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 पन्द्रहवी बैठक की कार्यसूची - के सम्बन्ध में ।

Subject: Agenda for the 15th Meeting of National Committee on Transmission (NCT) – regarding.

महोदया (Madam) / महोदय (Sir),

The 15th meeting of the "National Committee on Transmission" (NCT) is scheduled as given below:

Date: 25/08/2023

Time: 03:00 PM

Venue: Chintan, 2nd Floor, CEA, Sewa Bhawan, R.K. Puram Sector-1, New Delhi

The agenda for the meeting is enclosed herewith. Kindly make it convenient to attend the meeting.

भवदीय/Yours faithfully,

Rakesh Goyal 21/08/2023

(राकेश गोयल / Rakesh Goyal)

मुख्य अभियन्ता एवं सदस्य सचिव,एन.सी.टी.

/Chief Engineer & Member Secretary (NCT)

प्रतिलिपि / **Copy to:**

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

List of Addresses:

1.	Chairperson, Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	2.	Member (Power System), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.
3.	Member (Economic & Commercial), Central Electricity Authority Sewa Bhawan, R.K. Puram, New Delhi – 110 066.	4.	Director (Trans), Ministry of Power Shram Shakti Bhawan, New Delhi-110001.
5.	Sh. Ajay Yadav, Joint Secretary Room no 403, 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 – 110010
9.	Ms. Seema Gupta, Ex. Director (Operations), POWERGRID		

Special Invitee

Chief Engineer (PCD), CEA

Table of Agenda

Agenda for the 15th meeting of National Committee on Transmission

1 Confirmation of the minutes of the 14th meeting of National Committee on Transmission.

1.1 The minutes of the 14th meeting of NCT held on 09.06.2023 were issued vide CEA letter no CEA-PS-12-13/3/2019-PSPA-II dated 07.07.2023.

1.2 Further, a corrigendum to the minutes was issued vide CEA letter dated 10.08.2023 with following modifications:

Para 3.2.12:

Sl. No. 8 of the table of para 3.2.12 is modified as below:

8.	80 MVAR, 420 kV switchable Line Reactors at Pune-III (GIS) end of Pune-III (GIS) – Koyna 400 kV S/c line formed after above LILO (with NGR bypass arrangement).	• 80 MVAR, 420 kV switchable line reactor along with switching equipment- 1 Nos.

Sl.no. viii of Row 4 of table under IV (b) of Summary of the deliberations of the 14th meeting of NCT held on 09th June, 2023 is modified as below:

"80 MVAR, 420 kV switchable Line Reactors at Pune-III (GIS) end of Pune-III (GIS) – Koyna 400 kV S/c line formed after above LILO (with NGR bypass arrangement)."

Para 3.5.8:

Sl.No. 2 under Column: Scope of the Transmission Scheme of the table of para 3.5.8 is modified as below:

"Fatehgarh-IV (Section-2) PS – Bhinmal (PG) 400 kV D/c line (Twin HTLS*) along with 50 MVAR switchable line reactor on each ckt at each end

Sl.No. 3 under Column: Scope of the Transmission Scheme of the table of para 3.5.8 is modified as below:

LILO of both ckts of 765 kV Fatehgarh-III- Beawar D/c line at Fatehgarh-IV (Section-2) PS along with 330 MVAR switchable line reactor at Fatehgarh-IV PS end of each ckt of 765 kV Fatehgarh-IV- Beawar D/c line (formed after LILO)"

The following is added at the end of table of para 3.5.8:

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

Sl. No. iii of Row 8 of table under IV (b) of Summary of the deliberations of the 14th meeting of NCT held on 09th June, 2023 is modified as below:

"LILO of both ckts of 765 kV Fatehgarh-III- Beawar D/c line at Fatehgarh-IV (Section-2) PS along with 330 MVAR switchable line reactor at Fatehgarh-IV PS end

of each ckt of 765 kV Fatehgarh-IV- Beawar D/c line (formed after LILO)"

1.3 Members may confirm the minutes along with the corrigendum.

2 Status of the transmission schemes noted/approved/recommended to MoP in the 14th meeting of NCT:

2.1 The status of the transmission schemes noted/approved/recommended in the 14th meeting of NCT is tabulated below:

Sr. No	Name of the Transmission Scheme	Noted/ Recommended/ Approved	Mode of Implementation	MoP approval	Survey Agency	BPC
1.	Requirement of additional FOTE of STM-16 capacity at Bhuj PS to cater to connectivity of RE Gencos	Approved	RTM	Not Applicable	Not Applicable	Not applicable
2.	Requirement of additional FOTE of STM-16 capacity at Bhuj-II substation to cater to connectivity of RE Gencos	Approved	RTM	Not applicable	Not Applicable	Not applicable
3.	Upgradation of STM-4 communication link of Dehgam, Ranchhodpura, Santhalpur Rep, Bhachau and CGPL Mundra to STM-16 capacity	Approved	RTM	Not applicable	Not Applicable	Not applicable
4.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW): Part A1	Approved	RTM	Not applicable	Not Applicable	Not applicable
5.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW)	Approved	RTM	Not applicable	Not Applicable	Not applicable

Sr. No	Name of the Transmission Scheme	Noted/ Recommended/ Approved	Mode of Implementation	MoP approval	Survey Agency	BPC
	(Jaisalmer/Barmer Complex): Part H2					
6.	Augmentation of transformation capacity by 1x1500 MVA (3rd), 765/400 kV ICT at Maheshwaram (PG) substation in Telangana	Approved	RTM	Not applicable	Not Applicable	Not applicable
7.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part E1	Approved	RTM	Not applicable	Not Applicable	Not applicable
8.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part E3	Approved	RTM	Not applicable	Not Applicable	Not applicable
9.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part E4	Approved	RTM	Not applicable	Not Applicable	Not applicable
10.	Western Region Network Expansion scheme in Kallam area of Maharashtra	Approved	TBCB	Not applicable	RECPDCL	RECPDCL
11.	Transmission System for Evacuation of Power from potential	Recommended	TBCB	To be approved	RECPDCL	RECPDCL

Sr. No	Name of the Transmission Scheme	Noted/ Recommended/ Approved	Mode of Implementation	MoP approval	Survey Agency	BPC
	renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part A					
12.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part B	Recommended	TBCB	To be approved	PFCCL	PFCCL
13.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part C	Recommended	TBCB	To be approved	RECPDCL	RECPDCL
14.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part D	Recommended	TBCB	To be approved	PFCCL	PFCCL
15.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW): Part E2	Recommended	TBCB	To be approved	RECPDCL	RECPDCL
16.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of	Recommended	TBCB	To be approved	RECPDCL	RECPDCL

Sr. No	Name of the Transmission Scheme	Noted/ Recommended/ Approved	Mode of Implementation	MoP approval	Survey Agency	BPC
	Gujarat under Phase-V (8 GW): Part A					
17.	Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW): Part C	Recommended	TBCB	To be approved	PFCCL	PFCCL
18.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part A	Recommended	TBCB	To be approved	RECPDCL	RECPDCL
19.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part B	Recommended	TBCB	To be approved	PFCCL	PFCCL
20.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part C	Recommended	TBCB	To be approved	CTUIL	RECPDCL
21.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer	Recommended	TBCB	To be approved	CTUIL	RECPDCL

Sr. No	Name of the Transmission Scheme	Noted/ Recommended/ Approved	Mode of Implementation	MoP approval	Survey Agency	BPC
	Complex): Part D					
22.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part E	Recommended	TBCB	To be approved	RECPDCL	RECPDCL
23.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part F (By clubbing Part F1 & F2)	Recommended	TBCB	To be approved	PFCCL	PFCCL
24.	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex): Part H1	Recommended	TBCB	To be approved	RECPDCL	RECPDCL

3 Modifications in the earlier approved/notified transmission schemes:

3.1 Termination of Bidar – Maheshwaram 765kV D/c line alongwith 240 MVAr switchable line reactor at Maheshwaram end under the "Transmission Scheme for Solar Energy Zone in Bidar (2500 MW), Karnataka".

3.1.1 Bidar - Maheshwaram PS 765 kV D/c line was identified with 240 MVAr switchable line reactor at Bidar end considering 160 km line length. The NGR of 600 ohms was included as part of RfP details. However, as confirmed by the BPC (RECPDCL), on survey the line length has been changed to ~242 km. Accordingly, revised analysis has been carried out for reactive compensation and NGR with revised line length and it was found that 240 MVAr switchable line reactor is required at both Bidar &

Maheshwaram ends. Further ohmic value of NGR of 500 ohms for Line Reactors may be considered.

3.1.2 In view of the above following may be revised in the scope for the transmission scheme

Original Scope	**Revised Scope**
765 kV, 1x240 MVAR Switchable Line Reactor for each circuit at Bidar PS end of Bidar PS- Maheshwaram (PG) GIS 765 kV D/C line	765kV, 1x240MVAR Switchable Line Reactor for each circuit at Bidar PS end **& Maheshwaram end** of Bidar PS – Maheshwaram (PG) GIS 765kV D/C line
Note: POWERGRID to provide space for 2 Nos. of 765 kV line bays at Maheshwaram (PG) substation for termination of Bidar PS – Maheshwaram (PG) 765 kV D/c line.	Note: POWERGRID shall provide space for 2 no. of 765 kV line bays **with provision for 240 MVAr SLR at** Maheshwaram (PG) substation for termination of Bidar PS – Maheshwaram (PG) 765 kV D/c line

3.1.3 The revised scope has already been communicated to the BPC. As per the status of the scheme as provided by RECPDCL, the LoI has been issued on 11.08.2023 and SPV transfer date is 21.08.2023.

3.1.4 Members may deliberate.

3.2 Transmission system for evacuation of power from Shongtong Karcham HEP (450 MW) and Tidong HEP (150 MW)

3.2.1 A comprehensive transmission scheme (400 kV Jhangi-Wangtoo-Panchkula D/c Corridor) for evacuation of power from two Hydro Electric Projects (HEPs) viz Tidong (150 MW) of Tidong Power Generation Private Limited (STATKRAFT) and Shongtong Karcham HEP (450 MW) of HPPCL in Himachal Pradesh was evolved. The transmission scheme was approved by MoP based on the recommendation by NCT for implementation through TBCB route. Subsequently, HPPCL had intimated that the commissioning date of Shongtong Karcham HEP (STKHEP) had been revised (preponed) from July'26 to July'25 and requested to review the timelines of the transmission system for evacuation of power from Shongtong Karcham HEP (STKHEP) in Himachal Pradesh due to the revised timeline of commissioning of STKHEP.

3.2.2 The revised scheme was also discussed in the 65th NRPC meeting held on 21.04.2023. During the NRPC meeting, MS, NRPC stated that all efforts may be made to reduce the time frame of the interim part to ensure that the generation is not stranded.

Therefore, NRPC Forum recommended NCT to consider generation project schedule and accordingly transmission system may be developed.

3.2.3 In the 14th NCT meeting, CTUIL informed that based on the preliminary survey report for 400 kV Wangtoo-Panchkula D/c line, conductor in certain portion of the transmission line may need to be of different configuration (due to very high altitude encountered in certain sections) in order to avoid Corona inception gradient. The cost of the transmission scheme may also increase. Accordingly, CTUIL was requested to confirm change in conductor configuration if any along with revised cost of the scheme based on the survey report and submit the same within two weeks.

3.2.4 Subsequently, in a meeting held with CEA and CTUIL, CTUIL informed that the conductor for the 400 kV Wangtoo-Panchkula D/c line will be Quad Moose.

3.2.5 Detailed scope of the scheme along with changes from earlier transmission scheme (approved in 65th NRPC meeting and discussed in 14th NCT) is given below:

Sl. No.	Scope of the Transmission Scheme (as per 14th NCT agenda)	Revised Scope of the Transmission Scheme
1.	**Interim Part (For Shongtong HEP: with time frame of 24 months)** Generation switchyard of Shongtong HEP** to Wangtoo (HPPTCL) 400 kV D/c line (Quad$) • Route length- 18 km 2 nos. of 400 kV bays (GIS) at Wangtoo (HPPTCL) ** *Associated 400 kV bays at Shongtong Generation switchyard shall be under the scope of applicant/generation developer* *Note: HPPTCL shall provide space for two number of 400kV line bays (GIS) at Wangtoo (HPPTCL) substation for termination of the 400kV line*	**Interim Part (For Shongtong HEP: with time frame of 24 months)** **1) -No Change-** **2) -No Change-**
2.	**Final System (To be matching with Tidong generator requirement ie. with time frame of 1st July 2026)** Establishment of 2x315 MVA (7x105 MVA 1-ph units including one spare unit), 400/220 kV GIS Pooling Station at Jhangi^ • 400/220 kV ICTs – 2x315 MVA (7x105 MVA 1-ph units including one spare unit) • 400 kV ICT bays – 2 Nos.	**Final System (To be matching with Tidong HEP requirement i.e. with time frame of 1st July 2026)** **-No Change—**

Sl. No.	Scope of the Transmission Scheme (as per 14th NCT agenda)	Revised Scope of the Transmission Scheme
	• 220 kV ICT bay -2 Nos. • 220 kV Bus coupler- 1 No. • 400 kV line bays (GIS) – 3 Nos. (2 nos. for extension of Wangtoo (HPPTCL) – Shongtong HEP 400 kV (Quad[$]) D/c line upto Jhangi PS with one circuit through Shongtong HEP generation switchyard) & 1 nos. for GIS Diameter completion at Jhangi • 420 kV Bus reactor- 1 No. (4x41.66 single phase units including one spare unit) • 420 kV reactor bay – 1 No. **Future provisions (Space for):** • 400 kV line bays-4 Nos. • 220 kV line bays for future projects-6 Nos (Out of above 6 bays, space for 2 bays to be utilized for connectivity to Tidong generation) • 400/220 kV ICT-2 Nos. • 420 kV Bus Reactor along with associated bay - 1 No. • 220 kV Sectionalization bay: 1 set • Bus Coupler: 1 No.	
	Extension of Wangtoo (HPPTCL) - Shongtong HEP 400 kV (Quad[$]) D/c line upto Jhangi PS with one circuit through Shongtong HEP generation switchyard • Route length- 37 km	**No Change—**
	Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c line* (twin HTLS) • Route length- 210 km	**Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c line* (Quad Moose)** • **Route length- 175 km** **Change in line length and conductor configuration**
	80 MVAR switchable line reactor at Panchkula end on each circuit of 400 kV Wangtoo (HPPTCL) - Panchkula (PG) D/c line	**-No Change—**
	400 kV bays at Wangtoo S/s (2 nos.-GIS) and	

Sl. No.	Scope of the Transmission Scheme (as per 14th NCT agenda)	Revised Scope of the Transmission Scheme
	Panchkula S/s (2 nos.-AIS) for termination of 400 kV Wangtoo (HPPTCL) - Panchkula (PG) D/c line *$ Line capacity shall be 2500 MVA per circuit at Nominal voltage* **** with minimum capacity of 2100 MVA on each circuit at Nominal voltage*** **Note:** *i. Developer of Shongtong HEP to provide 2 nos. of 400kV bays at Shongtong switchyard for LILO of one circuit of Jhangi PS - Wangtoo (HPPTCL) 400 kV D/c (Quad) line at generation switchyard of Shongtong HEP* *i. HPPTCL to provide space for two number of 400kV line bays (GIS) at Wangtoo (HPPTCL) substation for termination Wangtoo - Panchkula (PG) D/c line* *i. Power Grid to provide space at 2 nos. of 400 kV bays alongwith SLR at Panchkula S/s for termination of Wangtoo (HPPTCL) - Panchkula (PG) D/c line* *v. Tidong HEP- Jhangi PS 220 kV D/C line (along with associated bays at both ends)- under the scope of applicant/generation developer* *v. The line lengths indicated above are approximate as the actual line length would be obtained after detailed survey.*	**-No Change--** **Note:** *i. Developer of Shongtong HEP to provide 2 nos. of 400kV bays at Shongtong switchyard for LILO of one circuit of Jhangi PS - Wangtoo (HPPTCL) 400 kV D/c (Quad) line at generation switchyard of Shongtong HEP* *ii. HPPTCL to provide space for two number of 400kV line bays (GIS) at Wangtoo (HPPTCL) substation for termination Wangtoo - Panchkula (PG) D/c line* *iii. Power Grid to provide space at 2 nos. of 400 kV bays alongwith SLR at Panchkula S/s for termination of Wangtoo (HPPTCL) - Panchkula (PG) D/c line* *iv. Tidong HEP- Jhangi PS 220 kV D/C line (along with associated bays at both ends)- under the scope of applicant/generation developer* *The line lengths indicated above are approximate as the actual line length would be obtained after detailed survey.*

Sl. No.	Scope of the Transmission Scheme (as per 14th NCT agenda)	Revised Scope of the Transmission Scheme
	Estimated Cost: Rs 2624 Cr	**Estimated Cost: Rs 2680 Cr^**

^Revised cost include net increment cost due to change in conductor configuration from earlier twin HTLS to Quad Moose and reduced line length of 400kV Wangtoo (HPPTCL) - Panchkula (PG) D/c line after survey to 175 kms ~ Rs 56 Cr

3.2.6 Members may deliberate.

3.3 Delinking of Jhatikara - Dwarka 400 kV D/c line (Quad) from the Transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part D"

3.3.1 The transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part D" was agreed in the 5th meeting of NCT held on 25.08.2021 and 02.09.2021. MoP vide Gazette Notification dated 06.12.2021 has appointed REC Power Development and Consulting Limited (RECPDCL) as the Bid Process Coordinator of the transmission scheme.

3.3.2 The scope of the transmission scheme along with the cost estimates (as per the Cost Committee) is given below:

Sl. No.	Scope of the Transmission Scheme	Capacity /km	Cost Estimates (as per Cost Committee) (Rs. Cr)
1	Sikar-II – Khetri 765 kV D/c line	• Length – 90 km	548.04
2	Sikar-II – Narela 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II – Narela 765 kV D/c line	• Length – 260 km • Switching equipment for 765 kV 240 MVAR Switchable line reactor –4 nos. • 240 MVAr, 765kV Switchable line reactor- 4 nos.	1690.73
3	Jhatikara – Dwarka 400 kV D/c line (Quad)	• Length – 20 km	102.92
4	765 kV line bays at Sikar -II for Sikar-II – Khetri 765 kV D/c line and Sikar-II – Narela 765 kV D/c line	• 765 kV line bays – 4 nos.	92.18
5	2 nos. of 765 kV line bays at both Khetri and Narela S/s	• 765 kV line bays – 4 nos.	92.18

6	2 nos. of 400 kV line bays at both Jhatikara and Dwaraka S/s	• 400 kV line bays – 4 nos.	42.32
Total Cost (Rs Crores)			**2568.37**

Note:

i. Developer of Sikar-II S/s to provide space for 4 nos. of 765 kV line bays at Sikar-II S/s along with space for two nos. of switchable line reactors

ii. Developer of Narela S/s to provide space for 2 nos. of 765 kV line bays along with space for switchable line reactors at Narela S/s

iii. Powergrid to provide space for two nos. of 765 kV line bays at Khetri substation

iv. Powergrid and DTL to provide space for two nos. of 400 kV line bays both at Jhatikara and Dwarka S/s respectively

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

vi. Scheme to be implemented in matching time frame of Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part C1

3.3.3 Due to the high complexity involved in resolution of RoW for the Jhatikara – Dwarka 400 kV transmission line and prior approval required for the proposed transmission line route from various authorities like Delhi Development Authority (DDA), Airport Authority of India Limited (AAI), Flood & Irrigation (F&I) Department of Delhi; BPC vide letter dated 4.08.2023 (copy enclosed) has requested to de-link the Jhatikara – Dwarka 400 kV transmission line from the scope of the Phase-III Part D transmission scheme.

3.3.4 Based on the above and in order to avoid further delay in the implementation of the Phase-III Part D transmission scheme, following is proposed for the ease of implementation:

i. Delinking of the 400 kV Jhatikara – Dwarka D/c line (Quad) from the existing scope of Phase-III Part-D transmission scheme

ii. Separate package comprising the 400 kV Jhatikara – Dwarka D/c line (Quad) and its corresponding bays

3.3.5 Accordingly, the scope of the transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part D" is proposed to be bifurcated into two parts:

a. Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part D- Phase I:

- To be implemented through TBCB mode with the **implementation timeframe of 18 months** (from the date of SPV transfer) and with an estimated cost of Rs. 2423.13 Cr.
- The scope of the transmission scheme is given below:

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1	Sikar-II – Khetri 765 kV D/c line	Length – 90 km

2	Sikar-II – Narela 765 kV D/c line along with 240 MVAr Switchable line reactor for each circuit at each end of Sikar-II – Narela 765 kV D/c line	Length – 260 km Switching equipment for 765 kV, 240 MVAR switchable line reactor –4 nos. 765 kV, 240 MVAR Switchable line reactor- 4 nos.
3	765 kV line bays at Sikar -II for Sikar-II – Khetri 765 kV D/c line and Sikar-II – Narela 765 kV D/c line	765 kV line bays – 4 nos.
4	2 nos. of 765 kV line bays at both Khetri and Narela S/s	765 kV line bays – 4 nos.

