due to GPRS/ PLCC connectivity. Moreover, Grid-India further mentioned that in future PMUs may also be planned for Shree Cement station under URTDSM Ph-II project. As GPRS/PLCC bandwidth is not sufficient to transmit PMU data therefore OPGW based communication shall also be required to send the PMU/SCADA/AMR data to NRLDC in a secured and reliable manner. Hence, Grid-India has requested CTU to plan OPGW based connectivity for the same.

4.5.3 The agenda for OPGW installation on 400 kV Kota – Merta line (256 kms.) along with OPGW installation on LILO portion of Shree Cement alongwith FOTE was

discussed in 57th, 69th & 70th NRPC meetings. In the 69th & 70th meetings of NRPC, OPGW installation was agreed for the 400 kV Kota – Merta line (256 kms.) alongwith LILO portion of Shree Cement (55 kms) including FOTE at all three stations costing approximately Rs. 18.5 crore. Proposed OPGW arrangement is shown in the Fig-1 below:

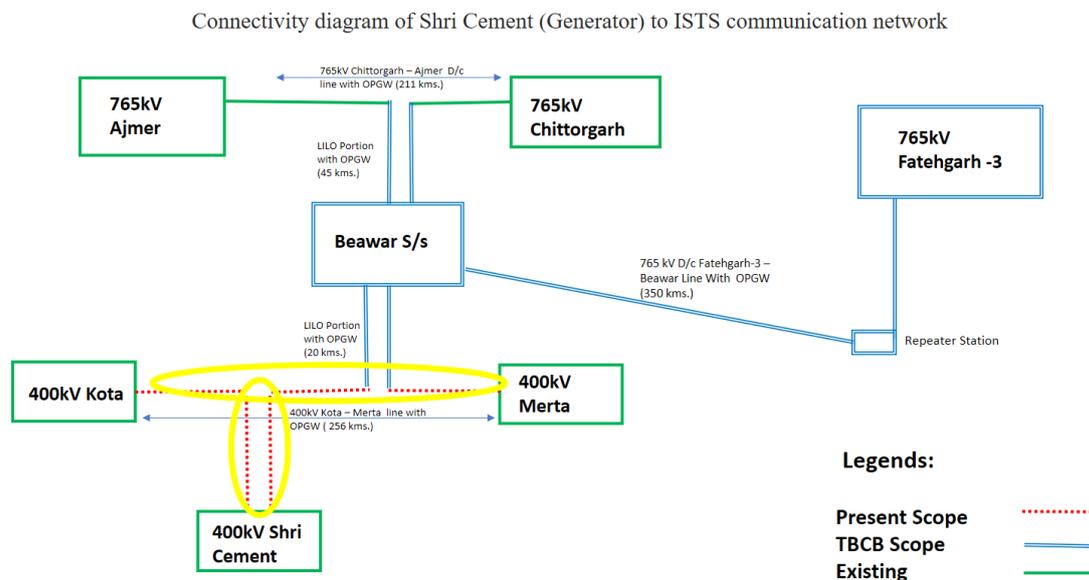


Fig-1

4.5.4 This agenda was also deliberated in the 11th meeting of NCT, however as decision of LILO portion was pending, therefore same was again put up in RPC and OPGW on LILO portion was also agreed in 69th & 70th meetings of NRPC alongwith main line.

4.5.5 In view of CERC order on petition no. 94/MP/2021 dtd. 27.12.23, scheme was re-deliberated in the 71st meeting of NRPC regarding implementation mode. Where implementation mode was agreed as RTM.

4.5.6 After deliberations, scheme for OPGW installation on existing 400 kV Kota – Merta line alongwith LILO portion at Shree Cement including FOTE at all 3 locations was approved under RTM.

4.5.7 Summary of the scheme is given below:

SI No.	Name of the scheme and tentative implementation timeframe	Estimated Cost (₹ Crores)	Remarks
1.	OPGW installation on existing 400 kV Kota – Merta line alongwith LILO portion at Shree Cement including FOTE at all 3 locations	18.5	Approved under RTM route to be

	Tentative implementation timeframe: 24 months from the date of allocation		implemented by POWERGRID
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4.5.8 Detailed scope of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme
1.	OPGW installation on existing 400 kV Kota – Merta line (256 kms.) alongwith LILO portion at Shree Cement (55 kms.) including FOTE at all 3 locations. (Total 311 kms.)

4.6 **OPGW installation on one circuit of existing 765 kV Fatehpur-Agra D/c (2x S/c) Line which is to be LILOed at new Ghiror S/s (ISTS), alongwith FOTE**

4.6.1 Representative of CTUIL stated that under the transmission scheme for “Transmission system for evacuation of power from Fatehgarh/Barmer Complex as part of Rajasthan REZ Ph-IV (Part-4: 3.5 GW) [Fatehgarh/Barmer Complex]” LILO of one circuit of existing 765 kV Fatehpur-Agra D/c (2xS/c) Line is proposed on the new Ghiror S/s.

4.6.2 On the existing 765 kV Fatehpur-Agra D/c (2xS/c) Line OPGW is not available. To provide communication between Fatehpur, Agra and Ghiror Substations OPGW to be installed over the one circuit of 765 kV Fatehpur-Agra D/c Line which is proposed to be LILOed on Ghiror S/s.