Note:

i. Developer of Sikar-II S/s to provide space for 4 nos. of 765 kV line bays at Sikar-II S/s along with space for two nos. of switchable line reactors

ii. Developer of Narela S/s to provide space for 2 nos. of 765 kV line bays along with space for switchable line reactors at Narela S/s

iii. Powergrid to provide space for two nos. of 765 kV line bays at Khetri substation

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

v. Scheme to be implemented in matching time frame of Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part C1

b. Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part D- Phase II:

- Separate package including the Jhatikara – Dwarka 400 kV D/c line (Quad) and its corresponding bays, with the **implementation timeframe of 24 months** and estimated cost of Rs. 145.24 Cr.
- The scope of the transmission scheme is given below:

Sl. No.	Scope of the Transmission Scheme	Capacity /km
1	Jhatikara – Dwarka 400kV D/c line (Quad)	Length – 20 km
2	2 nos. of 400 kV line bays at both Jhatikara and Dwaraka S/s	400 kV line bays – 4 nos.

Note:

i. Powergrid and DTL to provide space for two nos. of 400kV line bays both at Jhatikara and Dwarka S/s respectively

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

3.3.6 Members may deliberate the mode of implementation for "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part D- Phase II" transmission scheme, having the implementation timeframe of 24 months.

3.4 **De Linking of augmentation of 765/400 kV, 1500 MVA transformer at Bhiwani S/s from Transmission system for evacuation of RE power from renewable energy parks in Leh (5 GW Leh- Kaithal HVDC Transmission corridor)**

3.4.1 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 NCT meeting held on 03.12.21. As part of EHVAC system (beyond Kaithal) of above scheme, augmentation of 765/400 kV, 1500 MVA transformer at Bhiwani S/s (one section has 2x1000 MVA ICT wherein 1500 MVA augmentation was agreed to be done, whereas other section has 1x1000 MVA ICT & both sections connected through series reactor) along with associated bays including 500 MVA spare transformer unit (1- Phase) was also approved. Same was allocated to POWERGRID in RTM 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.

3.4.2 In 209th OCC meeting of NRPC held on 19.07.23, N-1 non-compliance of 765/400 kV Bhiwani (PG) ICTs was deliberated. In the meeting it was stated that during high solar generation hours, the loading of 765/400kV 3x1000 MVA Bhiwani ICTs is observed to be above N-1 loading limit. Maximum ICT loading was observed sometimes to be 2300 MW-2500 MW (violated its N-1 loading limit of 2100 MW). It was deliberated that augmentation of 1x1500 MVA (4th) transformer at Bhiwani S/s is linked with Transmission system for evacuation of RE power from renewable energy parks in Leh and delay in implementation of Leh scheme will also impact the implementation of 765/400 kV, 1x1500 MVA (4th) ICT at Bhiwani S/s. In view of urgent requirement of 765/400 kV, 1x1500 MVA ICT, proposal for delinking of 765/400 kV, 1x1500 MVA (4th) ICT at Bhiwani S/s from agreed transmission scheme i.e. Transmission system (EHVAC+HVDC) for evacuation of RE power from renewable energy parks in Leh (5GW Leh- Kaithal transmission corridor) will be taken up in Consultation Meeting for Evolving Transmission Schemes in Northern Region"

3.4.3 In Grid India operational feedback report FY 2022-23(Q3/Q4) also, it was mentioned that during high solar generation hours, the loading of 765/400 kV, 3x1000 MVA Bhiwani ICTs is above N-1 loading limit. Therefore, proposal for additional 1500 MVA ICT at 765/400 kV Bhiwani may be expedited in line with other RE evacuation transmission network in the corridor.

3.4.4 The matter was deliberated in the 21st Consultation Meeting for Evolving Transmission Schemes in Northern Region held on 31.07.2023. In the meeting, it was proposed that delinking of Augmentation of 765/400 kV, 1500 MVA transformer of Bhiwani S/s along with associated bays including 500 MVA spare transformer unit (1-Phase) may be carried out from Leh Transmission scheme and above ICT augmentation may be taken up as separate scheme due to early requirement

Grid India agreed to the proposal and stated that 765/400 kV ICT is required on urgent basis. In real time, overloading is observed on 765/400 kV Bhiwani ICTs which may

become N-1 non-compliant. The issue was earlier highlighted in its operational feedback report. CEA also agreed for implementation of augmentation 765/400 kV Bhiwani ICT on urgent basis

In the meeting, CTU enquired about interconnection details for 765/400 kV 4th & 5th ICT at Bhiwani S/s. POWERGRID vide mail dated 31.07.23 informed that Section-I is connected with 02 Nos. 765/400 kV, 1000 MVA ICTs (ICT-2 and ICT-3) and Section-II is connected with 01 No. 765/400 kV, 1000 MVA ICT (ICT-1). Space is available for 765/400 kV, 1500 MVA ICT (4th) (3rd in section-I) & 5th (4th in section-I), however, space is a constraint for hot spare 500 MVA unit for both ICT-4 & ICT-5 but same can be installed as cold spare.

However, for ICT-5, at 400 kV side, to facilitate the connection in Section-I, GIS Duct is envisaged and dummy dia of Bhiwani (BBMB) shall be utilized. The work involves construction of one no. complete 400 kV diameter and shifting of 400 kV Bhiwani (BBMB) bay from Bay no. 413 to Dummy side bay.

3.4.5 In view of above, it was agreed that delinking of Augmentation of 765/400 kV, 1500 MVA transformer at Bhiwani S/s along with associated bays including 500 MVA spare transformer unit (1- Phase) needs to carried out from Transmission system for evacuation of RE power from renewable energy parks in Leh (5GW Leh- Kaithal transmission corridor) due to early requirement.

It was also agreed that delinking proposal will be taken up in ensuing NCT meeting and based on NCT decision, augmentation of 765/400 kV, 1500 MVA transformer (4^{th}) at Bhiwani S/s will be taken up as separate scheme with the implementation timeframe of 18 months from allocation.

3.4.6 In view of above and urgent requirement of 765/400 kV ICT at Bhiwani S/s, following is proposed:

i. Delinking of augmentation of 765/400 kV, 1500 MVA transformer along with 500 MVA spare transformer unit (1- Phase) at Bhiwani S/s along with associated bays from the existing scope of Transmission system for evacuation of RE power from renewable energy parks in Leh (5GW Leh- Kaithal HVDC transmission corridor)

ii. Separate package comprising the Augmentation of 765/400 kV, 1500 MVA transformer at Bhiwani S/s (4th) along with 500 MVA spare transformer unit (1-Phase) as a cold spare with the implementation timeframe of 18 months from allocation.

3.4.7 Details of transmission scheme is as under:

Sl. No.	**Scope of the Transmission Scheme**	**Capacity /km**
1	Augmentation of 765/400 kV, 1500 MVA transformer at Bhiwani S/s (4^{th}) (3^{rd} in Section-I which have 2x1000 MVA ICTs) along with associated ICT bays	• 765/400 kV, 1500 MVA ICT- 1 No. (3x500MVA) • 765 kV ICT bay- 1 No. • 400 kV ICT bay- 1 No.

Sl. No.	Scope of the Transmission Scheme	Capacity /km
2	500 MVA spare transformer unit (1- Phase) as a cold spare	500 MVA spare transformer unit (1- Phase) – 1nos.

Estimated Cost: Rs 165 Crores.

3.4.8 Members may deliberate.

3.5 **Review of implementation timeline of "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part I" based on TSP request**

3.5.1 In the 9th Meeting of NCT held on 28th September 2022, the Scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part I" was recommended to MoP for implementation under TBCB route with 42 months schedule from the date of transfer of SPV to the successful bidder. The scheme was notified vide Gazette Notification dated 13th January 2023. RECPDCL floated RFP of the scheme on 11th July, 2023 with bid submission deadline of 12th September, 2023.

3.5.2 Further, the matter regarding change in the implementation timeline of HVDC was discussed in 14th Meeting of NCT held on 09th June 2023. In the meeting, it was agreed that the timeline of commissioning of HVDC shall be increased by 06 months for Bipole-II i.e. if implementation timeline is 48 months for Bipole I, then 54 months for Bipole-II. However, the changed timelines for implementation of HVDC schemes would be applicable only to the new schemes brought up in NCT henceforth. Chairperson, CEA, also stated that rating of HVDC transmission system must be standardised by CEA so that delivery time is reduced.

3.5.3 Subsequently, M/s POWERGRID vide letter dated 09.08.2023 (**Annexure I**), requested to review the execution schedule of the above project in terms of increasing the SCOD to 60 months citing a limited number of HVDC Terminal OEMs/Contractors of HVDC projects who are presently overwhelmed with high volume of orders from different parts of the world. POWERGRID indicated the request of M/s Siemens and M/s GE citing limited manufacturing capacity, supply chain constraints, and already ongoing projects around the world requested at least 60 months' time for executing the above project. M/s Hitachi citing similar reasons requested at least 49 months for Bipole-1 and 54 months for Bipole-2 from the commencement date of contract award placed on OEM (ordering timeline needs to be considered in addition to this.

3.5.4 Further, *POWERGRID vide letter dated 02nd August, 2023 requested for the following:*

a) Increase of commissioning schedule from 42 months to 60 months,

b) Increase of time period of bidding from 02 months to 06 months,

c) Request to waive off requirement of Minimum Local Content (MLC) of 60%.

3.5.5 Members *may deliberate.*

3.6 **Modification in implementation schedule of "Transmission Scheme for integration of Renewable Energy Zone (Phase-II) in Koppal-II (Phase-B) in Karnataka" from 36 months to 24 months**

3.6.1 Transmission system for integration of additional RE potential declared by MNRE/SECI for 4 GW each at Koppal and Gadag as a part of 181.5 GW, was recommended for implementation through TBCB route in the 10th NCT held on 07.11.2022 with implementation schedule of 24 months and 36 months from SPV transfer. The details of agreed scheme is given below:

A. Transmission Scheme for integration of Renewable Energy Zone (Phase-II) in Koppal-II (Phase-A) and Gadag-II (Phase- A) in Karnataka

Sl.	***Scope of the Transmission Scheme***	***Capacity /km***
1.	Establishment of 765/400kV 2x1500 MVA, 400/220kV 2x500 MVA Koppal-II (Phase-A) Pooling Station with provision of two (2) sections of 4500 MVA each at 400 kV level and provision of four (4) sections of 2500 MVA each at 220 kV level **Future Space Provisions: (Including space for Phase-B)** • 765/400 kV, 1500 MVA, ICTs – 5 Nos. • 765 kV ICT bays – 5 Nos. • 400 kV ICT bays – 5 Nos. • 400/220kV, 500 MVA, ICTs – 10 Nos. • 400 kV ICT bays – 10 Nos. • 220 kV ICT bays – 10 Nos. • 765kV line bays – 8 Nos. (with provision for SLR) • 400kV line bays – 14 Nos. (with provision for SLR) • 220kV line bays – 12 Nos. • 220kV Bus Sectionalizer – 3 sets • 220 kV Bus Coupler (BC) Bay – 3 Nos. • 220 kV Transfer Bus Coupler (TBC) Bay – 3 Nos. • 400kV Bus Sectionalizer: 1 set	• 765/400kV, 1500 MVA, ICTs – 2 nos. (7x500 MVA incl. 1 spare unit) • 765 kV ICT bays – 2 nos. • 400 kV ICT bays – 2 nos. • 400/220kV, 500 MVA, ICTs – 2 Nos. • 400 kV ICT bays – 2 Nos. • 220 kV ICT bays – 2 Nos. • 765 kV line bays – 2 Nos.(at Koppal-II for termination of Koppal-II-Narendra new 765kV D/c line) • 220kV line bays – 4 Nos. • 220 kV Bus Coupler (BC) Bay – 1 No. • 220 kV Transfer Bus Coupler (TBC) Bay – 1 No.

Sl.	*Scope of the Transmission Scheme*	*Capacity /km*
2.	Koppal-II PS – Narendra New 765kV D/c line with 240 MVAr SLR at Koppal-II PS end (~150 km)	• Line length ~150 km • 765kV line bays – 2 Nos. (GIS) [at Narendra New] • 765 kV, 240 MVAr SLR at Koppal-II PS – 2 Nos. (7x80 MVAr including 1 switchable spare unit)
3.	2x330 MVAr (765kV) & 2x125 MVAr (400 kV) bus reactors at Koppal-II PS	• 765kV, 330 MVAr Bus Reactor – 2 Nos. (7x110 MVAr including 1 switchable spare unit for both bus reactor and line reactor) • 765 kV Bus Reactor bays – 2 Nos. • 420kV, 125 MVAr Bus Reactors – 2 Nos. • 420kV, 125 MVAr Bus Reactor bays – 2 Nos.
4.	Establishment of 400/220kV, 2x500 MVA Gadag-II (Phase-A) Pooling Station **Future Space Provisions:** • 400/220kV, 500 MVA, ICTs – 10 Nos. • 400kV ICT bays – 10 Nos. • 220kV ICT bays – 10 Nos. • 400kV line bays – 6 Nos. (with provision for SLR) • 220kV line bays – 10 Nos. • 220kV Bus Sectionalizer – 3 sets • 220 kV Bus Coupler (BC) Bay – 3 Nos. • 220 kV Transfer Bus Coupler (TBC) Bay – 3 Nos.	• 400/220 kV, 500 MVA ICTs – 2 Nos. • 400 kV ICT bays – 2 Nos. • 220 kV ICT bays – 2 Nos. • 400 kV line bays – 2 Nos. (at Gadag-II for termination of Gadag-II – Koppal-II line) • 220kV line bays – 4 Nos. • 220 kV Bus Coupler (BC) Bay – 1 No. • 220 kV Transfer Bus Coupler (TBC) Bay – 1 No.
5.	Gadag-II PS – Koppal-II PS 400kV (Quad Moose) D/c line (~100 km)	• Line length ~100 km • 400kV line bays - 2 Nos. (at Koppal-II)
6.	2x125MVAr 420kV bus reactors at Gadag-II PS	• 420kV, 125 MVAr bus reactors – 2 Nos. • 420kV, 125 MVAr bus reactor bays – 2 Nos.

Note:
(i) Powergrid shall provide space for 2 No. of 765 kV line bays at Narendra (New) for termination of Koppal-II PS – Narendra (New) 765 kV D/c line.

Estimated Cost	**Rs. 2564 cr**

Suggested under	TBCB
Implementation Time Frame	24 Months from date of SPV transfer

B. **Transmission *Scheme for integration of Renewable Energy Zone (Phase-II) in Koppal-II (Phase-B)***

Sl.	***Scope of the Transmission Scheme***	***Capacity /km***
1.	Koppal-II PS – Raichur 765kV D/c line with 330 MVAr SLR at Koppal-II PS end (~190 km)	• Line length ~190 km • 765kV line bays – 2 Nos. (at Koppal-II) • 765kV line bays – 2 Nos. (at Raichur) • 765 kV, 330 MVAr SLR at Koppal-II PS – 2 Nos. (6x110 MVAr) • Switching equipment for 765 kV, 330 MVAr SLR – 2 Nos.
2.	Augmentation of 2x1500, 765/400kV, ICTs at Koppal-II PS	• 765/400kV, 1500 MVA, ICTs – 2 nos. • 765kV ICT bays – 2 Nos. • 400kV ICT bays – 2 Nos.
3.	Augmentation of 2x500, 400/220kV, ICTs at Koppal-II PS.	• 400/220kV, 500 MVA, ICTs – 2 Nos. • 400kV ICT bays – 2 Nos. • 220kV ICT bays – 2 Nos. • 220kV line bays – 4 Nos. • 220kV Bus Sectionalizer – 1 set • 220 kV Bus Coupler (BC) Bay – 1 No. • 220 kV Transfer Bus Coupler (TBC) Bay – 1 No.

Note:
(i) Powergrid shall provide space for 2 No. of 765 kV line bays at Raichur for termination of Koppal-II PS – Raichur 765 kV D/c line

Estimated Cost	**Rs. 1881 cr**
Suggested under	TBCB
Implementation Time Frame	36 Months from date of SPV Transfer

3.6.2 The implementation schedule for “Transmission Scheme for integration of Renewable Energy Zone (Phase-II) in Koppal-II (Phase-A) and Gadag-II (Phase-A) in Karnataka” has been kept as 24 months and “Transmission Scheme for integration of Renewable Energy Zone (Phase-II) in Koppal-II (Phase-B) in Karnataka” had been kept as 36 months looking into the limited number of applications from RE developers.

3.6.3 Subsequently, CTU has received large number of applications from various RE developers from April 2023 to July 2023 seeking connectivity at Koppal-II and Gadag-II pooling stations. Presently Connectivity of about 485 MW at Koppal-II and 830 MW at Gadag-II has been granted / agreed for grant to RE developers. In addition to above, connectivity applications of about 1669 MW at Koppal-II and 2,420 MW at Gadag-II has been received and are under process. With this, the total connectivity applications at Koppal-II shall be 2104 MW and at Gadag-II shall be 3,250 MW.

3.6.4 In view of the above, it is proposed to modify the implementation schedule of "Transmission Scheme for integration of Renewable Energy Zone (Phase-II) in Koppal-II (Phase-B) in Karnataka" from 36 months to 24 months for facilitating timely integration of above RE generations.

3.6.5 Members may deliberate.

3.7 Revision in scope of Spare 80 MVAR Reactor under Rajasthan Ph IV Part C transmission scheme

3.7.1 Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2: 5.5 GW) (Jaisalmer/Barmer Complex): Part A, B, C, D, E, F, H1, H2 was approved in the 14th NCT meeting held on 09.06.2023. In this regard, CTU has informed that one no. 80 MVAR 1-Ph Spare reactor has been considered at Mandsaur S/S under Raj Ph IV Part C transmission scheme. It may be noted that there is no 240 MVAR Reactor bank at Mandsaur S/S under this scheme. 240 MVAR Reactors at Mandsaur S/S have been considered under Rajasthan Ph IV Part D and Rajasthan Ph IV Part H1 scheme.

3.7.2 Since switching scheme is to be formed for spare reactor with the 3-ph reactor bank, it will be better if the 80 MVAR spare reactor may be made part of the scheme in which 240 MVAR reactor bank is coming. Thus 80 MVAR spare reactor may be provided under Rajasthan Ph IV Part D or Rajasthan Ph IV Part H1 scheme in place of Rajasthan Ph IV Part C transmission scheme.

3.7.3 Considering the above, it has been suggested to shift the 80 MVAR spare reactor to Part-H1 and the proposed modifications required in Part C & H1 is given below. Further, the spare units has been designated as spare unit for line/Bus Reactor:

Original Scope			**Revised Scope**		
SI No.	**Scope**	**Capacity/Route length**	**SI No.**	**Scope**	**Capacity/Route length**
Part C					
1.	Establishment of 3x1500 MVA, 765/400 kV & 5x500 MVA,	765/400 kV, 1500 MVA ICT – 3 Nos. (10x500 MVA single phase units		Establishment of 3x1500 MVA, 765/400 kV & 5x500	765/400 kV, 1500 MVA ICT – 3 Nos. (10x500 MVA

	400/220 kV Mandsaur Pooling Station along with 2x330 MVAR (765 kV) Bus Reactors & 2x125 MVAR, 420 kV Bus Reactor Future Provisions: Space for: 765/400 kV ICT along with bays- 3 No. 765 kV line bays along with switchable line reactors – 12 Nos. 765 kV Bus Reactor along with bay: 2 No. 765 kV Sectionaliser bay: 1 -set 400 kV line bays along with switchable line reactor – 12 Nos. 400/220 kV ICT along with bays -5 Nos. 400 kV Bus Reactor along with bay: 2 No.	including one spare unit) 400/220 kV, 500 MVA ICT – 5 Nos. (3 Nos. on 220 kV bus section-1 & 2 Nos. on 220 kV bus section-2) 765 kV ICT bays – 3 Nos. 400 kV ICT bays – 8 Nos. 330 MVAR 765 kV bus reactor-2 Nos. (7x110 MVAR single phase units including one spare unit) 765 kV bus reactor bay- 2 Nos. 765 kV line bay- 2 Nos. (for Indore line) **80 MVAR, 765 kV, 1-ph reactor (spare unit)-1 No.** 125 MVAR, 420 kV bus reactor-2 Nos. 400 kV reactor bay- 2 Nos. 220 kV ICT bays – 5 Nos. 220 kV line bays – 7 Nos. (4 Nos. on bus section-1 and 3		MVA, 400/220 kV Mandsaur Pooling Station along with 2x330 MVAR (765 kV) Bus Reactors & 2x125 MVAR, 420 kV Bus Reactor Future Provisions: Space for: 765/400 kV ICT along with bays- 3 No. 765 kV line bays along with switchable line reactors – 12 Nos. 765 kV Bus Reactor along with bay: 2 No. 765 kV Sectionaliser bay: 1 -set 400 kV line bays along with switchable line reactor – 12 Nos. 400/220 kV ICT along with	single phase units including one spare unit) 400/220 kV, 500 MVA ICT – 5 Nos. (3 Nos. on 220 kV bus section-1 & 2 Nos. on 220 kV bus section-2) 765 kV ICT bays – 3 Nos. 400 kV ICT bays – 8 Nos. 330 MVAR 765 kV bus reactor-2 Nos. (7x110 MVAR single phase units including one spare unit for line/bus reactor) 765 kV bus reactor bay- 2 Nos. 765 kV line bay- 2 Nos. (for Indore line) ~~**80 MVAR, 765 kV, 1-ph reactor (spare unit)-1 No.**~~ 125 MVAR, 420 kV bus reactor-2 Nos. 400 kV reactor

	400 kV Sectionalization bay: 1- set 220 kV line bays: 11 Nos. 220 kV Sectionalization bay: 1 set 220 kV BC and TBC: 1 Nos. STATCOM (± 300 MVAR) along with MSC (2x125 MVAR) & MSR (1x125 MVAR) along with one 400 kV bay.	Nos. on bus section-2) 220 kV Bus Sectionaliser – 1 set 220 kV TBC bay – 2 Nos. 220 kV BC bay – 2 Nos.		bays -5 Nos. 400 kV Bus Reactor along with bay: 2 No. 400 kV Sectionalization bay: 1- set 220 kV line bays: 11 Nos. 220 kV Sectionalization bay: 1 set 220 kV BC and TBC: 1 Nos. STATCOM (± 300 MVAR) along with MSC (2x125 MVAR) & MSR (1x125 MVAR) along with one 400 kV bay.	bay- 2 Nos. 220 kV ICT bays – 5 Nos. 220 kV line bays – 7 Nos. (4 Nos. on bus section-1 and 3 Nos. on bus section-2) 220 kV Bus Sectionaliser – 1 set 220 kV TBC bay – 2 Nos. 220 kV BC bay – 2 Nos.
Part H1					
2.	240 MVAR switchable line reactors on each ckt at both ends of Mandsaur – Kurawar 765 kV D/c line	240 MVAR, 765 kV switchable line reactor- 4 (2 for Mandsaur end and 2 for Kurawar end) • Switching equipment for 765 kV line reactor- 4 (2 for Mandsaur end and 2 for Kurawar end)	2.	240 MVAR switchable line reactors on each ckt at both ends of Mandsaur – Kurawar 765 kV D/c line	240 MVAR, 765 kV switchable line reactor- 4 (2 for Mandsaur end and 2 for Kurawar end) • Switching equipment for 765 kV line reactor- 4 (2 for Mandsaur end and 2 for

					Kurawar end) • **80 MVAR, 765 kV, 1-ph reactor (spare unit)-1 No. for Mandsaur end** 80 MVAR, 765 kV, 1-ph reactor (spare unit)-1 No. for Kurawar end is mentioned at Sl. No. 1. of the present scheme.

3.7.4 Members may deliberate.

3.8 Modifications in the schemes viz. OPGW on 400kV Agra - Ballabhgarh & 400kV Kishenpur - Wagoora line approved in 11th NCT

3.8.1 In 11th NCT meeting held on 28th Dec' 22 & 17th Jan ' 23, following two no. of schemes were approved:

a) OPGW Replacement on 400 kV Agra-Ballabhgarh (Length:181km)

b) OPGW Replacement on 400 kV Kishenpur- Wagoora line (Length:183km)

3.8.2 However, POWERGRID informed that above two nos. of OPGW links awarded to POWERGRID for replacement were not originally implemented under ISTS schemes but by PowerTel (PQWERGRID). Further, these links are partially being used in sharing mode for ISTS purpose.

3.8.3 Accordingly, the above schemes need to be modified as follows:

Original Scope	Revised Scope
Replacement of old OPGW and terminal equipment on existing 400 kV Agra – Ballabhgarh line (181 km) with new	Supply & Installation of OPGW on 400 kV Agra - Ballabhgarh

OPGW and terminal equipment	

Original Scope	Revised Scope
Replacement of old OPGW alongwith terminal equipment on 400 kV Kishenpur-Wagoora line with new OPGW (183 km) except LILO portion at New Wanpoh (3 km) and terminal equipment	Supply & Installation of OPGW on 400 kV Kishenpur- Wagoora line

3.8.4 Further after implementation of the above schemes, the shared usage of the existing PowerTel links for ISTS purpose shall be discontinued and PowerTel usage for the new ISTS OPGW links, if any, shall be governed by CERC norms.

3.8.5 This agenda was deliberated in the 66th NRPC and approved by NRPC forum. The same is put up in the NCT for the approval for the modifications in the schemes.

3.8.6 CTUIL may inform about financial implications, if any.

3.8.7 Member may deliberate.

4 New Transmission Schemes:

4.1 ISTS Network Expansion scheme "Transmission Scheme for integration of Renewable Energy Zone in Tumkur area of Karnataka"

4.1.1 Out of the identified (86 GW) RE Potential in Southern Region, 17 GW has been identified in the State of Karnataka. MNRE have indicated that out of the 17 GW REZ potential in Karnataka, transmission system for evacuation capacity of about 11 GW may be identified considering the Energy Storage System. A comprehensive transmission system has been identified for immediate integration and evacuation of the above potential. Further, Tumkur REZ is being integrated with existing Tumkur (Pavagada) PS through Tumkur-II PS – Tumkur (Pavagada) 400 kV (Quad ACSR moose) D/c line.

4.1.2 The scheme was discussed and agreed in the 14th CMETS (SR) held on 26.12.2022 and in the 45th SRPC meeting held on 04.03.2023.

4.1.3 Details of the scheme is summarized as below:

Sl. No.	**Items**	**Details**

<table>
<tr><td>1.</td><td>Name of Scheme</td><td>Transmission Scheme for integration of Tumkur-II REZ in Karnataka</td></tr>
<tr><td>2.</td><td>Scope of the scheme</td><td>
<table>
<tr><th>Sl. No.</th><th>Scope of the Transmission Scheme</th><th>Capacity /km</th></tr>
<tr><td>1.</td><td>Establishment of 400/220kV 4x500 MVA Pooling Station near Tumkur, Karnataka
Future Provisions: Space for
• 400/220 kV, 500 MVA, ICTs – 7 nos.
• 400 kV ICT bays – 7 nos.
• 220 kV ICT bays – 7 nos.
• 400 kV line bays – 6 nos. (with provision for SLR)
• 220 kV line bays – 14 nos.
• 220kV Sectionalizer: 3 sets
• 220 kV Bus Coupler (BC) Bay – 3 nos.
• 220 kV Transfer Bus Coupler (TBC) Bay – 3 nos.</td><td>• 400/220kV, 500 MVA, ICTs – 4 nos.
• 400kV ICT bays – 4 nos.
• 220 kV ICT bays – 4 Nos.
• 400 kV line bays – 2 Nos. (at Tumkur-II PS for termination of Tumkur-II – Tumkur(Pavagada) line))
• 220 kV line bays – 4 Nos.
• 220 kV Bus Coupler (BC) Bay – 1 No.
• 220 kV Transfer Bus Coupler (TBC) Bay – 1 No.</td></tr>
<tr><td>2.</td><td>Tumkur-II – Tumkur(Pavagada) line 400kV (Quad ACSR moose) D/c line</td><td>~100 km
• 400kV line bays – 2 (at Tumkur (Pavagada))</td></tr>
<tr><td>3.</td><td>2x125MVAr 420kV bus reactors at Tumkur-II PS</td><td>• 420 kV, 125 MVAr bus reactors – 2 nos.
• 420 kV, 125 MVAr bus reactor bays – 2 nos.</td></tr>
</table>
</td></tr>
<tr><td>3.</td><td>Upstream/downstream system associated with the scheme</td><td>Not applicable</td></tr>
<tr><td>4.</td><td>Objective / Justification</td><td>Govt. of India has set a target of 500 GW generation capacity from non-fossil fuel resources by 2030. In this direction, MNRE has identified addition of 181.5 GW RE</td></tr>
</table>

Potential in the States of Andhra Pradesh, Telangana, Karnataka, Rajasthan, Madhya Pradesh and Tamil Nadu (Offshore). Out of the identified 181.5 GW Potential, 86 GW RE Potential is identified in the State of Andhra Pradesh, Telangana, Karnataka and Tamil Nadu (Offshore) in Southern Region.

The transmission system for integration of 181.5 GW RE Potential has been identified by CEA and a report on Transmission System for Integration of over 500 GW RE Capacity has been published by CEA on 07.12.2022.

Out of the identified (86 GW) RE Potential in Southern Region, 17 GW has been identified in the State of Karnataka. MNRE have indicated that out of the 17 GW REZ potential in Karnataka, transmission system for evacuation capacity of about 11 GW may be identified considering the Energy Storage System. The details of district wise potential is as below:

District	**Potential (GW)**		**Total (GW)**	**Dispatch (90% S + 55% W)**	**BESS**	**Evacuation capacity to be planned (GW)**
	Wind	**Solar**				
Koppal	2	2	4	2.9	1	2
Gadag	2	2	4	2.9	1	2
Davangere / Chitradurga	2	2	4	2.9	1	2
Bijapur	2		2	1.1		2
Bellary		1.5	1.5	1.35		1.5
Tumkur		1.5	1.5	1.35		1.5
Total	**8**	**9**	**17**	**12.5**	**3**	**11**

A comprehensive transmission system has been identified for immediate integration and evacuation of the above potential.

Further, based on the communication from SECI, a meeting was held under the chairmanship of Chairperson, CEA on 03.11.2022. During the meeting, it was decided that transmission system for evacuation of power from other RE Zones suggested by SECI viz. Devangere/Chitradurga & Tumkur-II in Karnataka and Nizamabad-II in Telangana would be put up to NCT after deliberations in CMETS and SRPC forum. CTUIL was

		requested to expedite the same. The transmission system for integration of additional RE potential in Koppal-II and Gadag-II area of Karnataka was already agreed. Further, Davangere / Chitradurga REZ is being integrated with Koppal-II PS through Davangere / Chitradurga PS – Koppal-II PS 400kV (Quad ACSR moose) D/c line. Further, Tumkur REZ is also being integrated with existing Tumkur (Pavagada) PS through Tumkur-II PS – Tumkur (Pavagada) 400kV (Quad ACSR moose) D/c line. The present scheme shall facilitate integration and evacuation of 1.5 GW RE potential from Tumkur area. The schemes were discussed and agreed in the 14th CMETS-SR held on 26.12.2022.
5.	Estimated Cost	**Rs. 792.77 Crore**
6.	Impact on the total Annual Transmission charges in % along with the existing ATC	A. ATC (considering Levelized Tariff @15% of estimated cost): 118.91 Crore B. Present ATC: Rs. 46,327.09 Crore# C. A/B (%): 0.256%
7.	Need of phasing, if any	Not Applicable
8.	Implementation timeframe	**24 months** from date of allocation to implementing agency / SPV Transfer (as the case may be). Tentative time-frame: **Oct'25** (Considering 4-6 months for necessary approvals & subsequent award of the project)
9.	Inclusion of any wild life/protected area along the transmission line route	No major National Park, Wildlife Sanctuary or other protected areas observed. However, for details of forest/protected areas, survey is required to be done.
10.	Deliberations with RPC along with their comments	The scheme was discussed in the 45th SRPC meeting held on 04.03.2023. SRPC vide letter dated 03.04.2023 has forwarded the views on the scheme (**Annexure II**).
11.	System Study for evolution of the proposal	Report on Transmission System for Integration of over 500 GW RE Capacity has been published by CEA on 07.12.2022.

Total YTC allowed for Feb'23 as per Notification of Transmission Charges payable by DICs for Billing Month of April, 2023 dated 25.03.2023 posted on NLDC website.

4.1.4 Detailed scope of the scheme is given below:

Sl. No.	*Scope of the Transmission Scheme*	*Capacity /km*
1.	Establishment of 400/220kV 4x500 MVA Pooling Station near Tumkur, Karnataka **Future Space Provisions:** • 400/220 kV, 500 MVA, ICTs – 7 Nos. • 400 kV ICT bays – 7 Nos. • 220 kV ICT bays – 7 Nos. • 400 kV line bays – 6 Nos. (with provision for SLR) • 220kV line bays – 14 Nos. • 220kV Sectionalizer: 3 sets • 220 kV Bus Coupler (BC) Bay – 3 Nos. • 220 kV Transfer Bus Coupler (TBC) Bay – 3 Nos.	• 400/220 kV, 500 MVA, ICTs – 4 Nos. • 400 kV ICT bays – 4 Nos. • 220 kV ICT bays – 4 Nos. • 400 kV line bays – 2 Nos. (at Tumkur-II PS for termination of Tumkur-II – Tumkur(Pavagada) line)) • 220 kV line bays – 4 Nos. • 220 kV Bus Coupler (BC) Bay – 1 No. • 220 kV Transfer Bus Coupler (TBC) Bay – 1 No.
2.	Tumkur-II – Tumkur(Pavagada) line 400 kV (Quad ACSR moose) D/c line	~100 km • 400 kV line bays – 2 Nos. (at Tumkur (Pavagada))
3.	2x125MVAr, 420 kV bus reactors at Tumkur-II PS	• 420 kV, 125 MVAr bus reactors – 2 Nos. • 420 kV, 125 MVAr bus reactor bays – 2 Nos.

4.1.5 Members may deliberate.

4.2 Transmission system strengthening for interconnections of Bhadla-III & Bikaner-III complex

4.2.1 Planned EHVAC capacity at Bhadla-III, in the requisite time frames (25-26), there is a need for optimal utilization of Bikaner-III corridor capacity by forming a high capacity tie interconnection between Bhadla-III & Bikaner-III PS. Accordingly, 765kV Bhadla-III - Bikaner-III D/c line is proposed to facilitate optimal utilization of EHVAC corridor beyond Bikaner-III PS for evacuation of RE generation including at Ramgarh/Bhadla-III PS.

4.2.2 The transmission scheme was discussed and agreed in the 67th NRPC meeting held on 30.06.23.

4.2.3 Details of the schemes are summarized as below:

S. No.	**Items**	**Details**
1.	**Name of Scheme**	Transmission system strengthening for interconnections of Bhadla-III & Bikaner-III complex

S. No.	Items	Details
2.	**Scope of the scheme**	• 765 kV Bhadla-III – Bikaner-III D/c line along with 240 MVAr switchable line reactor for each circuit at Bhadla-III end (~150 km)
3.	**Depiction of the scheme on Transmission Grid Map**	Given below
4.	**Upstream/downstream system associated with the scheme**	Establishment of 765/400/220 kV Bhadla-III PS and Bikaner-III S/s are under bidding as part of Rajasthan REZ Ph-III & Ph-IV (Part-1) schemes respectively. 765/400/220kV Bhadla-III PS proposed to be interconnected with Ramgarh PS and Sikar-II S/s at 765kV level and Fatehgarh-III (Sec-2) and Fatehgrah-II PS at 400kV level. 765/400/220kV Bikaner-III PS proposed to be interconnected with Neemrana-II S/s at 765kV level and Bikaner(PG)/Bikaner-II S/s at 400kV level.
5.	**Objective / Justification**	1. The subject transmission scheme comprises Transmission system strengthening for interconnections of Bhadla-III & Bikaner-III complex. The scheme was deliberated and agreed in 19th CMETS-NR meeting held on 31.05.23. 2. Comprehensive Transmission scheme for evacuation of power from Rajasthan REZ Ph-IV (Part-1) (Bikaner Complex) is under bidding for power transfer of 7.7GW incl. 4GW from Bikaner-III PS. The scheme comprises 765kV EHVAC corridor from Bikaner-III PS towards load centers of Delhi/UP. About 2.2 GW connectivity application granted/received at Bikaner- III PS (out of which few applications may be shifted at Bikaner-II PS to utilize vacated margin of about 0.45 GW at Bikaner-II PS in GNA). In view of that about 1.75GW RE applications will be available at Bikaner-III PS against 4GW RE evacuation capacity. 3. St-II Connectivity for about 3.8 GW and LTA of about 1GW, against the potential of 6.5 GW (under Ph-III), was received/agreed for grant at Bhadla-III PS. Earlier, St-II Connectivity for about 2.75 GW RE and LTA of 2.6GW, against the potential of 2.9 GW (under Ph-III), was received/granted at Ramgarh PS. However, M/s Adani surrendered 2.1 GW connectivity/LTA at Ramgarh PS under GNA, considering above, power transfer requirement from

S. No.	Items	Details
		Ramgarh will be 0.65 GW (2.75GW-2.1GW) in GNA regime. 4. As part of Rajasthan REZ Ph-III (20GW) Transmission scheme, Bhadla-III & Ramgarh PS are being established for integration of 6.5GW & 2.9 GW RE potential respectively. Ramgarh PS is also being inter-connected with Bhadla-III for evacuation of RE power. In order to facilitate evacuation of 9.4GW RE power from Ramgarh/Bhadla-III PS (6.5GW+2.9GW) from Bhadla-III onwards, 765kV Bhadla-III - Sikar-II D/c line with implementation schedule of Dec'24 (Tentative) [for about 2.9GW power transfer requirement] as well as 6GW HVDC corridor (+800kV Bhadla (HVDC) -Fatehpur (HVDC)) with implementation schedule of Dec'26 (42 months schedule) is being implemented as part of Ph-III scheme. 5. As mentioned above, Connectivity for 4.55GW (0.65GW at Ramgarh + 3.9GW at Bhadla-III) is already granted/under process at Ramgarh/Bhadla-3 PS. In view of expected implementation schedule of HVDC system beyond Bhadla-3 (Dec'26), there is a need of additional corridor from Bhadla-3 onwards beyond 2.9GW RE potential of Ramgarh/Bhadla-3 PS. 6. Since, more injection is anticipated than planned EHVAC capacity at Bhadla-III, in the requisite time frames (25-26), there is a need for optimal utilization of Bikaner-III corridor capacity by forming a high capacity tie interconnection between Bhadla-III & Bikaner-III PS. 7. Accordingly, 765kV Bhadla-III - Bikaner-III D/c line is proposed to facilitate optimal utilization of EHVAC corridor beyond Bikaner-III PS for evacuation of RE generation including at Ramgarh/Bhadla-III PS. 8. Further, as part of committee report "Transmission system for integration of over 500GW capacity by 2030" as well as MNRE/SECI inputs, a Comprehensive transmission plan for evacuation of 75GW RE potential from Rajasthan is evolved comprising 10 GW RE potential (Wind: 4 GW, Solar: 6 GW) along with 3GW BESS (net evacuation 5 GW) at Ramgarh in Jaisalmer complex by 2030. Out of 10 GW potential by 2030, in its Ph-I (by 2025) 3GW potential (Wind: 2GW, Solar: 1GW) was informed at Ramgarh. As part of above committee report, additional 3 GW RE injection at Ramgarh PS

S. No.	Items	Details
		and 2GW RE injection at Bhadla-III/Bhadla-IV PS is envisaged beyond 2025 (Ph-II/III), which will utilize the planned HVDC corridor beyond Bhadla-3 as it will match implementation schedule of generation and transmission i.e. in 2026-27 timeframe. 9. In the MOP meeting held on 01.05.23, it was deliberated that GIB committee clearance is still pending for 400kV Fatehgarh-ll-Bhadla-lll D/c line under Ph-lll Part-B1 package as above line is emanating from Fatehgarh-ll PS, which is falling under GIB core area and adversely impacting progress of other linked packages. Accordingly, it was directed that process of delinking of 400kV Fatehgarh-ll- Bhadla-lll D/c line from Ph-lll Part-B1 may be carried out at the earliest and a separate package may be formed comprising this line. It is understood that RE developers are also facing challenges in getting DTL clearance from GIB committee at Fatehgarh-II PS. Deferment of 400kV Fatehgarh-ll- Bhadla-lll D/c line will also reduce the SCR at Bhadla-III PS/Bhadla HVDC which is already at border line. Therefore,765kV Bhadla-III PS - Bikaner-III PS D/c line shall also provide additional advantage to improve short circuit strength in Bhadla-III complex including for LCC HVDC terminal at Bhadla. 10. Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-3 :2 GW) (Ramgarh Complex) was deliberated in 17th CMETS-NR meeting held on 31.03.23 which included 765kV Ramgarh-Bhadla-III PS - Bikaner-III PS D/c Corridor. However, considering connectivity surrendered at Ramgarh by M/s Adani (2100 MW) the proposal was reviewed as above. 11. In 19th CMETS-NR held on 31.05.2023 CTU stated that system studies were carried out under various scenarios considering 765 kV Bhadla-III – Bikaner-III D/c tie interconnection and study files were also circulated on 25.05.23. From the study results, it was observed that line loading with proposed strengthening is in order in normal as well as N-1 contingency condition. It is also observed that in Feb solar maximized scenario (revised case), loading of 400kV RAPS-Shujalpur D/c line is marginally higher (about 900MW) in N-1 contingency. Additionally loading of 765/400kV Bareilly ICT (2x1500MVA) is marginally higher in some scenarios (n-1:1550MW). The loading of the above line and ICT will be

S. No.	Items	Details
		reviewed with progress of RE generation projects at Rajasthan and strengthening requirement will be identified later, if required. Further, short circuit level at Bikaner-III PS is also within limits (765kV-29.3kA, 400kV- 55kA, 220 kV-24.3 kA) with proposed strengthening. It was stated that in view of the above considerations, 765 kV Bhadla-III – Bikaner-III D/c tie interconnection shall provide following advantages: ➢ Optimal utilization of EHVAC transmission system beyond Bikaner-III PS while providing flexibility of power transfer from Bhadla/Bikaner RE clusters. ➢ Additional evacuation requirement from future RE generation of 181.5 GW (Ph-1/2) RE potential at Ramgarh/Bhadla-III (2 GW). ➢ Meeting evacuation requirement from Bhadla-III PS onwards for same RE generators coming up in 2025-26. ➢ Improves SCR in Bhadla-III complex including for LCC HVDC terminal at Bhadla. ➢ Tie connection will also increase resiliency of transmission corridor in both the complexes i.e. Bhadla & Bikaner. 12. **In 19th CMETS-NR meeting Grid-India stated that studies are in order and proposal is agreeable to them.** Further, Grid-India in the meeting as well as vide mail dated 31.05.23 informed that multiple transmission line tripping in a short duration have been observed in Rajasthan RE complex during inclement weather condition in recent days. Some of these lines tripped due to tower collapse/damage and are still under long outage. This has resulted in backing down of RE generation also to keep the line loadings within permissible limits in the depleted network. 13. It was further mentioned that the tripping of multiple lines during inclement weather especially due to tower collapse/damage is a matter of serious concern and suggested following measures in order to avoid such incidents in future.