4.6.3 CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022 provides that “*The primary path for tele-protection shall be on point-to-point Optical Ground Wire*”. Therefore, this OPGW also serves as primary tele-protection path for Ghiror – Fatehpur and Ghiror – Agra Lines formed after LILO. Asset owner of 765 kV Fatehpur-Agra D/c (2xS/c) Line is POWERGRID (line was constructed under RTM). This scheme was deliberated in the 71st meeting of NRPC and agreed.

4.6.4 After deliberations, scheme for OPGW installation on one circuit of existing of 765 kV Fatehpur-Agra D/c (2x S/c) Line which is to be LILOed at new Ghiror S/s (ISTS) was approved under RTM.

4.6.5 Summary of the scheme is given below:

SI No.	Name of the scheme and tentative implementation timeframe	Estimated Cost (₹ Crores)	Remarks
1.	OPGW installation on one circuit of existing of 765 kV Fatehpur-Agra D/c (2x S/c) Line which is to be LILOed at new Ghiror S/s (ISTS) including FOTE at Fatehpur & Agra locations (2 Nos.) Tentative implementation timeframe: 24 months	16.5	Approved under RTM route to be implemented by POWERGRID

	from the date of allocation		
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4.6.6 Detailed scope of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme
1.	OPGW installation on one circuit of existing 765 kV Fatehpur-Agra D/c (2x S/c) Line (Total 335 kms.) which is to be LILOed at new Ghiror (ISTS S/s) including FOTE at Fatehpur & Agra locations (2 nos.).

4.7 Redundant communication for Fatehgarh-I (Adani) station

4.7.1 Representative of CTUIL stated that at present Fatehgarh-I (Adani) is connected with Bhadla (PG) via LILO at Fatehgarh-II (PG) with 24F OPGW on one E/W peak of Fatehgarh-I – Bhadla (PG) line. On the LILO portion of Fatehgarh-II, OPGW (24F) is also installed from LILO point to Fatehgarh-II (PG) for both Loop-In and Loop-Out portion. However, one No. OPGW is being used for earthwire functionality only as it is not continued upto Fatehgarh-I (Adani) end.

4.7.2 As per the inputs received from Adani & POWERGRID, present connectivity is shown in the below Fig-2 where 12 fibre are used for LILO of Fatehgarh-I (Adani) – Bhadla(PG) at Fatehgarh-II (PG) and 12 Nos. of fibre bypassed towards Bhadla (PG) station.

Present Fiber Connectivity of Fatehgarh-I

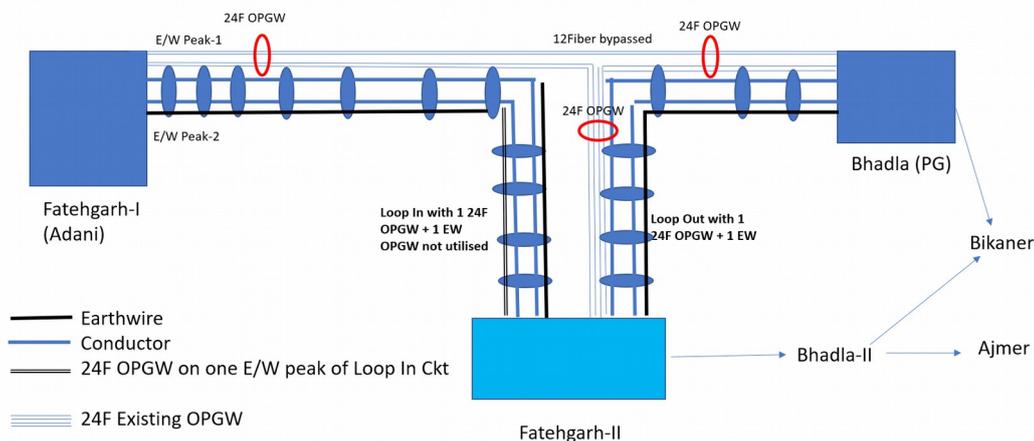


Fig-2

4.7.3 It was proposed that 6.5 kms. 24F OPGW may be installed on the second peak of 400 kV Fatehgarh-I (Adani)- Fatehgarh-II (PG) line by replacing the earthwire with OPGW in live line condition upto LILO point of Fatehgarh-II (PG) shown in **Fig-3**. The LILO portion of Fatehgarh-II(PG) upto LILO point is owned by POWERGRID. This shall provide redundant communication for Fatehgarh-I (Adani) station upto

Fatehgarh-II (PG). Additional FOTE are not required for this configuration as existing FOTE shall be used. Further as Fatehgarh-II (PG) & Bhadla (PG) are connected with other ISTS wideband nodes and thus provide two redundant paths.

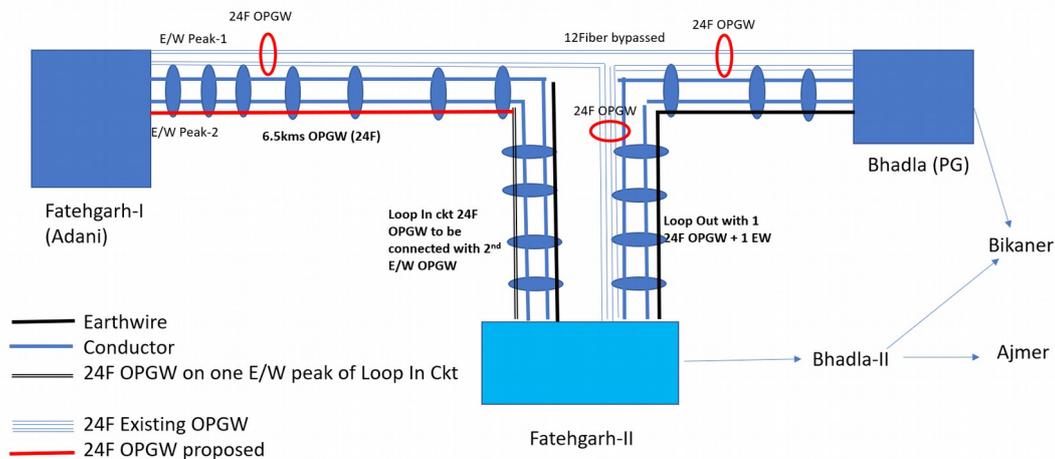


Fig-3

4.7.4 In view of CERC order of petition no. 94/MP/2021 dtd. 27.12.2023, scheme was again deliberated in the 71st NRPC for implementation mode. Where implementation mode was agreed as change in law as per Petition order.

4.7.5 NCT approved the scheme Supply and installation of OPGW on 400kV Fatehgarh-I (Adani) - Fatehgarh-II (PG) line (6.5 kms.) upto LILO portion of Fatehgarh-II (PG).

4.7.6 Summary of the scheme is given below:

SI No.	Name of the scheme and tentative implementation timeframe	Estimated Cost (₹ Crores)	Remarks
1.	Supply and installation of OPGW on 400kV Fatehgarh-I (Adani) - Fatehgarh-II (PG) line (6.5 kms.) upto LILO portion of Fatehgarh-II (PG). Tentative implementation timeframe : 18 months from the date of allocation	0.325	Approved for implementation by Adani Transmission Limited

4.7.7 Detailed scope of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme
1.	Supply and installation of OPGW on 400 kV Fatehgarh-I (Adani) - Fatehgarh-II (PG) line (6.5 kms.) upto LILO portion of Fatehgarh-II (PG) by replacing the existing earthwire (on 2 nd E/W peak) in Live Line installation.

4.8 Additional FOTE / Cards in view of resource disjoint and critical locations.

4.8.1 Representative of CTUIL stated that CEA Manual of communication Planning states that communication resources like FOTE and Media should be resource disjoint. Inputs for such locations where additional FOTE and ethernet cards (for SCADA, AGC, PMU, Voice etc.) for existing FOTE are required, has been provided by POWERGRID for NR. Details of the new FOTE locations are given below. The supply and Installation of 12 nos. new FOTE and additional Ethernet cards (125 Nos.) is proposed in view of grid operation.

4.8.2 This agenda was discussed in the 2nd & 4th CPM of Northern Region & 23rd TeST meeting and agreed in the 69th/70th NRPC meeting.

4.8.3 In view of CERC order of petition no. 94/MP/2021 dtd. 27.12.2023, scheme was re-deliberated in the 71st meeting of NRPC for implementation mode. Where implementation mode was agreed as RTM for such cases.

4.8.4 After deliberations, NCT approved the scheme for Additional FOTE / Cards in view of resource disjoint and critical locations under RTM.

4.8.5 Summary of the scheme is given below:

SI No.	Name of the scheme and tentative implementation timeframe	Estimated Cost (₹ Crores)	Remarks
1.	Additional FOTE / Cards in view of resource disjoint and critical locations Tentative implementation timeframe : 12 months from the date of allocation	5.2	Approved under RTM route to be implemented by POWERGRID

4.8.6 Detailed scope of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme	Locations	
1.	Supply and Installation of 12 Nos. new FOTE and additional ethernet cards (125 nos.) for existing FOTE in view of resource disjoint and critical locations (for SCADA, AGC, PMU, Voice, etc.)	Mandola	1
		DTL Bawana	1
		Muradnagar	1
		SLDC, RRVPNL (Jaipur)	1
		SLDC, HVPNL (Panipat)	1
		SLDC, BBMB (Chandigarh)	1
		SLDC, DTL (New Delhi)	1
		SLDC, HPSEBL (Shimla)	1
		SLDC J&K PDD (Jammu)	1
		SLDC Lucknow	1

	(UPPTCL)	
	SLDC PSTCL (Patiala)	1
	SLDC PTCUL (Dehradun)	1

4.9 FOTE at Backup SLDCs & Backup NRLDC

4.9.1 Representative of CTUIL stated that Grid-India had requested for planning of communication system for upcoming Backup NRLDC at Guwahati and ICCP communication from Main and Backup SLDCs to Backup NRLDC.

4.9.2 As per the new architecture proposed by Grid-India, backup NRLDC is proposed at NER – Guwahati and backup SLDCs in each state of Northern Region. Further, Main and backup SLDC shall report to main and backup RLDC respectively. This agenda was discussed in the 4th CPM of NR, 23rd TeST meeting of NRPC and agreed in 69th & 70th NRPC meetings.

4.9.3 In view of CERC order of petition no. 94/MP/2021 dtd. 27.12.23, scheme was re-deliberated in the 71st NRPC for implementation mode. Where implementation mode was agreed as RTM.

4.9.4 After deliberations, NCT approved the scheme for Supply and Installation of 11 Nos. FOTE at Backup SLDCs in Northern Region & Backup NRLDC (Guwahati) under RTM mode.