S. No.	Items	Details
		• Review of the Wind Zones in Rajasthan RE Complex on priority Enhancing resiliency of the transmission system through: • Planning of single ckt lines in place of double ckt lines in critical/high loading corridors • Applicability of N-2 reliability criteria or beyond may be considered on case to case basis in natural disaster/inclement weather prone areas. Historical data of multiple element outage in such areas and feedback of system operator may be referred in this regard while planning of the transmission system. It was agreed that input will be deliberated in a separate meeting and the final recommendations will be put up in subsequent NCT for approval. 14. CTU stated that the matter regarding review of wind zone and resiliency of the transmission system was also deliberated in the 66th NRPC meeting wherein it was decided that a committee shall be formed to deliberate on issue & mitigating measures. 15. NLDC representative further informed that, in the study cases, a large quantum of power (~9200 MW) is getting evacuated from 765/400 kV Bikaner PG making it one of the most critical station in the complex. Pooling of such large quantum of power at a single station is not desirable from resiliency point of view as complete station outage may result in cascade tripping. He further requested CTUIL to explore alternatives paths with suitable network rearrangements so as to reduce large evacuation of power from a single station. 16. CTUIL stated that RE pooling stations in western Rajasthan complex (Bikaner/Bhadla/Fatehgarh) are contagious to each other and power from above complexes shall flow towards load centres of Northern & Western region mainly through high capacity corridors. 17. In view of integration of more than 50GW in ISTS system in western Rajasthan, most of RE pooling station i.e. Bikaner (PG) may be utilized for evacuation of about 7-9 GW RE generation (incl self RE generation of 4-6GW) towards load centers. To make the system more resilient, additional transmission system may be required which may increase the transmission system investment (up to 1.5 times) for evacuation of the RE power mainly

S. No.	Items	Details
		through solar without BESS which is available only in day time. In view of this, detail deliberations are required on above matter on resilience of transmission system for RE vis-à-vis transmission system additional cost and optimal utilization of transmission system as above requirement is beyond transmission planning criteria. 18. NLDC representative further highlighted loading on some of the lines i.e. 765 kV Bhadla – III – Sikar D/c & 765 kV Bikaner – Moga D/c in the study case shared by CTUIL wherein angular separation in the base case and under N-1 is on the higher side (19^0 to 25^0). Same may also be addressed through suitable rearrangements. CTU stated that as per Transmission Planning Criteria, 2023, angular separation between adjacent buses under 'N-1' shall not exceed 30 degree. Further it is mentioned that in transmission planning efforts to be made that angular difference between adjacent buses may not exceed 20 degree in base case and 30 degree in N-1 contingency (except Inter regional and critical high capacity links). Additional transmission system/ rearrangements may be required to further reduce the angular difference between adjacent buses which may increase the transmission system investment. Further, in the 8th CMETS-NR meeting held on 30.06.22, result of P-V, Q-V analysis for such highly loaded 765kV lines was depicted by CTU as part of minutes of above meeting. From the result it was observed that the system was stable under various contingencies. 19. CEA & Grid-India also concurred on above proposal and no comments were received from other stakeholders. In view of deliberation held in 19th CMETS-NR meeting, ISTS Transmission scheme was agreed (as per S.No 2).
6.	**Estimated Cost**	**Total: Rs. 1382 Cr.**
7.	**Impact on the total Annual Transmission charges in % along with the**	A. ATC (considering Levelized Tariff @15% of estimated cost): Rs 207.3 Cr. B. Present ATC: ₹ **46405.37** Crore* C. A/B (%): 0.4467 %

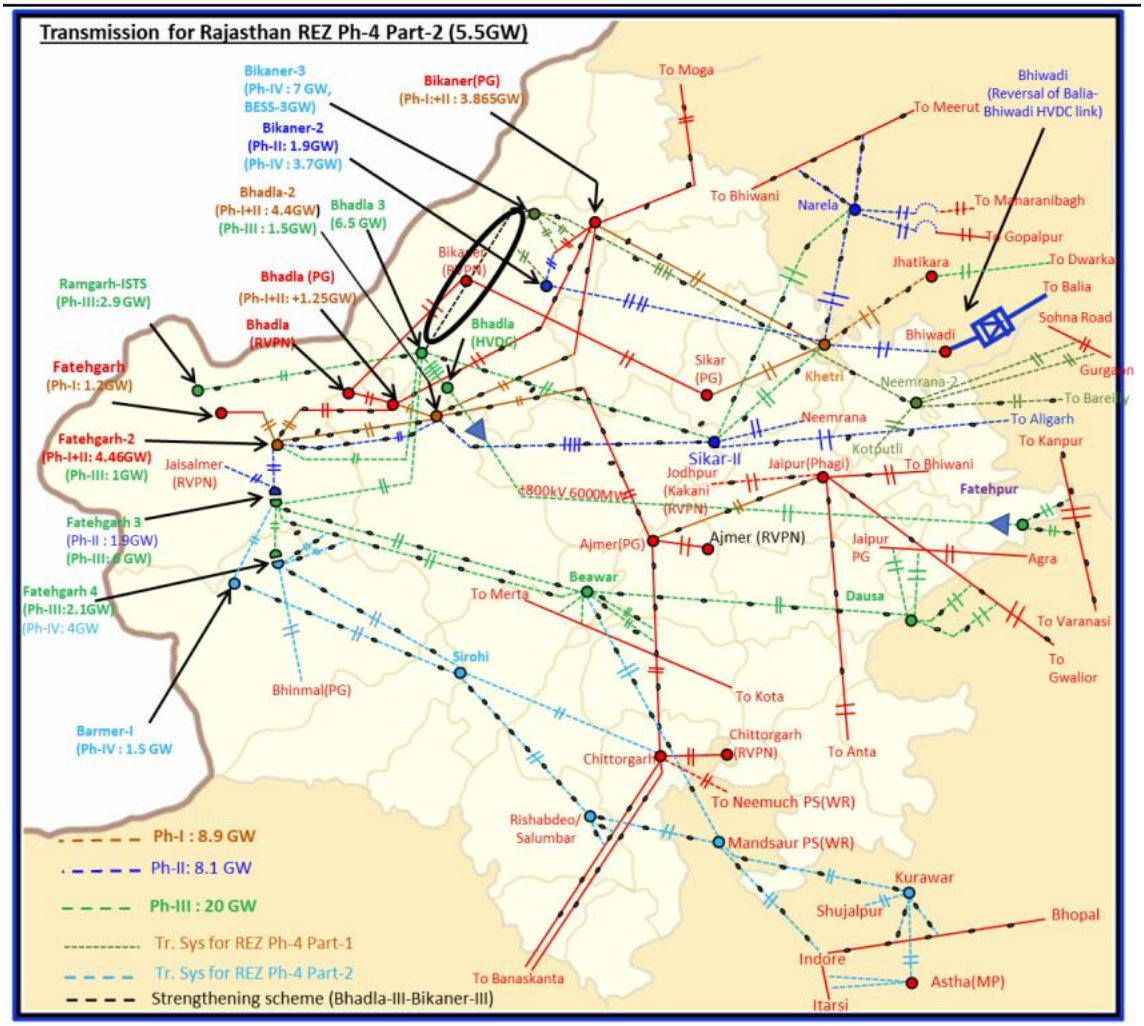
S. No.	Items	Details
	existing ATC	
8.	**Need of phasing, if any**	Not Applicable
9.	**Implementation timeframe**	24 months from allocation of project
10.	**Inclusion of any wild life/protected area along the transmission line route**	The line may pass through Jore Beed Gadwala Bikaner Con R* & GIB area or its buffer zone in the state of Rajasthan. However, for details of forest/protected areas survey is required to be done.
11.	**Deliberations with RPC along with their comments**	The transmission scheme was discussed and agreed in the 67th NRPC meeting held on 30.06.23.
12.	**System Study for evolution of the proposal**	Studies discussed and agreed in following meetings • 19th CMETS-NR meeting held on 31.05.23 • 67th NRPC meeting held on 30.06.23

**Total YTC allowed for Jan'23, as per notification of transmission charges payable by DICs for billing month of May 2023 dated 25.04.2023 published on NLDC website*

4.2.4 Detailed scope of the scheme is given below:

SI No.	Scope of the scheme
1.	Bhadla-III – Bikaner-III 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at Bhadla-III end (line length~150 km)

4.2.5 Schematic of the scheme is given below*:*



4.2.6 Members may deliberate.

4.3 Network Expansion scheme in Gujarat for drawl of about 3.6 GW load under Phase-I in Jamnagar area

4.3.1 The scheme has been planned to enable evacuation of 3.6 GW load under Phase-I in Jamnagar area of Gujarat to cater the Phase-I (Total 3.6 GW) load in Jamnagar (~750 MW) / Jam Khambhaliya (~2850 MW) area and to facilitate drawl/injection of power by GETCO from Jam Khambhaliya PS. The scheme has been planned to meet the drawl requirement of bulk consumers (RIL, EET Future etc.).

4.3.2 The transmission scheme was discussed and agreed in 47th WRPC meeting held on 15.06.2023.

4.3.3 Details of the scheme is summarized below:

<table>
<tr><th>S. No.</th><th>Items</th><th></th></tr>
<tr><td>1.</td><td>Name of Scheme</td><td>Network Expansion scheme in Gujarat for drawl of about 3.6 GW load under phase-I in Jamnagar area</td></tr>
<tr><td>2.</td><td>Scope of the scheme</td><td>
<table>
<tr><th>Sl. No.</th><th>Scope of the Transmission Scheme</th><th>Capacity/line length km</th></tr>
<tr><td>1.</td><td>Establishment of 2x1500 MVA 765/400 kV Jamnagar(GIS) with 2x330 MVAR 765 kV bus reactor and 2x125 MVAR 420 kV bus reactor.

Future Provisions:

Space for
➢ 765/400kV ICT along with bays- 4 no.
➢ 765 kV line bays along with switchable line reactors – 10 nos.
➢ 765kV Bus Reactor along with bay: 2 no.
➢ 765kV Sectionaliser bay: 1 -set
➢ 400 kV line bays along with switchable line reactor – 8 nos.
➢ 400/220kV ICT along with bays -6 nos.
➢ 420 kV Bus Reactor along with bay: 2 no.
➢ 400kV Sectionalization bay: 1- set
➢ 220 kV line</td><td>765/400 kV, 1500 MVA ICT-2 Nos.

765 kV ICT bays- 2 Nos.

400 kV ICT bays- 2

330 MVAR 765 kV bus reactor-2

125 MVAR 420 kV bus reactor-2

765 kV reactor bay- 2

765 kV line bay- 2

400 kV reactor bay- 2

400 kV line bay- 10

500 MVA, 765/400 kV 1-Ph Spare ICT-1

110 MVAR, 765 kV, 1-ph reactor (spare unit for line/bus reactor)-1</td></tr>
</table>
</td></tr>
</table>

			bays: 14 nos. ➢ 220kV Sectionalization bay: 1 set ➢ 220kV BC: 1 no. ➢ Space for 80MVAR 1-ph spare reactor unit	
		2.	Halvad – Jamnagar 765kV D/c line	170km
		3.	2 nos. of 765kV line bays at Halvad for termination of Halvad – Jamnagar 765kV D/c line	765 kV line bays– 2 Nos. (for Halvad end)
		4.	330MVAr switchable line reactors on each ckt at Jamnagar end of Halvad – Jamnagar 765kV D/c line (with NGR bypass arrangement)	• 330 MVAr, 765 kV switchable line reactor- 2. • Switching equipments for 765 kV line reactor- 2
		5.	LILO of Jam Khambhaliya PS – Lakadia 400kV D/c (triple snowbird) line at Jamnagar with conductor having ampacity equivalent to triple snowbird at nominal voltage	LILO route length 5km.
		6.	50MVAr, 420kV switchable line reactors on each ckt at Jamnagar end of Jamnagar – Lakadia 400kV D/c line (with NGR bypass arrangement)	• 50 MVAr, 420 kV switchable line reactor- 2. • Switching equipments for 400 kV line reactor- 2

		7.	Jamnagar – Jam Khambhaliya 400kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line	50km.
		8.	2 nos. of 400kV line bays at Jam Khambhaliya for termination of Jamnagar – Jam Khambhaliya 400kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line	• 400 kV line bays (GIS) – 2 Nos. (for Jam Khambhaliya end)
		9.	LILO of CGPL – Jetpur 400kV D/c (triple snowbird) line at Jamnagar with conductor having ampacity equivalent to triple snowbird at nominal voltage	LILO route length 65km.
		10.	80MVAr, 420kV switchable line reactors on each ckt at Jamnagar end of Jamnagar – CGPL 400kV D/c line (with NGR bypass arrangement)	• 80 MVAr, 420 kV switchable line reactor- 2. • Switching equipments for 400 kV line reactor- 2
		11.	LILO of both ckts of Kalavad – Bhogat 400kV D/c line (Twin AL-59) at Jam Khambhaliya PS with Twin AL59 Moose equivalent conductor	• LILO route length 10km.
		12.	4 nos. of 400kV line bays at Jam Khambhaliya for LILO of both ckts of Kalavad – Bhogat	• 400 kV line bays (GIS) – 4 Nos. (for Jam Khambhaliya end)

		<table><tr><td></td><td>400kV D/c line</td><td></td></tr><tr><td>13.</td><td>±400MVAr STATCOM with 3x125 MVAr MSC & 2x125 MVAr MSR at Jamnagar 400kV Bus section</td><td>• ±400MVAr STATCOM (with MSC/MSR) • 400kV bay – 2 no. (1 no. for STATCOM and 2nd for Dia. completion)*</td></tr></table> ***** The TSP shall implement one complete diameter(GIS) consisting of 2 main bays & 1 Tie bay in one and half breaker scheme **Note:** 1. Implementation Timeframe: 31.03.2026 subject to minimum implementation time-frame of 24 months from date of allocation to the implementing agency 2. Bay(s) required for completion of diameter (GIS) in one-and-half breaker scheme shall also be executed by the TSP. 3. TSP (JKTL) shall enable Inter-tripping scheme on Jamnagar – Jam Khambhaliya 400 kV D/c line (for tripping of the 63MVAR switchable line reactor at Jam Khambhalya PS end along with the main line breaker) after commissioning of the above system. *4.* TSP of the present scheme shall implement Inter-tripping scheme on Jamnagar – Lakadia 400 kV D/c line (for tripping of the 50MVAR switchable line reactor at Jamnagar end along with the main line breaker) after commissioning of the above system.
3.	Depiction of the scheme on Transmission Grid	**Given below**

	Map	
4.	Upstream/downstream system associated with the scheme	-
5.	Objective / Justification	RIL has requested for transition under GNA for 800MW (500MW from Oct'24 & 300MW from Mar'26) as bulk consumer at Jam Khambhaliya PS. Further, M/s EET Future has requested for transition under GNA for 1050MW (from Mar'26) as bulk consumer at Jam Khambhaliya PS and M/s RNSEL has requested for transition under GNA for 50MW (from Mar'28) as bulk consumer at Jam Khambhaliya PS. This shall result in total bulk consumer connectivity (under GNA) at Jam Khambhaliya to the tune of **1900MW**. Further, vide mails dated 12.01.2023 & 16.01.2023, M/s RIL/RNSEL has informed that cumulative capacity of 6000MW load is expected at Jamnagar by Dec'28. This translates in a total drawal requirement of 7GW (incl. 1.05GW of EET Future) in Jamnagar area. The matter was discussed in joint study meeting held amongst CEA, CTU, GRID-INDIA and GETCO on 17.02.2023 and in the 16th CMETS-WR meeting held on 27.02.2023, wherein after deliberations, transmission system was agreed to cater to Phase-I (Total 3.6GW) load in Jamnagar (~750MW) / Jam Khambhaliya (~2850MW) area and to facilitate drawl/injection of power by GETCO from Jam Khambhaliya PS. During the above meeting, it was also deliberated that the implementation timelines for the subject transmission shall be kept for 24 months. However, the transmission scheme shall be awarded for implementation after receipt of GNA / conversion of Connectivity into GNA beyond 1200MW in Jam Khambhaliya / Jamnagar complex. Now conversion of Connectivity into GNA to the tune of 1900MW has been received at Jam Khambhaliya and the proposed

		scheme is proposed to be implemented in matching time-frame of GNA applications viz. Mar'26 subject to minimum implementation time-frame of 24 months. The present scheme has been planned to enable evacuation of 3.6 GW load under phase-I in Jamnagar area of Gujarat.
6.	Estimated Cost	**3815 Crore**
7.	Impact on the total Annual Transmission charges in % along with the existing ATC	A. ATC (considering Levelized Tariff @15% of estimated cost): INR 572.25 Crore B. Present ATC: INR 45,374.29 Crore* C. A/B (%): About 1.26%
8.	Need of phasing, if any	Not Applicable
9.	Implementation timeframe	31.03.2026 subject to minimum implementation time-frame of 24 months from date of allocation to the implementing agency
10.	Inclusion of any wild life/protected area along the transmission line route	Given below
11.	Deliberations with RPC along with their comments	The scheme was discussed and agreed in the 47th WRPC meeting held on 15.06.2023
12.	System Study for evolution of the proposal	The matter was discussed in joint study meeting held amongst CEA, CTU, GRID-INDIA and GETCO on 17.02.2023 and in the 16th CMETS-WR meeting held on 27.02.2023.

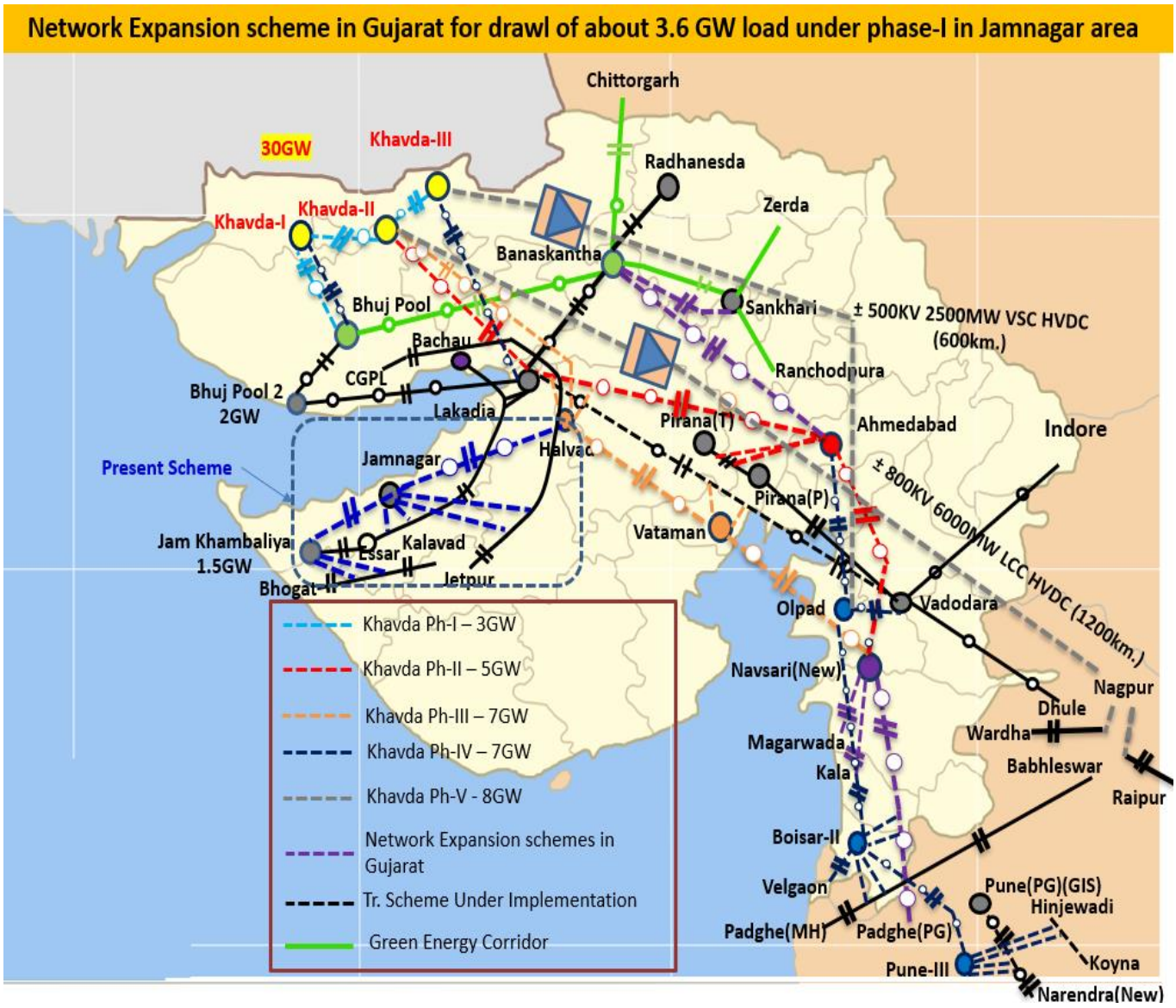
4.3.4 Detailed scope of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme	Capacity/line length km
1.	Establishment of 2x1500 MVA 765/400 kV Jamnagar(GIS) with 2x330 MVAR 765 kV bus reactor and 2x125 MVAR 420 kV bus reactor. **Future Scope**: Space for ➢ 765/400kV ICT along with bays- 4 no. ➢ 765 kV line bays along with switchable line	765/400 kV, 1500 MVA ICT-2 Nos. 765 kV ICT bays- 2 Nos. 400 kV ICT bays- 2 Nos. 330 MVAR 765 kV bus reactor-2 Nos.