4.9.5 Summary of the scheme is given below:

SI No.	Name of the scheme and tentative implementation timeframe	Estimated Cost (₹ Crores)	Remarks
1.	Supply and Installation of 11 nos. FOTE at Backup SLDCs in Northern Region & Backup NRLDC (Guwahati) Tentative implementation timeframe : 12 months from the date of allocation	3.3	Approved under RTM route to be implemented by POWERGRID

4.9.6 Details scope of the scheme is given below:

Scope of the Transmission Scheme	Name	Backup CC location	FOTE
Supply and Installation of 11 nos. FOTE at Backup SLDCs in Northern	Backup NRLDC	Guwahati	2
	SLDC, RRVPNL (Jaipur)	Sub-LDC Bhilwara	1
	SLDC, HVPNL (Panipat)	HW, Shakti Bhawan Panchkula	1
	SLDC, BBMB (Chandigarh)	SLDC, Patiala, Punjab	0
	SLDC, DTL (New Delhi)	400kV Bamnauli (ALDC Bldg)	2

Region & Backup NRLDC (Guwahati)	SLDC, HPSEBL (Shimla)	Sub-LDC Hamirpur	1
	SLDC JKPTCL (Jammu)	Backup SLDC Srinagar	2
	SLDC Lucknow (UPPTCL)	SLDC Modipuram (UPPTCL)	1
	SLDC PSTCL (Patiala)	SLDC, BBMB (Chandigarh)	0
	SLDC PTCUL (Dehradun)	Backup SLDC Kashipur	1
		Total	11

5 Any other issues, with permission of chair

5.1 CMD, Grid-India stated that at present transmission schemes (ISTS) for evacuation of power from high RE potential zones have been planned till the year 2030. RE capacity of around 60 GW in Rajasthan and around 30 GW in Khavda (Gujarat) has been planned to be integrated to the ISTS in various phases. Presently, around 13 GW RE generation connected to the ISTS in Rajasthan is getting evacuated through only AC transmission systems. Although a few STATCOMs have been commissioned recently and these are helping the system, the operation with RE evacuation based on AC only system may be challenging in going forward. On 28th May 2023, around 8000 MW RE generation (50% of installed RE capacity in Rajasthan) was lost within one hour due to cloud cover and inclement weather. Further, poorly damped oscillations have also been observed in the RE complex. Going ahead with more than ~40-50 GW of RE capacity expected to be added, evacuation only through EHVAC transmission systems needs to be deliberated. Grid-supporting elements like Synchronous Condensers (SYNCON), Battery Energy Storages and HVDC systems that enhance reliability and flexibility need to be considered. While support from around 42 GW of BESS on an all-India basis was envisaged (by 2030) in the 500 GW RE report, there is a need to expedite the phase-wise commissioning of BESS in the ISTS schemes. Measures need to be taken in coordination with REIAs to realize the proposed BESS in Rajasthan and other states.

- 5.2 CMD, Grid-India further emphasized the importance of conducting stability studies during the transmission planning for large RE complexes. The evacuation of ~100 GW of RE capacity by 2030 through EHVAC transmission systems requires detailed stability studies for identification of potential issues and timely planning of corrective measures.
- 5.3 CTUIL stated that as decided in the 71st NRPC meeting held in January, 2024, a Committee has been setup under Member Secretary (NRPC) and members from NRLDC, CEA, CTU and STUs as well as co-opted members from BHEL and NTPC. The Committee meeting was also held on 22.04.2024 to do futuristic analysis for requirement of Synchronous Condensers based on inertia considerations for Northern Region. The Committee will analyse and submit its comprehensive report in the next 3-4 months to CEA and Ministry of Power.
- 5.4 CTUIL also mentioned that apart from EHVAC corridors, 3 Nos. HVDC corridors (2 Nos. LCC and 1 No. VSC) is already under bidding i.e. 6 GW Bhadla-Fatehpur HVDC (LCC) in Rajasthan 6 GW Khavda-Nagpur (LCC) and 2.5 GW Khavda-South Olpad HVDC (VSC) in Gujarat. In addition, 4-5 more HVDC systems are being planned from Rajasthan and Gujarat, hub of RE Generations.
- 5.5 Chairperson, CEA, and Chairman, NCT acknowledged the issues raised by Grid India. He stated that Pumped Storage Plants (PSPs) are coming up in a big way and these will help in maintaining grid stability. Further, based on the recommendations of the Committee, set up under Member Secretary (NRPC) to assess the requirement of Synchronous Condensers in Northern Region, implementation of Synchronous Condensers would be taken up. He advised SECI that storage capacity should also be considered while inviting bids for RE capacity.
- 5.6 CMD, Grid-India also suggested that the rationale and supporting study results for proposing any new element like STATCOM may be explicitly mentioned in the agenda / minutes of meeting.
- 5.7 Chairperson, CEA directed that the stability studies for the present system shall be carried out by Grid-India and the findings would be submitted to CEA/CTUIL. For, future system, stability studies shall be carried out by CTUIL and CEA in consultation with Grid India.
- 5.8 Director (SO), Grid-India stated that space provision for BESS may also be kept at this stage or space for bays for BESS installation might not be available later.
- 5.9 Chairperson, CEA stated that pilot project on dynamic line rating (DLR) needs to be expedited. CMD, Grid-India shared that seasonal line ratings are being considered while assessment of transfer capability e.g. the seasonal (monthly temperature based) ratings are being considered in case of 400 kV Talcher – Meramundali D/C line, 400 kV Kolhapur PG – Kolhapur MS D/C line etc.
- 5.10 Chairperson, CEA directed CTUIL to identify the margin in existing RE pooling stations and publish the same on its website.

- 5.11 Regarding reconductoring of existing transmission lines, Chairperson, CEA directed CEA and CTUIL to bring out a comprehensive plan for reconductoring of existing transmission lines where construction of new lines are not feasible due to RoW constraints.
- 5.12 Chairperson, CEA directed that CEA shall take up with all the transmission service providers including STUs regarding compliance of the CEA (Technical Standards for Communication System in Power System Operations) Regulations, 2020 and installation of OPGW in their existing networks.

Summary of the deliberations of the 19th meeting of NCT held on 29th April, 2024

I. Modification in the earlier approved/notified transmission schemes:

1. Implementation of Jhatikara – Dwarka 400 kV (Quad) D/c line under Rajasthan REZ Ph-III, Part-D- Ph-II Scheme

NCT approved the scope modifications in the Jhatikara – Dwarka 400 kV D/c line under Rajasthan REZ Ph-III, Part-D- Ph-II Scheme mentioned as below:

Earlier Scope	Revised Scope
Jhatikara-Dwarka 400 kV D/C Line (Quad)- length 20 km	Jhatikara-Dwarka 400 kV D/C Line (Twin HTLS*): length 17 km [Monopole/ Narrow base/Normal towers]
2 Nos. of 400 kV line bays each at both Jhatikara and Dwarka sub-stations; (Total 4 Nos. of 400 kV line bays)	No change
Approved cost: Rs. 145 cr.	Revised estimated cost: Rs. 240 cr @
Tentative implementation time-frame of 18 months from MOP OM-06/11/23	No change

*with minimum capacity of 2100 MVA on each circuit at nominal voltage
@ including forest clearance, Crop and Tree compensation

2. Delinking of EHVAC System beyond Kaithal from Transmission system for evacuation of RE power from renewable energy parks in Leh (5 GW Leh-Kaithal transmission corridor)

NCT approved delinking of EHVAC system beyond Kaithal from Transmission system for evacuation of RE power from renewable energy parks in Leh (5 GW Leh-Kaithal transmission corridor as follows:

S. No.	Scope as per OM dated 13.01.2022	Revised Scope
1.	<u>ISTS system for RE interconnection at Pang</u> i. 400kV PS-1 - Pang D/C (quad moose) line – 7 km ii. 400kV PS-2 -Pang D/C (quad moose) line – 27 km iii. 400kV PS-3 -Pang D/C (quad moose) line – 41 km <i>Note :400kV GIS line bays (2 Nos.)</i>	<u>ISTS system for RE interconnection at Pang</u> i. 400kV PS-1 - Pang D/C (quad moose) line – 7 km ii. 400kV PS-2 -Pang D/C (quad moose) line – 27 km iii. 400 kV PS-3 -Pang D/C (quad moose) line – 41 km <i>Note :400 kV GIS line bays (2 Nos.)</i>

S. No.	Scope as per OM dated 13.01.2022	Revised Scope
	<i>each at PS-1, PS-2 & PS-3 (under developer scope)</i>	<i>each at PS-1, PS-2 & PS-3 (under developer scope)</i>
2.	<p><u>Battery Energy Storage System (1GWh: 250 MW X 4 hr) at Pang</u></p> <p>i. BESS of suitable size (1 GWh: 250 MW x 4 hr)</p> <p>ii. 220kV line bay (1 no) for BESS (ISTS) interconnection at Pang</p>	Deleted
3.	<p><u>HVDC System</u></p> <p>i. Pooling point in Pang (Leh): ±350 kV, 2 Nos. of 2500 MW HVDC terminal Future provisions: Space for</p> <ul style="list-style-type: none"> ❖ 400 kV line bays: 6 Nos. ❖ 400/220 kV ICTs along with bays: 2 Nos. ❖ 220 kV line bays: 4 nos <p>ii. Pooling point in Kaithal (Haryana): ±350 kV, 2 Nos. of 2500 MW HVDC terminal Future provisions: Space for</p> <ul style="list-style-type: none"> ❖ 765/400 kV ICTs along with bays : 1 No. ❖ 765 kV line bays along with switchable line reactor : 2 Nos. ❖ 400kV line bays along with switchable line reactor : 4 Nos. ❖ 400/220 kV ICTs along with bays : 2 Nos. ❖ 220 kV line bay: 4 Nos. <p>iii. 4 Nos. of 400 kV converter (VSC) bays at Pang</p> <p>iv. 4 Nos. of 400 kV converter (VSC) bays at Kaithal</p> <p>v. 2 Nos. of 400/220/33 kV, 315 MVA Transformers along with associated Bays at Pang</p> <p>vi. 3 Nos. of 765/400/33 kV, 1500 MVA Transformers along with associated bays at Kaithal</p> <p>vii. 2 Nos. of 400 kV line bays at Kaithal</p>	<p><u>HVDC System</u></p> <p>i. Pooling point in Pang (Leh): ±350 kV, 2 Nos. of 2500 MW HVDC terminal Future provisions: Space for</p> <ul style="list-style-type: none"> ❖ 400 kV line bays: 6 Nos. ❖ 400/220 kV ICTs along with bays: 2 Nos. ❖ 220 kV line bays: 4 nos <p>ii. Pooling point in Kaithal (Haryana): ±350 kV, 2 Nos. of 2500 MW HVDC terminal Future provisions: Space for</p> <ul style="list-style-type: none"> ❖ 765/400 kV ICTs along with bays : 1 No. ❖ 765 kV line bays along with switchable line reactor : 4 Nos. ❖ 400kV line bays along with switchable line reactor : 6 Nos. ❖ 400/220 kV ICTs along with bays : 2 Nos. ❖ 220 kV line bay : 4 Nos. <p>iii. 4 Nos. of 400 kV converter (VSC) bays at Pang</p> <p>iv. 4 Nos. of 400 kV converter (VSC) bays at Kaithal</p> <p>v. 2 Nos. of 400/220/33 kV, 315 MVA Transformers along with associated Bays at Pang</p> <p>vi. 3 Nos. of 765/400/33 kV, 1500 MVA Transformers along with associated bays at Kaithal</p> <p>vii. Deleted</p> <p>viii. Deleted</p>