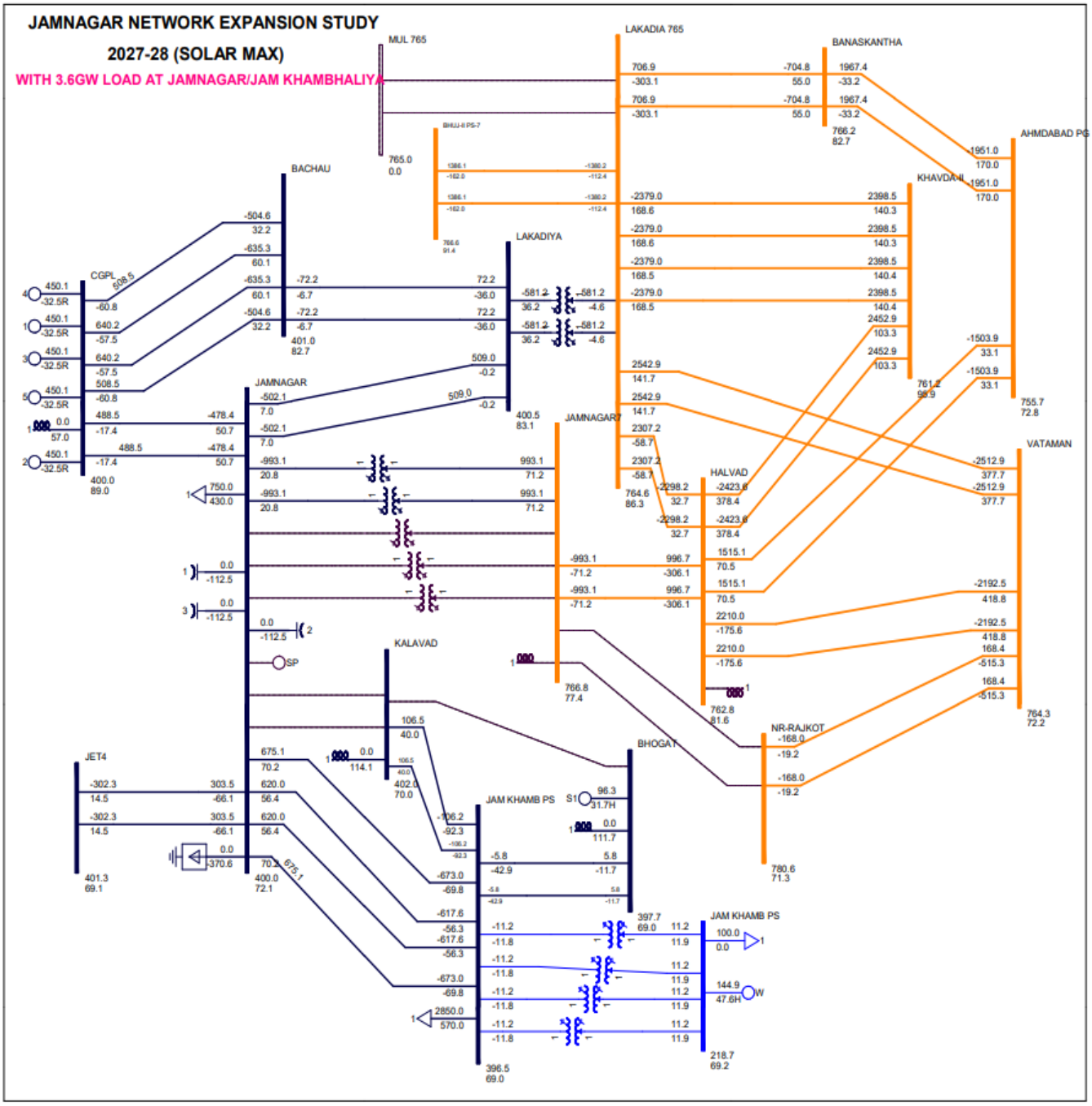
Sl. No.	Scope of the Transmission Scheme	Capacity/line length km
	reactors – 10 nos. ➢ 765kV Bus Reactor along with bay: 2 no. ➢ 765kV Sectionaliser bay: 1 -set ➢ 400 kV line bays along with switchable line reactor – 8 nos. ➢ 400/220kV ICT along with bays -6 nos. ➢ 420 kV Bus Reactor along with bay: 2 no. ➢ 400kV Sectionalization bay: 1- set ➢ 220 kV line bays: 14 nos. ➢ 220kV Sectionalization bay: 1 set ➢ 220kV BC: 1 no. ➢ Space for 80MVAR 1-ph spare reactor unit	125 MVAR 420 kV bus reactor- 2 Nos. 765 kV reactor bay- 2 Nos. 765 kV line bay- 2 Nos. 400 kV reactor bay- 2 Nos. 400 kV line bay- 10 Nos. 500 MVA, 765/400 kV 1-Ph Spare ICT-1 No. 110 MVAR, 765 kV, 1-ph reactor (spare unit for line/bus reactor)-1
2.	Halvad – Jamnagar 765 kV D/c line	170 km
3.	2 nos. of 765 kV line bays at Halvad for termination of Halvad – Jamnagar 765 kV D/c line	765 kV line bays– 2 Nos. (for Halvad end)
4.	330 MVAr switchable line reactors on each ckt at Jamnagar end of Halvad – Jamnagar 765 kV D/c line (with NGR bypass arrangement)	• 330 MVAr, 765 kV switchable line reactor- 2 Nos. • Switching equipments for 765 kV line reactor- 2 Nos.
5.	LILO of Jam Khambhaliya PS – Lakadia 400 kV D/c (triple snowbird) line at Jamnagar with conductor having ampacity equivalent to triple snowbird at nominal voltage	LILO route length 5 km.
6.	50 MVAr, 420 kV switchable line reactors on each ckt at Jamnagar end of Jamnagar – Lakadia 400kV D/c line (with NGR bypass arrangement)	• 50 MVAr, 420 kV switchable line reactor- 2 Nos. • Switching equipments for 400 kV line reactor- 2 Nos.
7.	Jamnagar – Jam Khambhaliya 400 kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line	Route Length~ 50 km.
8.	2 nos. of 400kV line bays at Jam Khambhaliya for termination of Jamnagar – Jam Khambhaliya 400kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line	• 400 kV line bays (GIS) – 2 Nos. (for Jam Khambhaliya end)

Sl. No.	Scope of the Transmission Scheme	Capacity/line length km
9.	LILO of CGPL – Jetpur 400kV D/c (triple snowbird) line at Jamnagar with conductor having ampacity equivalent to triple snowbird at nominal voltage	LILO route length 65 km.
10.	80MVAr, 420kV switchable line reactors on each ckt at Jamnagar end of Jamnagar – CGPL 400kV D/c line (with NGR bypass arrangement)	• 80 MVAr, 420 kV switchable line reactor- 2 Nos. • Switching equipments for 400 kV line reactor- 2 Nos.
11.	LILO of both ckts of Kalavad – Bhogat 400kV D/c line (Twin AL-59) at Jam Khambhaliya PS with Twin AL59 Moose equivalent conductor	• LILO route length 10 km.
12.	4 nos. of 400kV line bays at Jam Khambhaliya for LILO of both ckts of Kalavad – Bhogat 400kV D/c line	• 400 kV line bays (GIS) – 4 Nos. (for Jam Khambhaliya end)
13.	±400 MVAr STATCOM with 3x125 MVAr MSC & 2x125 MVAr MSR at Jamnagar 400kV Bus section	• ±400 MVAr STATCOM (with MSC/MSR) • 400 kV bay – 2 no. (1 no. for STATCOM and 2nd for Dia. completion)*

4.3.5 Schematic of the scheme is given below:



4.3.6 Load Flow Result (2027-28, Feb: Solar Max) is summarised below:



4.3.7 Details of Inclusion of any Wild life/protected area along the transmission line route is given below:

Sr. No.	Transmission line	WLS/NP/Buffer Zone etc.	Remarks
1	**Halvad – Jamnagar 765kV D/c line(170 kms)**	**No major NP, WLS, other protected areas observed.**	**However, for details of forest/protected areas survey is required to be done.**
2	**LILO of Jam Khambhaliya PS –**	**No major NP, WLS, other protected areas**	**However, for details of forest/protected areas survey is required to be done.**

Sr. No.	Transmission line	WLS/NP/Buffer Zone etc.	Remarks
	Lakadia 400kV D/c (triple snowbird) line at Jamnagar with conductor having ampacity equivalent to triple snowbird at nominal voltage] (5kms)	**observed.**	
3	**Jamnagar – Jam Khambhaliya 400kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line (50kms)**	**No major NP, WLS, other protected areas observed.**	**However, for details of forest/protected areas survey is required to be done.**
4	**LILO of CGPL – Jetpur 400kV D/c (triple snowbird) line at Jamnagar with conductor having ampacity equivalent to triple snowbird at nominal voltage (65kms)**	**No major NP, WLS, other protected areas observed.**	**However, for details of forest/protected areas survey is required to be done.**
5	**LILO of both ckts of Kalavad – Bhogat 400kV D/c line (Twin AL-59) at Jam Khambhaliya PS with Twin AL59 Moose equivalent conductor (10kms)**	**No major NP, WLS, other protected areas observed.**	**However, for details of forest/protected areas survey is required to be done.**

4.3.8 Members may deliberate.

4.4 North Eastern Region Generation Scheme-I (NERGS-I)

4.4.1 M/s Assam Power Distribution Company Limited (APDCL) applied for ISTS Connectivity under GNA Regulations 2022 for its new solar generation of 1000 MW to be installed in Karbi Anglong, Bokajan, Assam. It was decided that connectivity of 1000 MW may be granted to M/s APDCL for its solar generation project under GNA Regulations, 2022 with the identified augmentation in ISTS to be carried out under subject scheme and the same to be treated as Associated Transmission System (ATS).

4.4.2 The application was deliberated in the 20th CMETS-NER meeting held on 23-06-2023.

4.4.3 Details of the schemes are summarized as below:

Sl. No.	Items	Details
1.	**Name of scheme**	North Eastern Region Generation Scheme-I (NERGS-I)
2.	**Scope of the scheme**	1) Establishment of new 400 kV switching station (to be upgraded to 400/220 kV level in future) at Bokajan in Assam including 1 no. of 400 kV line bay for termination of APDCL – Bokajan 400kV S/c dedicated transmission line 2) LILO of both circuits of Misa (POWERGRID) – New Mariani (POWERGRID) 400kV D/c line at Bokajan switching station along with 420kV, 50MVAr switchable line reactor (one in each circuit) in Bokajan – New Mariani 400kV D/c line at Bokajan formed after above LILO
3.	**Depiction of the scheme on Transmission Grid Map**	Given below
4.	**Upstream/downstream system associated with the scheme**	The DTL by Ms/ APDCL viz. APDCL – Bokajan 400kV S/c line along with associated line bay at APDCL generation switchyard end.
5.	**Objective / Justification**	M/s Assam Power Distribution Company Limited (APDCL) applied for ISTS Connectivity under GNA Regulations 2022 for its new solar generation of 1000MW to be installed in Karbi Anglong, Bokajan, Assam. The application was deliberated in the 20th CMETS-NER meeting held on 23-06-2023. Brief of deliberations and outcomes/agreements by the stakeholders including the applicant is given below: a) SECI mentioned that it has not identified/declared any solar potential in the Karbi Anglog and nearby area. b) Various alternatives for interconnection of this solar generation with the ISTS was explored: i. APDCL – Misa 400kV S/c line as DTL ii. APDCL – New Kohima 400kV S/c line as DTL iii. Establishment of a new 400kV switching station at Bokajan through LILO of both circuits of Misa – New Mariani 400kV D/c

Sl. No.	Items	Details
		line & connection of generation to this switching station through DTL i.e. Bokajan – APDCL 400kV S/c line, with bay for termination of DTL at Bokajan station to be constructed under ISTS iv. Establishment of a new 400 kV switching station at Bokajan through LILO of both circuits of New Mariani – New Kohima 400kV D/c line & connection of generation to this switching station through DTL i.e. Bokajan – APDCL 400kV S/c line, with bay for termination of DTL at Bokajan station to be constructed under ISTS c) Considering the forest issues, hilly terrain of NER and completion timeline constraints, the alternative at b) iii. above was agreed for grant of Connectivity under GNA Regulations to M/s APDCL. d) Presently, 50 MVAr fixed line reactor is installed at Misa end in original Misa – New Mariani 400kV D/c line. With the LILO of the line at Bokajan, the tentative length of line sections Misa – Bokajan and Bokajan – New Mariani would be about 120 km and 140 km respectively. Keeping in view reactive compensation requirements, 50 MVAr switchable line reactor is planned at Bokajan end in the Bokajan – New Mariani 400kV line section. e) AEGCL mentioned that presently there is no requirement for drawal of power in Bokajan area but requested that space for installation of 400/220 kV ICTs and creation of 220 kV level may be kept for future interconnection to feed the loads in nearby area of Bokajan. f) In view of the above, it was decided that connectivity of 1000 MW may be granted to M/s APDCL for its solar generation project under GNA Regulations, 2022 with the identified augmentation in ISTS to be carried out under subject scheme and the same to be treated as Associated Transmission System (ATS).

Sl. No.	Items	Details
6.	**Estimated Cost**	**INR 214 Cr.** ***Note:*** *Considering the expected timeline for award of ISTS scheme (1-2 months for NCT approval & issuance of OM thereafter + about 3 months from allocation in case of TBCB) and start date of Connectivity requirements, project completion schedule has been considered as 24 months for cost estimation purpose.*
7.	**Impact on the total Annual Transmission Charges in % along with the existing ATC**	A. ATC (considering levelized tariff @15% of estimated cost): ₹32.1 Cr. B. Present ATC: ₹44617.55 Cr.* C. A/B: 0.072%
8.	**Need of phasing, if any**	Nil
9.	**Implementation timeframe**	31-12-2025 ***Note:*** *The scheme is required by 31-12-2025 matching with start date of Connectivity of M/s APDCL's 1000MW solar plant.*
10.	**Inclusion of any wildlifewildlife/ protected area along the transmission line route**	No major NP, WLS, other protected areas observed. However, for details of other forest/protected areas survey is required to be done.
11.	**Deliberations with RPC along with their comments**	Estimated cost of the ISTS scheme is less than INR 500 Cr. Accordingly, the same is not required to be sent to NERPC for deliberation in line with MoP office order no. 15/3/2018-Trans-Pt (5) dated 28-10-2021 regarding reconstitution of NCT.
12.	**System Study for evolution of the proposal**	

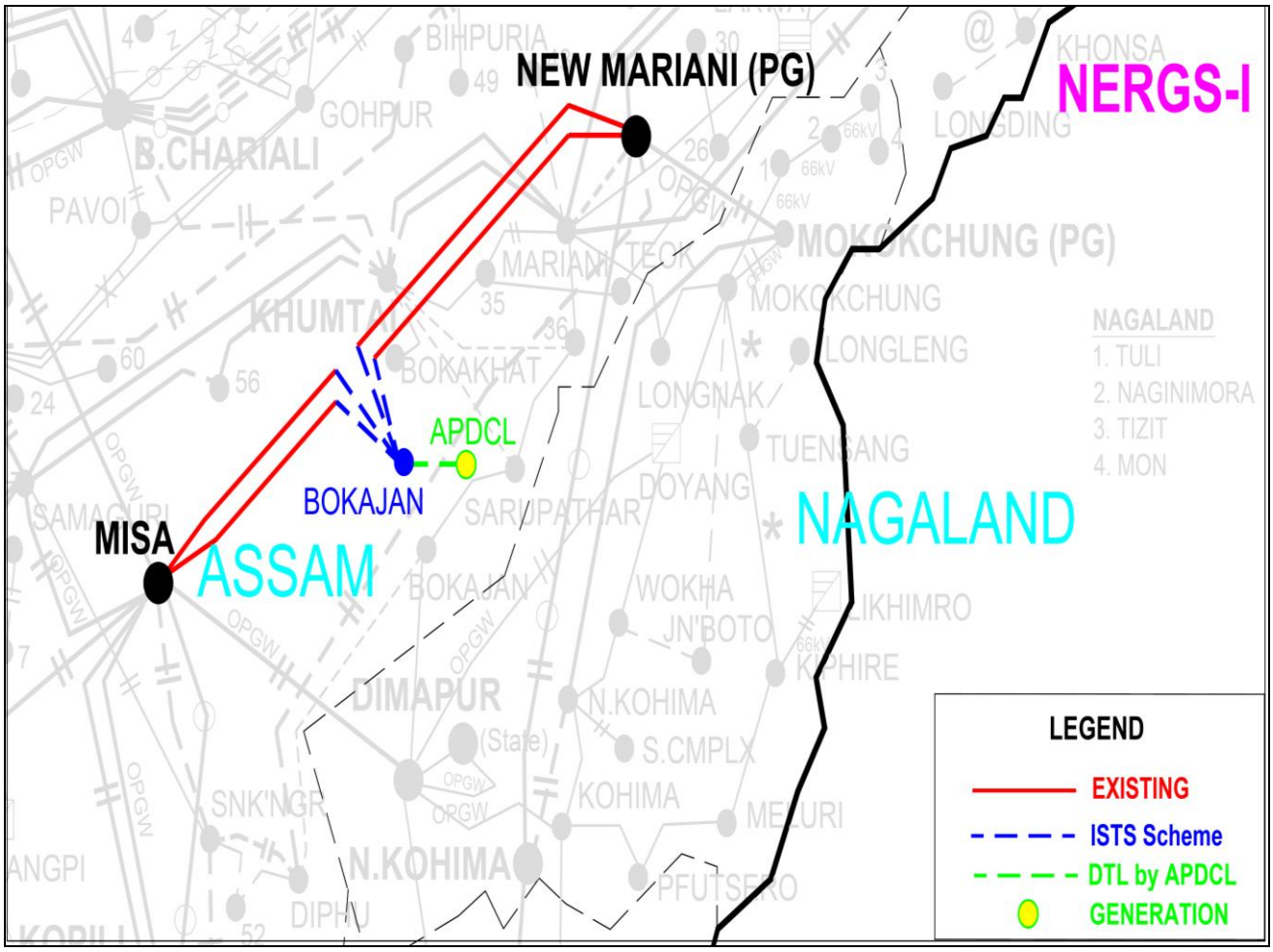
* Total YTC allowed for June 2023, as per notification of transmission charges payable by DICs for billing month of August 2023 dated 25-07-2023 published on NLDC website (available at https://posoco.in/download/notification_transmission-charges-for-dics_billing-month_august_2023/?wpdmdl=52754)

4.4.4 Detailed scope of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA) / Line length (km)/ Nos.
1.	Establishment of new 400 kV switching station	420 kV, 80 MVAr bus reactor: 2

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA) / Line length (km)/ Nos.
	(to be upgraded to 400/220kV level in future) at Bokajan in Assam **Additional space for future expansion**: - 400/220 kV, 4x500 MVA ICTs along with associated ICT bays at both voltage levels - 420 kV, 2x125 MVAr bus reactor along with associated bays - 9 nos. of 400 kV line bays (along with space for switchable line reactor) for future lines - 10 nos. of 220 kV line bays for future lines - 400 kV bus sectionaliser bay: 1 set - 220 kV bus sectionaliser bay :1 set - 220 kV bus coupler bay: 2 no. - 220 kV transfer bus coupler bay: 2 no.	Nos. 400kV bus reactor bays: 2 nos. 420 kV, 50 MVAr switchable line reactor: 2 Nos. (one in each circuit of Bokajan – New Mariani 400kV D/c line formed after LILO of both circuits of Misa (POWERGRID) – New Mariani (POWERGRID) 400kV D/c line at Bokajan) 400 kV line bays: 5 Nos. *[4 nos. for termination of LILO of both circuits of Misa – New Mariani 400kV D/c line at Bokajan (LILO under this scheme) & 1 no. for termination of APDCL – Bokajan dedicated transmission line (line under scope of M/s APDCL)]*
	LILO of both circuits of Misa (POWERGRID) – New Mariani (POWERGRID) 400kV D/c line at Bokajan	LILO route length 20 km (10 km Loop in and 10 km Loop out)

4.4.5 Schematic of the scheme is given below:



4.4.6 Members may deliberate.

4.5 North Eastern Region Expansion Scheme-XXI Part-B (NERES-XXI Part-B)

4.5.1 The existing 132 kV Badarpur (POWERGRID) switching station was commissioned in 1999 and shall be completing 25 years in service by 2024. POWERGRID the owner of the substation has informed that they are facing issues in O&M of the switching station and to improve the reliability it would be prudent to upgrade the switching station from single main and transfer bus scheme to double main transfer bus scheme by converting from AIS to GIS.