S. No.	Scope as per OM dated 13.01.2022	Revised Scope
	<p>viii. 2 Nos. of 765 kV line bays at Kaithal</p> <p>ix. 6 nos of 400kV line bays at Pang for termination of lines from RE park</p> <p>DC GIS/ AIS</p> <p>i. DC GIS / AIS at Pang and DC AIS at Kaithal</p> <p>ii. 4 Nos. of transition stations with DC GIS/ AIS</p> <p>HVDC Line (OHL and UG Cable)</p> <p>i. HVDC Line (OHL and UG Cable): 480 kms of ± 350kV HVDC line between Pang & Kaithal PS (combination of 465km overhead line (Quad) and 15 km underground cable)</p>	<p>ix. 6 nos of 400kV line bays at Pang for termination of lines from RE park</p> <p>DC GIS/ AIS</p> <p>i. DC GIS / AIS at Pang and DC AIS at Kaithal</p> <p>ii. 4 Nos. of transition stations with DC GIS/ AIS</p> <p>HVDC Line (OHL and UG Cable)</p> <p>i. HVDC Line (OHL and UG Cable): 480 kms of ± 350kV HVDC line between Pang & Kaithal PS (combination of 465km overhead line (Quad) and 15 km underground cable)</p>
4.	<p><u>EHVAC System beyond Kaithal</u></p> <p>i. Kaithal – Bahadurgarh (PG) 400 kV D/c Line (Twin HTLS*) – 170 km</p> <p>ii. Kaithal – Modipuram (Meerut) (UPPTCL) 765 kV D/c Line along with 1x240 MVAR switchable line reactor on each circuit at Kaithal end (along with 2 no.s switching equipment for 765 kV, 240 MVAR Switchable line reactor) – 210 km</p> <p>iii. **Augmentation of 765/400 kV, 1500 MVA transformer of Bhiwani S/s (one section has 2x1000 MVA ICT wherein 1500 MVA augmentation will take place, whereas other has 1x1000 MVA ICT through series reactor) along with associated bays incl. 500 MVA spare transformer unit (1-Phase)</p>	<p><u>EHVAC System beyond Kaithal</u></p> <p>Deleted (Proposed to be delinked and formed as separate scheme)</p>

S. No.	Scope as per OM dated 13.01.2022	Revised Scope
	iv. 2 Nos. of 400 kV line bays at Bahadurgarh (PG) v. 2 Nos. of 765 kV line bays at Modipuram (Meerut) (UPPTCL)	
5.	ISTS system to provide reliable power supply to Ladakh: i. 220kV Pang – Leh (Phyang) (PG) S/C line (Deer conductor) (S/C line on D/c tower) along with 220kV line bay each at Pang & Leh (Phyang) for line termination 151 km + 7 km underground cable.	ISTS system to provide reliable power supply to Ladakh: i. 220 kV Pang – Leh (Phyang) (PG) S/C line (Deer conductor) (S/C line on D/c tower) along with 220kV line bay each at Pang & Leh (Phyang) for line termination 151 km + 7 km underground cable.
Notes	❖ With minimum capacity of 2100 MVA on each circuit at nominal voltage i. UPPTCL to provide space for 2Nos. of 765kV bays at Modipuram (Merrut) S/s ii. POWERGRID to provide space for 2Nos. of 400V bays at Bahadurgarh S/s iii. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey iv. implementation Time-frame: 5 years from approval	❖ Deleted i. Deleted ii. Deleted iii. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey iv. Completion Schedule: FY 2029-30 (by 31st March 2030).

**** due to urgent requirement of 1500 MVA, 765/400 kV ICT at Bhiwani S/s, this element was delinked from earlier RTM scope in 15th NCT meeting and MOP vide OM dated 06/11/23 allocated the implementation of the ICT to POWERGRID in RTM**

The agenda for implementation of EHVAC system may be again brought up to NCT in due course considering the implementation time frame difference between HVDC (about 4.5 years) and EHVAC system (about 2 yrs).

3. Change in Scope of transmission scheme "Eastern Region Expansion Scheme-XXXIV (ERES-XXXIV)"

Change in original scope from Extension at Paradeep (OPTCL) GIS S/s:

400 kV GIS line bay: 2 Nos. (one GIS diameter) **revised to** 400kV GIS line bays: 2 Nos. 400 kV GIS diameters [2 Nos. of bays in different diameter for termination of Paradeep – Paradeep (OPTCL) 400 kV D/c (Quad) line and utilization of balance 2 Nos. shall be identified in future for connecting transmission line/reactor/ICT as per ISTS requirement]

4. Change in implementation timeframe of Eastern Region Generation Scheme-I (ERGS-I)

Change in the completion schedule of ERGS-I scheme from 01-05-2027 to 28-03-2028

II. ISTS Transmission schemes, costing between Rs 100 Crore to Rs 500 Crore, approved by NCT:

a) The transmission schemes approved by NCT under TBCB route is given below:

Sl. No.	Name of Transmission Scheme	Implementation Mode	Implementation timeframe	BPC	Estimated Cost (Rs. Crs)
1.	Transmission system strengthening to facilitate evacuation of power from Bhadla/Bikaner complex	TBCB	Tentative implementation timeframe : 18 Months from date of SPV transfer	PFCCCL	198.75

The broad scope of above ISTS scheme, approved by NCT for implementation through TBCB route to be notified in Gazette of India is as given below:

Sl. No.	Name of Scheme & implementation timeframe	Broad Scope	Bid Process Coordinator
1.	Transmission system strengthening to facilitate evacuation of power from Bhadla/Bikaner complex Implementation timeframe : 18 months from the date of SPV transfer	<p>i. 400 kV Bareilly (765/400 kV) – Bareilly (PG) D/c line (Quad) (2nd)</p> <p>ii. Augmentation with 1x1500 MVA, 765/400 kV ICT (3rd) at Bareilly (765/400 kV) S/s</p> <p>(Detailed scope as approved by 19th NCT and subsequent amendments thereof)</p>	PFCCCL

III. ISTS Transmission schemes, costing greater than Rs 500 Crore, recommended by NCT to MoP:

The ISTS transmission schemes recommended by NCT to MoP are given below:

Sl. No.	Name of Transmission Scheme	Implementation Mode	Tentative Implementation timeframe	BPC	Estimated Cost (Rs. Crs)
1.1	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4 :3.5 GW): Part A	TBCB	24 months from the date of SPV transfer	RECPDCL	5845.93
1.2	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4 :3.5 GW): Part B	TBCB	24 months from the date of SPV transfer	RECPDCL	6394.94
1.3	System strengthening at Koppal-II and Gadag-II for integration of RE generation projects	TBCB	Dec. 2025 to June 2027	PFCCCL	1354.4

The broad scope of the above ISTS schemes to be notified in Gazette of India is as given below:

Sl. No.	Name of Scheme & Tentative implementation timeframe	Broad Scope	Bid Process Coordinator
1.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4 :3.5 GW): Part A Implementation	<ul style="list-style-type: none"> i. Augmentation with 765/400 kV, 2x1500 MVA Transformer (4th & 5th) at Barmer-I PS ii. Augmentation of 5x500 MVA (5th to 9th), 400/220 kV ICTs at Barmer-I PS iii. 220kV line bays (6 nos.) for RE connectivity at Barmer-I PS iv. 400kV Sectionalizer bay (1 set), 220kV Sectionalizer bay (1 set) 	RECPDCL

	<p>Timeframe: 24 months from the date of SPV transfer</p>	<p>along with 220kV BC (1 Nos.) and 220 kV TBC (1 Nos.) at Barmer-I PS</p> <p>v. STATCOM (2x±300MVA) along with MSC (4x125 MVA) & MSR (2x125 MVA) along with 2 nos. 400 kV bays at Barmer-I PS</p> <p>vi. Fatehgarh-IV PS (Sec-2) – Barmer-I PS 400kV D/c line (Quad)</p> <p>vii. Establishment of 765/400kV, 2x1500 MVA S/s at suitable location near Ghiror (Distt. Mainpuri) along with 2x240 MVA (765kV) & 2x125 MVA (420kV) bus reactor at Ghiror S/s (UP)</p> <p>viii. Dausa - Ghiror 765 kV D/c line along with 330MVA switchable line reactor at Ghiror end and 240 MVA switchable line reactor at Dausa end for each circuit of Dausa - Ghiror 765 kV D/c line</p> <p>ix. LILO of both ckt of 765 kV Aligarh (PG) -Orai (PG) D/c line at Ghiror S/s along with 240 MVA switchable line reactor for each circuit at Ghiror S/s end of 765 kV Ghiror -Orai (PG) D/c line</p> <p>x. LILO of one ckt of 765kV Agra (PG) – Fatehpur (PG) 2xS/c line at Ghiror along with 240 MVA switchable line reactor at Ghiror end of 765 kV Ghiror -Fatehpur (PG) line</p> <p>xi. 400kV Ghiror-Firozabad (UPPTCL) D/c line (Quad)</p> <p>xii. 2 nos. 765kV line bays at Dausa S/s</p> <p>xiii. 2 nos. 400kV line bays at</p>	
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		Firozabad (UPPTCL) S/s (Detailed scope as approved by 19th NCT and subsequent amendments thereof)	
2.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-4 :3.5 GW): Part B Implementation timeframe : 24 months from the date of SPV transfer	<p>i. Establishment of 765/400 kV, 2x1500 MVA S/s at suitable location near Merta (Merta-II Substation) along with 2x240 MVA_r (765kV) & 2x125 MVA_r (420kV) bus reactor at Merta-II S/s Future provisions at Merta-II S/s</p> <p>ii. Barmer-I PS – Merta-II 765 kV D/c line along with 330 MVA_r switchable line reactor for each circuit at each end of Barmer-I PS – Merta-II 765 kV D/c line</p> <p>iii. Merta-II – Beawar 400 kV D/c line (Quad)</p> <p>iv. Merta-II – Dausa 765 kV D/c line along with 240 MVA_r switchable line reactor for each circuit at each end of Merta-II – Dausa 765kV D/c line line</p> <p>v. 2 nos. 765kV line bays each at Barmer-I PS & Dausa S/s</p> <p>vi. 2 nos. 400kV line bays at Beawar S/s (Detailed scope as approved by 19th NCT and subsequent amendments thereof)</p>	RECPDCL
3.	System strengthening at Koppal-II and Gadag-II for integration of RE generation projects Implementation timeframe : specified in detailed scope	<p>i. Augmentation of 3x1500 MVA 765/400kV ICTs (5th, 6th & 7th) at Koppal-II PS</p> <p>ii. Augmentation of 5x500 MVA 400/220kV ICTs (5th, 6th, 7th, 8th & 9th) at Koppal-II PS</p> <p>iii. 6 Nos. of 220kV line bay at Koppal-II PS for termination of dedicated Connectivity transmission line of RE developers</p> <p>iv. Augmentation of 7x500 MVA</p>	PFCCL