4.5.2 The scheme was also discussed in the 23rd TCC & NERPC meetings held on 18th-19th Nov 2022 wherein the subject upgradation was agreed to be carried out in Green GIS.

4.5.3 Details of the scheme are summarized below:

Sl. No.	Items	Details
1.	**Name of scheme**	North Eastern Region Expansion Scheme-XXI Part-B (NERES-XXI Part-B)

Sl. No.	Items	Details
2.	**Scope of the scheme**	Upgradation of Single Main & Transfer Bus to Double Bus arrangement with Green GIS at 132kV Badarpur (POWERGRID) switching station along with upgradation of necessary Control, Protection, Communication, Automation & LT auxiliary system ***Note:*** *As the Green GIS is being introduced for first time in ISTS in the Indian network, the ISTS transmission licensee shall involve CTU officials at various stages of implementation such as detailed engineering, design, testing, commissioning etc., and also after commissioning, so as to assess the environmental impact, operational performance, ageing characteristics etc. of the Green GIS.*
3.	**Depiction of the scheme on Transmission Grid Map**	
4.	**Upstream/downstream system associated with the scheme**	Nil
5.	**Objective / Justification**	The existing 132kV Badarpur (POWERGRID) switching station was commissioned in 1999 and shall be completing 25 years in service by 2024. POWERGRID the owner of the substation has informed that they are facing issues in O&M of the switching station and to improve the reliability it would be prudent to upgrade the switching station from single main and transfer bus scheme to double main transfer bus scheme by converting from AIS to GIS. Further, towards adoption of new technology in the Indian Grid, it was proposed that the upgradation could be carried out as Green GIS instead of conventional GIS owing to the following benefits: • Green GIS is a new technology in which SF_6 gas is not used and this technology is being adopted by several countries in the world.

Sl. No.	Items	Details
		• This would help in the reduction of usage of Green House Gas and would be a step towards achieving sustainable development targets. The scheme was also discussed in the 23rd TCC & NERPC meetings held on 18th-19th Nov 2022 wherein the subject upgradation was agreed to be carried out in Green GIS. The proposal was deliberated in 16th CMETS-NER held on 24-02-2023 wherein following was decided to be implemented in ISTS: • Upgradation of Single Main and Transfer Bus to Double Bus arrangement with Green GIS at 132kV Badarpur (POWERGRID) switching station Upon finalization of the above scope a committee comprising of officials from CTU and POWERGRID visited Badarpur substation for finalization of the implementation modalities of the above agreed scope of works. The committee submitted a report wherein it is suggested the scope of works may be refined as per the actual site conditions. Accordingly, the proposal was once again discussed in the 20th CMETS-NER meeting held on 23rd June 2023 and revised scope of works (as mentioned below) under subject scheme was agreed with an implementation schedule of 30 months keeping in view implementation of new technology of Green GIS in ISTS: • Upgradation of Single Main & Transfer Bus to Double Bus arrangement with Green GIS at 132kV Badarpur (POWERGRID) switching station along with upgradation of necessary Control, Protection, Communication, Automation & LT auxiliary system ***Note:*** *As the Green GIS is being introduced for first time in ISTS in the Indian network, the ISTS transmission licensee shall involve CTU at various stages of implementation such as*

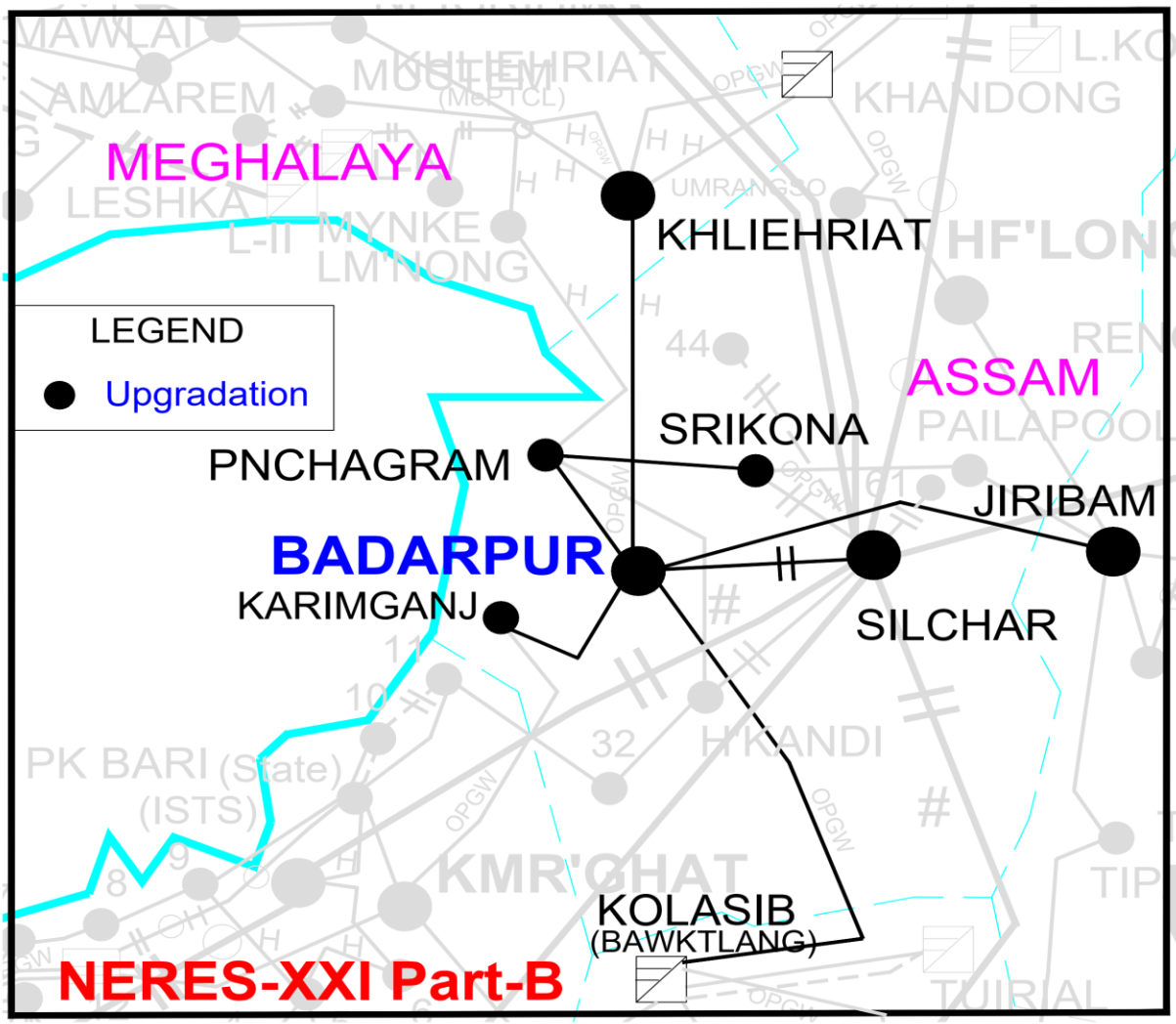
Sl. No.	Items	Details
		detailed engineering, design, testing, commissioning etc., and even after commissioning, so as to assess the environmental impact, operational performance, ageing characteristics etc. of the Green GIS.
6.	**Estimated Cost**	INR 110 Cr. ***Note:*** *CTU has done the cost estimation on quotation basis for the first time in India for new technology based on Green GIS. The practice for such type of cost estimate being followed by POWERGRID Cost Engg. was discussed with them, and it was gathered from them that lowest budgetary quote is considered for estimating the cost of such scheme. Accordingly, the cost estimate for this scheme has been worked out as per the said assumption i.e. lowest budgetary quote has been considered.*
7.	**Impact on the total Annual Transmission Charges in % along with the existing ATC**	D. ATC (considering levelized tariff @15% of estimated cost): ₹16.5 Cr. E. Present ATC: ₹44617.55 Cr.* F. A/B: 0.037%
8.	**Need of phasing, if any**	Nil
9.	**Implementation timeframe**	30 months from date of allocation
10.	**Inclusion of any wildlife/ protected area along the transmission line route**	No
11.	**Deliberations with RPC along with their comments**	Estimated cost of the ISTS scheme is less than INR 500 Cr. Accordingly, the same is not required to be sent to ERPC for deliberation in line with MoP office order no. 15/3/2018-Trans-Pt (5) dated 28-10-2021 regarding reconstitution of NCT.
12.	**System Study for evolution of the proposal**	Refer justification at Sl. No. 5 above.

4.5.4 Detailed scope of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme	Capacity/ km	Estimated Cost (₹ Cr.)

1.	Upgradation of Single Main & Transfer Bus to Double Bus arrangement with Green GIS at 132kV Badarpur (POWERGRID) switching station along with upgradation of necessary Control, Protection, Communication, Automation & LT auxiliary system ***Note:*** *As the Green GIS is being introduced for first time in ISTS in the Indian network, the ISTS transmission licensee shall involve CTU officials at various stages of implementation such as detailed engineering, design, testing, commissioning etc., and also after commissioning, so as to assess the environmental impact, operational performance, ageing characteristics etc. of the Green GIS.*	-	110
	Total		**110**

4.5.5 Schematic of the scheme is given below:



4.5.6 Members may deliberate.

5 Draft Guidelines on Assessment of Timeframe for Execution of Transmission System

5.1 In the meeting taken by Secretary (Power) on 24th May, 2023, it was decided that CEA shall prepare a guideline to estimate the timeframe for the execution of the transmission system awarded either under Tariff Based Competitive Bidding (TBCB) or under a Regulated Tariff Mechanism (RTM).

5.2 Subsequently, MoP vide letter dated 03.07.2023 has directed that NCT will indicate the tentative implementation timeline of the project in the detailed scope of the project. The timeline will be finalised with the approval of Chairperson, CEA, based on the detailed survey report furnished by the BPCs to CEA and same shall be indicated in the RfP document published by BPCs.

5.3 Accordingly, CEA in consultation with various stakeholders, examined the main factors affecting the implementation timeline of the transmission projects and the reasonable time required for each activity has been finalized.

5.4 These guidelines will be helpful in estimating the time required for the implementation of the transmission projects.

5.5 The draft guidelines are enclosed at **Annexure-III.**

5.6 Members may deliberate.

6 Nomination of Members from RPCs to NCT

6.1.1 SRPC vide letter dated 26.06.2023 mentioned that**,** in the 46th SRPC meeting the SR States opined that that a member from RPC should be part of NCT for a consultative approach towards optimal ISTS development and due to strong interdependence of Inter State Transmission System (ISTS) and lntra State Transmission System (InSTS) planning. The respective RPC member shall convey the views of RPC /consensus arrived at RPC in respect of the ISTS schemes being planned in the NCT meetings in more coherent manner. It was suggested that Chairperson, TCC of RPC may be a member of NCT.

6.1.2 Members may deliberate.

7 Time Schedule for OPGW installation schemes on existing lines on live line condition

7.1 In 11th NCT meeting 6 nos. of communication schemes were approved for OPGW installation on existing lines in live line condition. Out of Six schemes 5 nos. were awarded to POWERGRID in RTM mode and 1 no. to Indigrid in RTM mode. The five nos. scheme awarded to POWERGRID had the implementation schedule varying from 18-24 months.

7.2 The timeframe for implementation of OPGW schemes in live line condition as stated by CTUIL was based on the inputs received from various TSPs. CTU generalised the implementation timeframe for lines less than 200 km as 18 months and for lines greater than 200 km, as 24 months.

7.3 However, POWERGRID after receiving the award letter dtd. 17.02.2023, requested CTU to revise timeframe of OPGW installation from 18/24 months to 36 months vide their letter dtd. 28.03.2023 in view of following constraint being faced by POWERGRID in live line installation:

(1) Requirement of PTWs (Permit to Work) from Grid-India & difficulties due to power system constraints.

(2) Limited working window (during dry seasons). Work hampered in rainy season, water logging in fields post rains, in winter seasons due to fog & snow, crop harvesting period etc.

(3) Limited number of contracting agencies are available after Public Procurement (Preference to Make in India) orders of DOT & MoP. Further, General Financial Rules (Rule 144 (xi) issued by Dept of Expenditure, Ministry of Finance on 23.07.2020) has also impacted supply and installation (Live-Line) of OPGW (03 bidders' only) and Communication Equipment (02 OEMs only).

(4) As per their previous experience of such packages POWERGRID informed in their letter that around 45 kms./ month installation progress received in live line condition.

7.4 The matter was put up to CEA for deliberations, wherein CEA replied that since these schemes are approved by NCT so deliberations in this regard shall be taken up to NCT forum.

7.5 However, M/s Indigrid has not requested for any such change. In view of above the time schedules for the schemes approved for POWERGRID in the 11th NCT and future schemes may be reviewed by NCT.

7.6 Member may kindly deliberate.

8 Any other issues, with permission of chair

पावरग्रिड POWERGRID

पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड
(भारत सरकार का उद्यम)
POWER GRID CORPORATION OF INDIA LIMITED
(A Government of India Enterprise)

Ref: C/HVDC/RFP/BF/01

Date: 09.08.2023

Shri P C Garg
Chief Operating Officer
Central Transmission Utility of India Ltd
"Saudamini", 1st Floor, Plot No.2, Sector- 29,
Gurugram, Haryana – 122 001

Subject: Request for Proposal (RFP) for selection of Bidder as Transmission Service Provider (TSP) to establish Inter-State Transmission system for "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part I": Extension of Commissioning Schedule of the Project - reg.

Dear Sir,

In reference to the RFP floated by RECPDCL for selection of TSP on "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part I". The scope, inter-alia, includes establishment of ±800kV, 6000MW HVDC[LCC] terminal stations each at Bhadla and Fatehpur. POWERGRID intends to participate in the bidding of this project. However, based on its experience of execution of similar projects in the past as well as discussions held with the HVDC OEMs/Contractors, the bidding for this project needs to address the key issue of the SCoD of the subject project.

The SCoD of the project is indicated as 42 (forty-two) months as per RFP documents. It may be noted that there are only a limited number of HVDC Terminal OEMs/Contractors for HVDC Projects available worldwide, who, at present, are overwhelmed with high volume of orders from various European Countries and other parts of the world as well. As a result, as intimated by them, execution of new HVDC projects requires more time at present. Upon interactions with potential OEMs/HVDC terminal suppliers, it emerged that time required for commissioning of both the bipoles under the subject project would be at least 60 months from the effective date of TSA. Copy of communications received from potential suppliers is enclosed.

It is requested to kindly review the execution schedule of this project in terms of increasing the SCOD to 60 (sixty) months.

Thanking You,

Yours faithfully,

सुबीर

(Dr. Subir Sen)
ED (Engg- HVDC)

Encl: As Above.

GE T&D India Limited
L31102DL1957PLC193993

T-5 & T-6, Plot I-14
Axis House, Jaypee Wishtown
Sector -128, Noida-201304

T +91 120 5021500

Ref: GS/KS/PGCIL/HVDC/01

Date: 18/07/2023

To:
Power Grid Corporation of India Limited,
`Saudamini', 3rd Floor, Plot No.-2, Sector-29,
Gurugram (Haryana) - 122001.

Kind Attn: Mr. Subir Sen (Executive Director – HVDC & Engineering)

Sub: Timelines for Bhadla Fatehpur HVDC project.

Dear Sir,

This is with reference to the RFP floated by M/s. RECPDCL for Bhadla Fatehpur HVDC project. We have noted that the timeline for "scheduled COD from effective date" has been mentioned as 42 months.

Delivery of such large projects in 42 months in the current global HVDC market scenario, is not realistic.

GE is keen to participate in the subject tender and strongly request to review the completion timeline. We believe we would be able to execute such a project in not less than **60 months** considering limited manufacturing capacity, supply-chain constraints, and already ongoing projects around the world.

We request you to kindly review the completion schedule.

We had already submitted a request letter in this regard to M/s. CEA. A copy of the same is enclosed herewith for your ready reference.

Thanking you in anticipation of your prompt response and ensuring you of our best services always.

For GE T&D India Limited

GE T&D INDIA LIMITED

Rakesh Singh
Capture Team Leader – HVDC

HITACHI
Inspire the Next

Ref. No.: PGCIL/HVDC/2023/01

Date: 9th June'2023

To,
Mr. Subir Sen
ED-Engineering
Power Grid Corporation of India Limited
Soudamini, Plot No.2, Sector 29,
Gurgaon-122001

Sub: Request to change Implementation timeframe of upcoming Bhadla-Fatehpur HVDC opportunity through TBCB

Ref: Minutes of 9th meeting of National Committee on Transmission (NCT)

Dear Sir,

This is in reference to the implementation time frame for "Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part I" scheme approved in Minutes of 9th meeting of National Committee on Transmission. We understand that PGCIL is a potential developer and planning to participate in same.The scheme includes establishment of 6000MW (2 Bipoles), +/-800kV HVDC (LCC) converter stations at Bhadla and Fatehpur for which the implementation timeframe is mentioned as 42 months.

Hitachi Energy is pioneer of HVDC technology and has implemented numerous HVDC converter stations all around the world including India. Based on the execution experience of similar mega HVDC projects in India, we are of the understanding that proposed time frame of 42 months will be inadequate. Considering the present global market uncertainties on supplies of components & their new lead times, our previous execution time lines will not hold good for projects coming up for execution in the near future.

Also, this project includes implementation of two bipoles and single stage commissioning will reduce the efficiency of project as there is natural float available between commissioning of two bipoles.

Although, execution time of such projects is contingent on exact commencement dates. Considering the current conditions and previous experience, commissioning of this project would require at least 49 months for Bipole-1 and 54 months for Bipole-2 from commencement date of contract award placed on OEM (Ordering timeline needs to be considered in addition to this).

In view of above, we would request you to kindly consider to change the implementation timeframe of the converter stations accordingly. We look forward to your kind consideration.

For and on behalf of Hitachi Energy India Limited (formerly known as ABB Power Products and Systems India Limited)

HITACHI ENERGY INDIA LIMITED (Formerly Known as ABB Power Products and Systems India Limited)

Saji.S

Senior Vice President – HVDC India

Hitachi Energy India Limited
(Formerly known as ABB Power Products and Systems India Limited)

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Hitachi Energy

Dr. Puneet Tyagi {पुनीत त्यागी}

From: Jain, Niket <niket.jain.ext@siemens-energy.com>
Sent: 28 July 2023 11:42
To: Dr. Puneet Tyagi {पुनीत त्यागी}
Cc: ptd, Nileshwer
Subject: 2023-07-28_FB6000_RFP_Annexure-C_Comments_List.pdf
Attachments: White_Paper_LCC-vs-VSC_RE_Integration_India_Jul-2023.pdf; 2023-07-24_FB6000 _RFP_Annexure-C_Comments_List.pdf

Dear Sir,

We take reference to the **Request for Proposal for selection of Bidder as Transmission Service Provider through tariff based competitive bidding process to establish Inter-State Transmission system for "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part I"** issued on 11 Jul 2023 by REC Power Development and Consultancy Limited.

1) Please refer our last email dated 17 Jul 2023 to PGCIL TBCB Cell (scroll below for ready reference). We wish to reiterate our concerns as follows:

   - Practically all HVDC transmission systems that are currently in operation or being planned for RE integration around the world use VSC technology. Out of the more than 50x HVDC contracts finalized globally in last 5 years, more than 95% of the schemes are VSC based. This global trend is clear indication that LCC is approaching end of life / obsolescence.
   - There are potential pitfalls of using LCC technology for RE integration, that could pose serious concern to the security and stability of the continuously changing grid. VSC technology not only overcomes the technical constraints of LCC for large scale RE integration, but it also offers several additional benefits over the LCC technology e.g. Blackstart / STATCOM / Grid Forming capability, etc. that would significantly enhance the flexibility, stability, security and reliability of the grid.
   - There is an illusion / misplaced perception that LCC scheme has lower CAPEX. Due to its inherent limitations, we consider LCC for RE Integration as blocked investment with low return over its lifetime. On the other hand, VSC technology offers significant return & value over time.

   Please refer attached White Paper in this regard.

   We hope and request that PGCIL takes up these concerns with RECPDCL and associated stakeholders viz. CEA, CTUIL, GRID-INDIA, etc. & convince them to take a long-term holistic view and choose a technology that is future ready, state of the art and globally being deployed for RE integration – in other words use VSC based HVDC technology for Bhadla-Fatehpur.

2) Though we do not recommend LCC technology for RE Integration in the Indian network, nevertheless we have done a preliminary review of the HVDC Specification (Annexure-C of RfP) from an overall grid integration perspective and provided our technical comments in attached document: "2023-07-24_FB6000_RFP_Annexure-C_Comments_List". It is advised to carry out suitable FEED study to assess the technical feasibility & performance constraints of the LCC scheme for RE rich region like Bhadla.

   Please note that we have not reviewed the HVDC station related parts of the specification – the same was considered unnecessary since we do not recommend LCC technology for RE integration.

3) We request you to reconsider the Implementation Time for HVDC projects. Kindly note that there is a robust development of the global HVDC market in the last 3-4 years. This upsurge in demand for HVDC solutions is expected to continue over the next several years. On the other hand, there are also hurdles for implementation (which in turn affect the pace of growth) caused due to global supply chain constraints, political factors (e.g. Ukraine crisis), lack of sufficient qualified resources, etc. Hence, almost every Transmission Utility / Planning Agency around the globe is planning in advance and with extended Time for Implementation of HVDC schemes.

As per global trends, Implementation Time given to HVDC OEM is typically 60 months for a bipolar scheme, subject to conditions e.g. readiness of prospective Developer to sign MoU / Preferred Supplier Agreement (PSA) to reserve an execution slot sufficiently in advance, etc. For arriving at overall Implementation Time, additional time (if any) required for non-concurrent tasks that are in Developer / BPC's scope e.g. financial closure, permits, licenses, land, etc. may be considered.

We request & hope that existing bidding / contract award process in India will be adapted in line with global market trends so that upcoming HVDC projects in India are considered attractive and ensure sustainable business for all HVDC OEMs.

We hope that we have been able to provide the information you seek & apprise you of our concerns. We hope that appropriate action would be taken by relevant authorities to mitigate the concerns raised by us. In case of any queries, please feel free to contact the undersigned.

P.S. Our commenting on the HVDC Specification for Bhadla-Fatehpur shall not be construed as any kind of validation that LCC technology is deemed suitable for RE integration.

Thanking you and assuring you of our cooperation always,

With best regards,

Niket Jain.
HVDC Technical Sales
+91 9971953311

From: Jain, Niket (ext)
Sent: Monday, July 17, 2023 3:49 PM
To: 'aksinghal1@consultant.powergrid.in' <aksinghal1@consultant.powergrid.in>
Cc: 'ppandey@powergrid.in' <ppandey@powergrid.in>; 'Virdi, Rajeev' <rajeev.virdi@siemens.com>; ptd, Nileshwer (ext) <nileshwer.ptd.ext@siemens-energy.com>
Subject: FW: Transmission System for RE Integration by 2030 - HVDC VSC is preferred choice globally

Dear Sir,

This has reference to our telecon on 14 Jul 2023 (Friday) regarding upcoming LCC schemes for RE integration.

We request your attention to the concerns expressed in our various emails below. We have repeatedly highlighted the potential pitfalls of using LCC technology for RE integration (e.g. Bhadla-Fatehpur, Khavda-Nagpur, etc.), and instead strongly advocated using latest & state-of-the-art VSC technology to ensure long term availability, reliability, stability & security of the Grid. Please see the first attachment "LCC-vs-VSC_RE_Integration_India.pdf" for details.

Furthermore, we have provided our recommendation regarding Implementation Time and shared the global market trends for HVDC contract award / implementation. We hope that existing bidding / contract award processes will be adapted in line with these global market trends so that upcoming HVDC projects in India are considered attractive and ensure sustainable business for both Developers and HVDC OEMs. Please refer the second attachment "2023-Jun_HVDC-Market-Trends.pdf" for details.

In case of any queries, please feel free to contact the undersigned.

Thanking you and assuring you of our cooperation always,

Best regards,

Niket Jain
HVDC Technical Sales
+91 9971953311

6	**30. Issues in Detailed Procedure for Connectivity and GNA to ISTS** ***Decision:*** *CTUIL agreed to conduct a physical presentation/ interaction session with SR Utilities on the Detailed Procedure for Connectivity and GNA to ISTS with SR utilities.*	CTUIL had conducted a workshop on the detailed procedure for Connectivity and GNA to ISTS for SR constituents on 28.11.2022	
7	**34. Study programme on the integration of renewable energy sources into the grid.** ***Decision:*** ✓ SRPC approved the Study Programme to be taken up through PSDF Funding. ✓ After approval of the detailed proposal by Chairperson, SRPC, SRPC Secretariat would submit the scheme to NLDC for PSDF funding.	After the approval of Chairperson, SRPC, SRPC vide letter dated 17.01.2023 had submitted a Detailed Project Report/Detailed Proposal to NLDC (Nodal Agency-PSDF).	Covering letter of the Detailed Proposal / DPR submitted to NLDC at **Annexure-ATR.6**

4. ISTS Network Expansion scheme "Transmission Scheme for integration of Renewable Energy Zones in Davangere/Chitradurga and Tumkur area of Karnataka"

4.1 CTUIL vide letter dated 10.02.2023 (**Annexure-4a**) informed that the ISTS Network Expansion Scheme "Transmission Scheme for integration of Renewable Energy Zones in Davangere/Chitradurga and Tumkur area of Karnataka" had been identified as part of integration of 500 GW RE Capacity by 2030 and a Report on Transmission System for Integration of over 500 GW RE Capacity was published by CEA on 07.12.2022. The schemes were discussed and agreed in the 14th CMETS (SR) held on 26.12.2022. The estimated cost of the schemes is Rs. 1553 Crores.

4.2 It was stated that the transmission schemes would facilitate integration and immediate evacuation of RE potential of 4 GW from Davangere/ Chitradurga and 1.5 GW from Tumkur areas. The transmission scheme would also act as an enabler towards achieving the Govt. of India target of establishing 500 GW capacity from non-fossil based energy sources by 2030. Presently, CTU has not received any Stage-II Connectivity applications for above locations.

4.3 Accordingly, CTUIL in line with Para 6 (3A) & Para 11 of MoP Gazette dated 03.12.2021 on resolution for establishment of SRPC requested that SRPC may forward their views in respect of the subject ISTS scheme so that the subject transmission schemes may be taken up promptly for consideration in the NCT meeting along with the views of SRPC.

TCC Deliberation

4.4 MS, SRPC briefed the ISTS Network Expansion Scheme "*Transmission Scheme for integration of Renewable Energy Zones in Davangere/Chitradurga and Tumkur area of Kamataka*" identified as part of integration of 500 GW RE Capacity by 2030 and requested CTUIL to elucidate further on the scheme.

4.5 CTUIL apprised the forum that the proposed scheme was identified to facilitate evacuation of RE potential of 4 GW from Davangere/ Chitradurga and 1.5 GW from Tumkur areas of Karnataka. It was informed that RE evacuation from these areas were prioritised as brought out in the Report on Transmission System for Integration of over 500 GW RE Capacity published by CEA on 07.12.2022 and CTUIL was requested to evolve transmission scheme for evacuation of the same. The scheme was deliberated in 14th CMETS (SR) held on 26.12.2022 and put forth for the views of SRPC to take up the scheme for approval in NCT. They further informed that the scheme has been planned in a phased manner and minimum transmission scheme for evacuation of the identified potential only has been proposed. It was stated that the scheme intends to integrate the proposed Davangere/Chitradurga RE Pooling station with already approved Koppal-II Pooling Station through 400kV D/C line. Koppal-II Pooling station is with Ministry of Power for approval and identification of implementation methodology and implementation route.

4.6 Further elucidating on the scheme, CTUIL informed that nearly 17 GW RE potential has been identified in the state of Karnataka and transmission system of Koppal-II PS would take care of evacuation of power of Gadag-II, Davangere/ Chitradurga, Bijapur and Bellary Pooling Stations. Nearly 9 GW RE power was slated to be evacuated through Koppal-II transmission system, which was connected to Narendra-New and Raichur transmission systems. Koppal-II Pooling Station was stated to have three voltage levels – 220kV, 400kV and 765kV.

4.7 W.r.t. Tumkur Pooling Station, CTUIL informed that the same has been proposed for integration of 1.5GW RE power assessed by SECI and MNRE. It was stated that only minimal transmission system to integrate the proposed Tumkur Pooling station with the existing Tumkur Pooling Station through a D/C line has been proposed.

4.8 CTUIL requested the forum to recommend the transmission scheme in order to ensure timely implementation of the scheme. It was clarified that no connectivity applications have been received at Davangere/ Chitradurga and Tumkur areas and once approved by the NCT, implementation would be taken up only after visibility of RE projects.

4.9 In this regard, TSTRANSCO enquired regarding the impact on RE evacuation in the event of outage of the proposed transmission system as there are only 2 existing high power corridors. CTUIL informed that there are several parallel high capacity corridors integrating NEW grid and SR grid at different voltage levels. 765kV Kolhapur PG - Narendra New – Madhugiri– Salem- Tuticorin PS Corridor,765kV Sholapur – Raichur – Kurnool- Cudappah -Thiruvalam Corridor, 765kV Wardha – Nizamabad – Maheshwaram – Kurnool Corridor, Chandrapur HVDC, under implementation 765kV Warora – Warangal D/C line between SR &WR and 800kV Raigarh – Pugalur HVDC bipoles, 500kV Talcher- Kolar HVDC bipoles, 765kV Angul – Srikakulam -Cudappah -Thiruvalam Corridor, Gazuwaka HVDCb2b

connecting ER to SR.CTUIL further apprised that all the integrations at different voltage levels ensure that loss of any one corridor does not hamper import / export of SR region completely. These inter-regional transmission elements had been/ are being planned in line with CEA transmission planning criteria in order to ensure maximum reliability of the import/ export requirements of SR region. Also informed that some of these inter-regional transmission elements are planned to be integrated with future elements as well. CTUIL apprehended that even though ISTS network is capable of delivering the load requirement of SR region but STU network is under developed and need to be evolved for the same.

4.10 Chairperson, TCC & Director (Tr.), TSTRANSCO expressed concern that with the integration of nearly 80GW RE power by 2030, the variability and behaviour of conventional generators need to be examined, and opined that the minimum load of the region shall also be considered for planning of transmission system.

CTUIL responded that system studies as part of 500GW RE integration report has been carried out by CTUIL and CEA. The study files had also been circulated to all stakeholders and any further studies of interest may be conducted in Joint studies meeting of SR. It was explained that in certain cases of the 9 number of scenarios of system studies, some of the units of conventional generators need to be switched off for obtaining load generation balance. Various scenarios had been considered in the study of the proposed system, and no issues were observed. In case of any major shift in load generation balance, analysis of the proposed system would be carried out again and necessary corrective action would be taken.

4.11 TSGENCO expressed concern regarding overvoltage occurring in the system when the proposed lines are lightly loaded during lean RE period. They also enquired regarding the quantum of reactors needed to mitigate the overvoltage generated by the proposed lines as well as the lines planned to be kept open in case of sustained overvoltage.

CTUIL stated that SR region is having a typical LGB pattern wherein RE generation of the region is not of much help during its peak demand season of February to April and high amount of RE poses serious grid imbalances during lean demand season. Further added that SR's interregional links help in huge import of power from NEW grid during peak demand season as well as aid in export of power during lean demand and high RE season. Explained that several reactors planned/ envisaged to come up in STU as part of various schemes in the past had been delayed exceedingly, and this has resulted in severe over-voltages in the grid. Further, reactive power injection into ISTS system from STU network through 400/220kV ICT was also stated to be a reason for over-voltages in the grid. Also informed that in certain locations under-voltages as well as over-voltages have been observed at different point of time. CTUIL further opined that in order to optimise planning of reactors, under certain circumstances shutdown of one circuit of the double circuit lines is necessary so that they do not generate unnecessary reactive power and maintain proper voltages.

4.12 TSGENCO opined that CTUIL need to take necessary actions during planning stage itself to restrict the huge voltage variations due to changing load patterns, RE injection etc.

SRLDC informed that the load curve has changed from what it used to be to accommodate available RE generation. Referring to the load variation of Telangana, SRLDC apprised the forum that load pattern was found to have changed from 15000MW (during peak hours) to 7000 MW (during off-peak hours). As the transmission line cannot be designed for both the scenarios, overvoltage was observed to be occurring during light load periods. Added that in order to control the overvoltage problem in Telangana nearly 8-10 lines are opened daily.

TSGENCO opined that in the state of Telangana, transmission lines dedicated to lift irrigation schemes can be opened to curb the over-voltages but in an all India perspective with the kind of redundant systems being built for accommodating the variability of generation and demand, balancing the grid under various situations would be challenging.

CTUIL responded that it is the collective responsibility of all stakeholders in proper planning of the system, timely implementation of the system and balancing of the system, and informed that they are carrying out nationwide analysis for RE projects in order to identify weak buses and STATCOM requirement would be firmed up in consultation with experts of the field.

4.13 In this regard, KSEBL enquired regarding status of location wise details of BESS implementation by MNRE / SECI. CTUIL responded that BESS implementation policy is under preparation and once notified, the same would be shared with the forum.

4.14 SRLDC requested that all pooling stations be provided with STATCOM for controlling the voltages dynamically, learning from the experience of tripping of RE pooling stations of Northern Region. Large variations in SCR of these Pooling stations often lead to huge voltage variations. STATCOM with MSR and MSC was stated to help in reducing voltage variations.

ED, SRLDC stated the proposed scheme may be agreed upon.

4.15 MS, SRPC stated that the transmission system proposed was minimal and may be recommended to NCT. He sought the views of SR constituents on the proposed scheme.

4.16 APTRANSCO informed that if the proposed scheme is aiding the import / export requirements of SR region, the same can be recommended. They sought clarity regarding whether STATCOM needs to be provided at Pooling station level or Grid level. CTUIL responded that RE Project Developers need to provide reactive power compensation as mandated by Regulations; additionally, at some weak grid points, support in form of STATCOM may be planned after proper studies. APTRANSCO expressed concern that many RE Project Developers have been violating the requirement of providing reactive power support and are not providing as mandated by regulations.

4.17 In this regard, ED, SRLDC re-iterated that presently the FTC clearance for RE power developers is provided only after ensuring strict compliance to all Regulations including necessary reactive power support. He further apprised the forum that in the entire country, nearly 4000MW is awaiting FTC clearance but have not been allowed due to non-providing of required reactive power support.

CTUIL endorsing the views of SRLDC informed that presently interconnection of RE to grid is allowed only after ensuring compliance to Connectivity Regulations.

ED, SRLDC requested all STUs to ensure the same with regard to RE Developers seeking connectivity to STU network as per CEA Standards for Connectivity to Grid. It was informed that the recommendations of the Working Group (WG) constituted under the Chairmanship of Member (GO&D), CEA for addressing the issues related to compliance of CEA Technical Standards for Connectivity to the Grid by RE plants came into effect from November 2022; as per which one-year time has been provided for existing RE Developers to comply with the Regulations.

4.18 KPTCL stated that they have concerns w.r.t the effect of the proposed RE schemes coming up in Karnataka on their 220kV downstream network and had sought clarifications on the same from CEA. CEA had replied to them that the same would be studied in Joint Studies meeting. It needs to be studied in Joint Studies meeting.

4.19 KSEBL opined that the scheme shall be taken up only after ensuring visibility of RE developers at Davangere/ Chitradurga and Tumkur areas and development of redundant assets shall not be allowed. CTUIL assured that implementation of the scheme shall be taken up only after ensuring the same, approval process is being taken up only to avoid bottling-up of RE power generation which have low gestation period.

4.20 TANGEDCO informed that during 14th CMETS (SR), they had requested for Joint Studies for the proposed scheme, but the same had not been carried out. Informed that as SR is having allocation from solar generation projects in NR & WR and the RE generation projects in SR are having their beneficiaries in NEW grid, off-setting of counter RE allocation may be worked out as suggested during Joint Studies meeting of SR region held on 21-21 February 2023. Further added that phasing of the transmission scheme along with the tie-up of firm beneficiaries shall be taken up. They also requested SECI to bring on record the details of Stage-II Connectivity as on date for entire country. It was stated that many applications are based on target region; and in the absence of firm beneficiaries the same shall lead to bottling up of power as well as development of redundant transmission schemes. Considering the impact of the proposal on tariff of all Discoms, the scheme has to be evolved through Joint Studies and they requested for the same. CTUIL responded that as the scheme was part of CEA's plan, CTUIL would not be able to convene Joint Study meeting for the same. It was also informed that CEA has already phased the scheme, by considering 50% injection at 220 kV level and 50% at 400 kV level thereby deferring the ICT requirement. They also pointed out that counter allocations was deliberated as part of additional inter-regional link and may not be part of the subject matter.

4.21 TANGEDCO enquired regarding implementation of BESS.

CTUIL informed that it would not be implemented as part of ISTS network and is planned to be considered as part of Generation Project. Added that SECI is coming up with location based bids with Round The Clock (RTC) Tenders. These tenders were stated to be having RTC provisions or PSP provisions thereby optimising the transmission system requirement, but currently BESS is delayed due to lack of Policy regarding implementation of the same.

TANGEDCO re-iterated that finalisation of any scheme proposed as part of 500 GW RE integration needs consultation with stakeholders and Joint Study shall be conducted for the same. Impact of the proposed schemes on downstream network, requirement of strengthening of the STU network, funding methodologies for the same etc. were included as part of 175GW RE integration report and the same shall be made part of present report as well.

4.22 Puducherry ED opined that as the money invested in power sector is borne by the end consumer, all investment proposals need to be scrutinised systematically. Hence the proposal may be studied in Joint Studies meeting.

4.23 MS, SRPC stated that all observations and concerns of TCC shall be put before SRPC forum for further deliberation, and finally to NCT through CTUIL.

SRPC Deliberation

4.24 MS, SRPC briefed the SRPC about the deliberations in TCC.

4.25 SRPC noted the individual views of the SR Constituents.

4.26 Chairperson, SRPC and CMD TSTRANSCO & TSGENCO opined that the existing corridor shall be utilised to the full extent before planning of new systems. Phasing of the system was requested to avoid burdening the end consumer for redundant assets.

4.27 CTUIL responded that mere collection of power at Davangere/ Chitradurga and Tumkur Pooling stations and pushing it to existing Koppal-II PS and Tumkur PS is envisaged as part of the subject proposals ensuring full utilisation of existing transmission system.

4.28 Chairperson, SRPC suggested that individual views of SR-Utilities may be communicated to CTUIL since no consensus could be arrived. The forum also requested CEA representative to participate in SRPC meetings.

4.29 **SRPC decided that as there was no consensus, individual views of SR-Utilities would be communicated to CTUIL for further taking up with NCT.**

5. Implementation of Automatic Meter Reading (AMR) in Southern Region

5.1 The following had been noted in the earlier meetings of SRPC:

(a) In the 24th Meeting of SRPC held on 15.03.2014, SRPC had approved implementation of the AMR scheme in SR by PGCIL.

(b) In the 37th meeting of SRPC held on 01.02.2020, SRPC had approved the estimate cost of Rs. 36.86 Cr for implementing AMR scheme in SR. However, the scheme was not implemented by PGCIL citing that Pan India Technical Specifications for the AMR were not available.

(c) NPC Division, CEA vide email dated 6th July 2022 had intimated that the Joint Committee after due deliberation has finalized the "*Technical Specification (TS) of Interface Energy Meters, Automatic Meter Reading system and Meter Data Processing system*" and circulated the Final copy of the Technical Specifications.

Email/Speed Post

भारतस रकार केंद्रीय विद्युत प्राधिकरण दक्षिण क्षेत्रीय विद्युत समिति 29, रेसकोर्स क्रास रोड बेंगलूर- 560 009		Government of India Central Electricity Authority **Southern Regional Power Committee** 29, Race Course Cross Road Bengaluru - 560 009
Web site: www.srpc.kar.nic.in	Email: mssrpc@yahoo.com	Phone: 080-22287205
सं/No. SRPC/MS/2023-24/ 1368	दिनांक/ Date	**03.04.2023**

To

The Chief Operating Officer
Central Transmission Utility of India Limited (CTUIL)
Saudamini, 1st Floor,
Plot No.2, Sector-29,
Gurugram, Haryana-122 001

Subject: ISTS Network Expansion Scheme "Transmission Scheme for integration of Renewable Energy Zones in Davangere/Chitradurga and Tumkur area of Karnataka"–reg.