		<p>400/220kV ICTs (3rd, 4th, 5th, 6th, 7th, 8th & 9th) at Gadag-II PS</p> <p>v. Gadag-II PS – Koppal-II PS 400kV (Quad) 2nd D/c line</p> <p>vi. 1 No. of 400kV line bay at Gadag-II PS for termination of dedicated transmission line of RE developers</p> <p>vii. 5 Nos. of 220kV line bays at Gadag-II PS for termination of dedicated transmission line of RE developers</p> <p>(Detailed scope as approved by 19th NCT and subsequent amendments thereof)</p>	
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IV. ISTS communication schemes approved by NCT:

Sl. No.	Name of Transmission Scheme	Implementation Mode	Tentative Implementation timeframe	Implementing Agency	Estimated Cost (Rs. Crs)
1.	OPGW installation on existing 400 kV Kurukshetra - Malerkotla line alongwith FOTE at both ends Part – A	RTM	18 months from the date of allocation	M/s NRSS-XXXI (B) Transmission Ltd	9
	OPGW installation on existing 400 kV Kurukshetra - Malerkotla line alongwith FOTE at both ends – Part-B		18 months from the date of allocation (with matching time frame of OPGW on 400kV Kurukshetra - Malerkotla transmission	POWERGRID	0.6

			line)		
2.	OPGW installation on existing 400 kV Kota – Merta line alongwith LILO portion at Shree Cement including FOTE at all 3 locations	RTM	24 months from the date of allocation	POWERGRID	18.5
3.	OPGW installation on one circuit of existing of 765 kV Fatehpur-Agra D/c (2x S/c) Line which is to be LILOed at new Ghiror S/s (ISTS) including FOTE at Fatehpur & Agra locations (2 Nos.)	RTM	24 Months from the date of allocation	POWERGRID	16.5
4.	Supply and installation of OPGW on 400kV Fatehgarh-I (Adani) - Fatehgarh-II (PG) line (6.5 kms.) upto LILO portion of Fatehgarh-II (PG).		18 Months from the date of allocation	Adani Transmission Limited	0.325
5.	Additional FOTE / Cards in view of resource disjoint and critical locations (12 Nos. of FOTE)	RTM	12 Months from the date of allocation	POWERGRID	5.2
6.	Supply and Installation of 11 nos. FOTE at Backup SLDCs in Northern Region & Backup NRLDC (Guwahati)	RTM	12 Months from the date of allocation	POWERGRID	3.3

Annexure**List of participants of the 19th meeting of NCT****CEA:**

1. Sh. Ghanshyam Prasad, Chairperson, CEA & Chairman, NCT
2. Sh. Ajay Talegaonkar, Member (E&C)
3. Sh. A.K. Rajput, Member (Power Systems)
4. Sh. Ishan Sharan, Chief Engineer (PSPA-I)
5. Sh. B.S. Bairwa, Chief Engineer (I/C) (PSPA-II)
6. Sh. Pranay Garg, Deputy Director (PSPA-II)
7. Sh. Manish Kumar Verma, Assistant Director (PSPA-II)

MoP:

1. Om Kant Shukla, Director (Trans.)

MNRE:

1. Sh. Lalit Bohra, Joint Secretary
2. Sh. Rohit Thakwani, Scientist D

SECI:

1. Sh. R.K. Agarwal, Consultant

NITI Aayog:

1. Sh. Kamil KPS Bhullar, Research Officer

CTUIL:

1. Sh. P C Garg, COO
2. Sh. Ashok Pal, Deputy COO
3. Sh. K K Sarkar, Sr GM
4. Sh. Kashish Bhambhani, GM
5. Sh. Anil Kr. Meena, GM
6. Sh. Sandeep Kumawat, DGM
7. Sh. T.P. Verma, DGM
8. Sh. Mahendranath M., Chief Manager
9. Sh. Venkatesh Gorli, Chief Manager
10. Sh. Manish Ranjan Keshari, Chief Manager

GRID India:

1. Sh. S.R. Narasimhan, CMD
2. Sh. Rajiv Porwal, Director (SO)
3. Sh. Vivek Pandey, Senior GM
4. Sh. Rahul Shukla, Chief Manager
5. Sh. Priyam Jain, Chief Manager
6. Sh. Gaurab Dash, Deputy Manager
7. Sh. Raj Kishan, Deputy Manager

RECPDCL

1. Sh. Satyaban Sahu, GM (Tech)
2. Sh. Anil Kumar Perala, Chief Manager

PFCCL

1. Sh. Navin Phogat, GM (Tech)
2. Sh. Deepak Kumar, Assistant Manager

Expert Member

1. Sh. Ravinder Gupta, Ex Chief Engineer, CEA