Sir,

CTUIL vide letter dated 10.02.2023 had requested SRPC to forward their views in respect of Transmission Scheme for integration of Renewable Energy Zones in Davangere/Chitradurga and Tumkur area of Karnataka so that the transmission scheme may be taken up for consideration in the NCT meeting along with the views of SRPC.

The ISTS Network Expansion Scheme was discussed in 45th SRPC meeting held on 04.03.2023 and SRPC decided that as there was no consensus, individual views of SR-Utilities would be communicated to CTUIL for further taking up with NCT. The approved views by Chairperson, SRPC as discussed in the 45th SRPC meeting are enclosed at **Annexure**.

Thanking You,

भवदीय/Yours faithfully,

(असित सिंह / Asit Singh)
सदस्य सचिव / Member Secretary

SOUTHERN REGIONAL POWER COMMITTEE
BENGALURU

The Summarized View of SRPC on the CTUIL's Proposal on ISTS Network Expansion scheme "Transmission Scheme for integration of Renewable Energy Zones in Davangere /Chitradurga and Tumkur area of Karnataka":

Reference: CTUIL Proposal received vide letter dated 10.02.2023:	
Basis: SRPC-45 Meeting held on 04.03.2023 and TCC-44 Meeting held on 03.03.2023	
Constituents	**Comments/ Observations**
APTRANSCO:	1. Opined that if the proposed scheme is aiding the import / export requirements of SR region, the same can be recommended. However, they sought clarity regarding whether STATCOM needs to be provided at Pooling station level or Grid level, and expressed concern that many RE project developers have been violating the requirement of providing reactive power support and are not providing as mandated by regulations.
KPTCL:	1. Stated that they have concerns w.r.t the effect of the proposed RE schemes coming up in Karnataka on their 220kV downstream network, and sought clarifications on the same from CEA. CEA replied to them that the same would be studied in Joint Studies meeting. As such, the proposal needs to be studied in Joint Studies Meeting.
KSEBL:	1. Opined that the scheme shall be taken up only after ensuring visibility of RE developers at Davangere/ Chitradurga and Tumkur areas and development of redundant assets shall not be allowed.
TANGEDCO	1. Suggested the need for Joint Studies considering various factors like off-setting of cross RE allocations between various regions, phasing of the scheme, and requested that SECI shall bring out the details of Stage-II Connectivity on pan-India basis. 2. Expressed concern that many applications are based on target region; hence in the absence of firm beneficiaries the same shall lead to bottling up of power as well as development of redundant transmission schemes. Considering the impact of the proposal on tariff of all Discoms, the scheme has to be evolved through Joint Studies and they requested for the same. 3. Re-iterated that finalization of any scheme proposed as part of 500 GW RE integration needs consultation with stakeholders and joint study shall be conducted for the same. Aspects such as the impact of the proposed schemes on downstream network, requirement of strengthening of the STU network, funding methodologies for the same etc shall be made part of present report, as was done in the case of earlier 175 GW RE integration report.
Puducherry ED:	1. Opined that as the money invested in power sector is borne by the end consumer, all investment proposals need to be scrutinized systematically. Hence the proposal may be studied in Joint Studies meeting.

TSTRANSCO	1. Stated that the existing corridor shall be utilised to the full extent before planning of new systems. 2. Opined that implementation of the transmission system shall be done in a phased manner so as to ensure that the Discoms are not charged for stranded/ redundant assets, and to avoid burdening the end consumer for redundant assets.
SRLDC:	1. Learning from the experience of tripping of RE pooling stations of northern region, and considering the fact that large variations in SCR of these Pooling stations often lead to huge voltage variations, requested that all pooling stations be provided with STATCOM for controlling the voltages dynamically. STATCOM with MSR and MSC was stated to help in reducing voltage variations. 2. Informed that presently the FTC clearance for RE power developers is provided only after ensuring strict compliance to all regulations including necessary reactive power support, and requested all STUs to ensure the same with regard to RE developers seeking connectivity to STU network as per CEA standards for connectivity to grid.
CTUIL	1. Apprised the forum that the proposed scheme was identified to facilitate evacuation of RE potential of 4 GW from Davangere/ Chitradurga and 1.5 GW from Tumkur areas of Karnataka. It was informed that RE evacuation from these areas were prioritised as brought out in the Report on Transmission System for Integration of over 500 GW RE Capacity published by CEA on 07.12.2022 and CTUIL was requested to evolve transmission scheme for evacuation of the same. It was apprised that the scheme was deliberated in 14th CMETS (SR) held on 26.12.2022 and put forth for the views of SRPC to take up the scheme for approval in NCT. 2. Informed that the scheme has been planned in a phased manner and minimum transmission scheme for evacuation of the identified potential only has been proposed. It was stated that the scheme intends to integrate the proposed Davangere/Chitradurga RE Pooling station with already approved Koppal-II Pooling Station through 400 kV D/C line. W.r.t. Tumkur Pooling Station, informed that the same has been proposed for integration of 1.5 GW RE power assessed by SECI and MNRE. It was stated that only minimal transmission system to integrate the proposed Tumkur Pooling station with the existing Tumkur Pooling Station through a D/C line has been proposed. 3. W.r.t. the requested Joint Studies, stated that the study for the proposed system had already been carried out by CEA and any issue regarding the same needed to be addressed to CEA. Also apprised that phasing of the transmission scheme has already been taken care of and optimisation of the system has been done by planning of BESS. It was further informed that off-setting of cross RE LTA s between various regions is under study by CEA, Grid-India and CTUIL for evolving a methodology for the same. 4. W.r.t. BESS, also informed that it would not be implemented as part of ISTS network and is planned to be considered as part of generation project. Added that SECI is coming up with location based bids with Round The Clock (RTC) Tenders. These tenders were stated to be having RTC provisions or PSP provisions thereby optimising the transmission system requirement, but

	currently BESS is delayed due to lack of policy regarding implementation of the same, which is under preparation at MNRE. 5. Regarding provision of STATCOM they intimated that national level study will be carried out and based on the report STATCOM will be implemented. 6. Assured that implementation of the scheme shall be taken up only after ensuring the same, approval process is being taken up only to avoid bottling-up of RE power generation. It was clarified that no connectivity applications have been received at Davangere/ Chitradurga and Tumkur areas and once approved by the NCT, implementation would be taken up only after visibility of RE projects. Requested the forum to recommend the transmission scheme in order to ensure timely implementation of the scheme.
SRPC Secretariat	SRPC Secretariat supported the proposal as the same was observed to be minimal for evacuation of the informed RE potential.

Annexure III

Draft Guidelines on Assessment of Timeframe for Execution of Transmission System

1. INTRODUCTION:

1.1. In the meeting taken by Secretary (Power) on 24th May, 2023, it was decided that CEA shall prepare a guideline to estimate the timeframe for the execution of the transmission system awarded either under Tariff Based Competitive Bidding (TBCB) or under a Regulated Tariff Mechanism (RTM).

1.2. Accordingly, CEA in consultation with various stakeholders, examined the main factors affecting the implementation timeline of the transmission projects and the reasonable time required for each activity has been finalized.

1.3. Subsequently, MoP vide letter dated 03.07.2023 has directed that NCT will indicate the tentative implementation timeline of the project in the detailed scope of the project. The timeline will be finalised with the approval of Chairperson, CEA, based on the detailed survey report furnished by the BPCs to CEA and same shall be indicated in the RfP document published by BPCs.

1.4. These guidelines will be helpful in estimating the time required for the implementation of the transmission projects,

2. ACTIVITIES INVOLVED IN TRANSMISSION PROJECT EXECUTION:

2.1. After the award of a transmission project, the Transmission Service Provider (TSP), generally carries out the following activities for execution of the project:

i). Route alignment, Detailed survey and soil investigations for transmission lines.

ii). Forest, Environmental, Power Telecom Coordination Committee (PTCC), Civil Aviation, Defence, Railway crossings and other statutory clearances.

iii). Identification of land for Substations and initiation of formalities for land acquisition.

iv). Conversion of land use type to non-agriculture (from the initial use type of the land)

v). Contouring and leveling of substation land and construction of boundary wall.

vi). Basic Engineering and technical specifications.

vii). Packaging (total scope of work divided into various packages for procurement of equipment and material).

viii). Finalizing scope of work, bidding documents and bill of quantities (BOQ) for various packages.

ix). Tendering, Bid evaluation, and award of contracts.

x). Design, Engineering and Tower Testing, scrutiny of drawings/type test reports of

equipment and material.

xi). Placement of order on manufacturer/supplier, consultation and deciding the manufacturing and delivery plan.

xii). Devising Quality Assurance Plan and carrying out Inspection at factory/Lab etc .

xiii). Supply Management.

xiv). Arranging site store(s).

xv). Construction Management.

xvi). Testing and commissioning.

3. GENERAL CONSIDERATIONS

3.1. In a meeting held on 11.01.2023 under the chairmanship of Secretary, Ministry of Power, it was decided that the default time for construction of Inter-state Transmission system (ISTS) may be considered as 24 months and any need with respect to increase/decrease in scheduled completion time may be decided by CTUIL/CEA/National Committee on Transmission (NCT) based on voltage level, length of the line, topography, available working season, clearances required for construction of the line etc.

3.2. CEA (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022, provides various aspects of transmission lines and substations that need to be taken care of at the time of implementation. These Regulations also specify a normal design span for transmission lines of 66 kV and above voltage levels for a normal route without constraint, forest area and urban area / populated area /approach section near the substation.

4. FACTORS AFFECTING PROJECT EXECUTION TIME OF TRANSMISSION LINES/PROJECTS:

4.1. Following major factors affect the project execution time:

a) Topography and terrain of the area;

b) Involvement of forest/wildlife area/Great Indian Bustard (GIB) area and other statutory clearances.

c) Length of the transmission line;

d) Availability of working season;

e) River/water bodies crossing;

f) Highway/Railway Crossing,

g) Crossing of other transmission lines;

h) Right of Way (RoW) issues;

i) Bay implementation work in existing substation;

j) Defence/Civil aviation zones;

k) Mining areas;

l) Coordination with the oil/gas/water pipeline owners etc.

m) Restriction on Corridor for transmission line; and

n) Supply position of equipment and material, especially the critical elements including imports.

o) Force Majeures

4.2. Topography and Terrain of Area

Topography refers to the detailed description of the shape and elevation of the land of the Earth's surface features, such as mountains, valleys, rivers, marshy land, water bodies, and coastlines etc. In topographic maps, the distinguishing factor is the elevation. Contour lines are shown in the topographic maps. Contour lines are lines of equal elevation.

Terrain refers to the surface of the land, including its natural features. It can include things like forests, deserts, fields (farm land), habitations, structures, and cities. The Indian subcontinent has terrains ranging from Upland plain (Deccan Plateau) in the south, flat to rolling plain along the Ganges, deserts in the west, and the Himalayas in the north.

Transmission projects which involve hilly terrain or passing through a steep slope may face some difficulties due to road/bridge conditions and may affect the transportation of tower materials, conductors, substation equipment, machinery etc. In few cases, there may be a need of strengthening of existing bridges and culverts, widening of roads (including amending sharp turns) etc.

At the time of conceptualization of the transmission scheme, transmission planners shall also take the help of the PM-GATISHAKTI portal for ascertaining topography and type of terrain etc.

4.3. Involvement of Forest Areas

In case a transmission line is proposed to traverse through the terrain involving Reserve Forest/Protected Forest/Mangroves Area/Eco-Sensitive Zone (ESZ)/Coastal Regulation Zone (CRZ) Areas, clearance needs to be taken from appropriate Authorities depending upon the quantum of area.

The processing timeline for forest clearance depends on the affected area of the forest. Presently, the timeline is provided in the slabs of 0-5 Ha (hectare) (140 days), 5-40 Ha (150 days), 40-100 Ha (200 days) and more than 100 Ha (290 days). The prescribed time counts only working days.

After Stage-I clearance, 45-60 days' time is required to get tree cutting and working permissions.

4.4. Involvement of Wildlife/GIB Areas

In case a transmission line is proposed to traverse through the Wild Life Sanctuary/National Park, the Hon'ble Supreme Court clearance is also required. Transmission projects involving GIB areas need to get clearance from the Hon'ble Supreme Court appointed GIB Committee.

The present timeline for approval for transmission lines passing through wildlife areas is 270 days. After Central Government has granted wildlife clearance, it is communicated to the State Government, and once both forest and wildlife clearances are available, the matter is processed for working permission.

4.5. Length of Transmission Line:

Implementation time for longer transmission lines may be more than for shorter lines. However, considering that the lines may be implemented in sections and work can be done in parallel, no additional time on account of the length of the line is recommended.

4.6. Availability of Working Season

In some forest areas, reserve forest/wildlife areas/mangroves hilly areas, and coastal areas work needs to be suspended for several months due to monsoon/heavy rainfall/snowfall etc. This leads to limited availability of working season and affects the implementation schedule of the transmission project.

4.7. River/water bodies Crossing:

River Crossing involved in the route of any Transmission line, is an important link of the line. It must be safe and sound from design considerations to take care of field conditions, and vagaries of nature such as cyclones/storms, whirlwinds, floods and changes of the course of rivers etc. Accordingly, pile foundations may be required for towers, which may affect the implementation time of the transmission project.

4.8. Highway / Railway Crossing:

The transmission licensee implementing a transmission project must obtain necessary clearances from Railways or Highway/Road authorities, in case the implementation of a transmission line requires crossing a highway/railway.

4.9. Right of Way issues

The right of way needs to be secured and land/tree/crop compensation needs to be settled by the TSP.

4.10. Bay implementation work in existing substation;

Sometimes, the land needs to be developed for the implementation of additional bay in the existing substation or the termination of line at bay need to be implemented through Gas Insulated Bus/Line. Such work may need additional time.

4.11. Defence/Civil Aviation zones

Specific permissions may be required before the implementation of transmission lines in/near defence or civil aviation zones. Further, lines may be required to be rerouted to avoid the runway funnel zone of airports. This may impact the timeline of completion of the transmission project.

4.12. Mining areas

If any transmission line is planned to traverse over the mining area, there may be issues in getting clearance from the mining authority. It is suggested that at the time of conceptualization of the transmission scheme, transmission planners shall also take the help of the PM-GATISHAKTI portal for ascertaining any involvement of mining area.

4.13. Restriction on Corridor for Transmission Line:

Sometimes, the route of the planned transmission line falls in areas of sensitive nature, for example, eco-sensitive zones or areas of strategic and heritage importance. In such cases, transmission lines may need to be re-routed.

4.14. Supply Position of Critical Elements:

Some critical elements in transmission projects such as the availability of Under Sea Cable, Insulated Cross Arms, any substation equipment of specific rating etc have longer lead times and thus can affect the transmission project implementation timeline.

5. FACTORS AFFECTING PROJECT EXECUTION TIME OF SUBSTATIONS:

5.1. In the case of substations involving tough hilly terrain, activities like land leveling, construction of approach road, strengthening of bridges for transport of materials etc need to be carried out. These activities may require considerable time.

5.2. Some critical elements in transmission projects such as GIS, STATCOM, HVDC, CRGO for manufacturing of Transformers/Reactors etc have longer lead times and thus may affect the transmission project implementation timeline.

6. FACTORS AFFECTING PROJECT EXECUTION TIME OF HVDC SYSTEMS:

6.1. In the case of HVDC system i.e. transmission line and terminal stations including the corresponding AC system, the timeline of implementation may be kept as 48 months. In case of more than one pole, additional time of 6 months may be considered for each additional pole.

7. PRACTICES TO BE ADOPTED TO MATCH THE TIMELINE

7.1. Parallel Processing of Activities:

Major reduction in project implementation schedule is possible by undertaking various preparatory activities (viz. surveys, design and testing, processing for forest and other statutory clearances, tendering activities etc) in advance/parallel to project appraisal

and approval phase and going ahead with construction activities once Transmission Line Project sanction/approval is received.

7.2. Packaging Concept:

Total transmission project should be broken down into clearly defined packages such that the packages could be procured and implemented requiring the least coordination and interfacing and at the same time it attracting competition and facilitating cost-effective procurement.

7.3. Standardization of Designs:

To avoid repetitive work and uncertainties during testing, the tower designs may be standardized. It is desirable that the designs are standardized and developed by Utilities prior to the floating of tenders for tower fabrication and construction so that time can be saved in project execution.

Standardization of designs/drawings for other transmission line materials and substation structures, equipment, control room building etc also may be standardized to the extent possible.

7.4. Route Alignment, Detailed Survey and Soil Investigations:

It is desirable that the project is defined in finer detail to the extent possible at the FR / Notice Inviting Tender (NIT) stage for effective planning and scheduling of project(s) besides optimization of resources.

Use of PM-Gatishakti portal for getting realistic information/details leading to the selection of optimum route alignment and facilitating realistic estimation of the bill of quantities is suggested.

7.5. Environment & Forest Clearance and Rehabilitation and Resettlement (R&R):

Advance action may be taken for processing forest clearances. With the use of PM-GatiShakti portal, it is possible to minimize the infringement with the forest areas as various alternatives can be analyzed.

7.6. Project Monitoring:

A master network for the entire project from concept to commissioning needs to be prepared and monitored regularly with reference to the target and required actions taken. A similar detailed network is also to be prepared for each package for monitoring activities at the micro level. Regular reviews should be done at Project Manager level and quarterly reviews at Chief Executive level also is recommended.

8. RECOMMENDATIONS:

8.1. The factors like Topography and terrain of the Area, Involvement of Forest/Wildlife/GIB Areas, Availability of working season, River crossing, Supply position of critical equipment/material etc increases implementation time of transmission projects.

8.2. Efforts should be made to minimize the impact of the factors affecting transmission scheme timelines by suitable planning and use of PM-GatiShakti portal. Viewing access of the same to all TSPs would facilitate the effective implementation of Transmission projects.

8.3. In case of involvement of hilly terrain, additional time for implementation of transmission scheme may be considered as under:

Line Length	**Average altitude**	**Additional time**
10 – 30 km	700 to 1000 meter	NIL
	More than 1000 m and up to 2000 m	6 Months
	More than 2000 m	9 Months
More than 30 km	700 to 1000 meter	6 Months
	More than 1000 m and up to 2000 m	9 Months
	More than 2000 m	12 Months

8.4. Additional time may be considered in case a transmission line is planned to traverse through Forest/CRZ/SEZ/mangroves areas as per following:

Involvement of Forest Area	**Additional time**
Upto 5 Hectare	NIL
5 – 100 Hectare	6 months
>100 Hectare	10 months

8.5. In case a transmission line is proposed to traverse through the Wild Life Sanctuary/National Park/GIB area, then additional time of 6 months can be considered.

8.6. In the areas where the implementation of the transmission system is likely to be affected due to limited availability of working season, following additional time may be considered:

S. No.	**Factor affecting working**	**Additional time**
1.	Snow/Ice	10 months
2.	Heavy rainfall	6 months

8.7. In case of river crossing, pile foundations may be required. Accordingly, following additional time is suggested for implementation of transmission scheme:

Pile foundations	**Additional time**
Bank piles only	NIL
Involvement of mid-span piles	12 months

8.8. As there are established procedures for obtaining clearances, no additional time on account of highway/railway crossings, defence/civil aviation approvals are suggested.

8.9. If constraints of availability of critical equipment are visible at the time of planning, additional time can be considered.

8.10. Considering above, the following additional time over the base timeline of 24 months mentioned at para 3.1, may be considered:

S.No.	Factors involved	Additional time implications
1.	Type of terrain/ Topography of area	Refer Para 8.3
2.	Hilly area altitude more than 700 m and elevation difference more than 10 meters (in case of substation)	12 months
3.	Involvement of forest/CRZ/SEZ/mangroves	Refer Para 8.4
4.	Involvement of Wildlife area	Refer Para 8.5
5.	Availability of working season	Refer Para 8.6
6.	River Crossing	Refer Para 8.7
7.	Supply position of critical elements	As per visibility

8.11. The timeframe for implementation of transmission scheme can be determined as given below:

(i). General Timeframe of implementation of projects without considering any of the factors affecting the implementation timeline = t;

(ii). Additional time implication = Maximum of additional time implications of various factors = x;

(iii). Total implementation timeline = t + x

Illustrative Example

1. Transmission project facing hilly terrain and major river crossing:
   (i). General timeframe of implementation of the project without considering any of the factors affecting the implementation timeline = 24 months;

   (ii). Additional time implication = Maximum of [{Additional time implication of Hilly Terrain for line length more than 30 km and altitude 2000m}, {Additional time implication of limited availability of working season due to heavy rainfall}]

   (iii). Additional time implication = Max [12, 06] = 12 months

   (iv). Total implementation timeline = 24+12 = 36 months

8.12. For schemes involving augmentation of ICTs at existing substations; small transmission lines in plain terrain not involving forest, wildlife, No Go areas, river crossings, proximity to airport, urban areas etc the implementation timeframe may be less than 24 months., which would be decided on a case to case basis.