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 तेरहवीं बैठक की कार्यसूची - के सम्बन्ध में ।

Subject: Agenda for the 14th Meeting of National Committee on Transmission (NCT) – regarding.

महोदया (Madam) / महोदय (Sir),

The 14th meeting of the "National Committee on Transmission" (NCT) is scheduled on 09.06.2023. Details of the meeting are given below:

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

Date: 09.06.2023

Time: **4.00 PM**

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

भवदीय/Yours faithfully,

06.06.2023

(ईशान शरण / Ishan Sharan)
मुख्य अभियंता एवं सदस्य सचिव ,एनसीटी
/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.	Dr. Radheshyam Saha, Ex. Chief Engineer, Central Electricity Authority	10.	Ms. Seema Gupta, Ex. Director (Operations), POWERGRID

Special Invitee

Chief Engineer (PCD), CEA

Table of Agenda

Agenda for the 14th meeting of National Committee on Transmission

1 Confirmation of the minutes of the 13th meeting of National Committee on Transmission.

1.1 The minutes of the 13th meeting of NCT held on 12.05.2023 were issued vide CEA letter no CEA-PS-12-13/3/2019-PSPA-II dated 19.05.2023.

1.2 No comments have been received on the minutes.

1.3 Members may confirm the minutes.

2 Status of the transmission schemes noted/approved/recommended to MoP in the 13th meeting of NCT:

2.1 The status of the transmission schemes noted/approved/recommended in the 13th meeting of NCT is tabulated below:

Sr. No	Name of the Transmission Scheme	Noted/ Recommended/ Approved	Survey Agency	MoP approval	BPC	Remarks
1.	Establishment of State-of Art Unified Network Management System (U-NMS) for ISTS and State Utility Communication System for Southern Region	Approved	Not Applicable	Not Applicable		RTM
2.	Eastern Region Expansion Scheme-XXXVII (ERES-XXXVII)	Approved	Not Applicable	Not applicable		RTM

3 New Transmission Schemes:

3.1 **Augmentation of transformation capacity by 1x1500 MVA (3rd), 765/400 kV ICT at Maheshwaram (PG) substation in Telangana**

3.1.1 SRLDC requested for augmentation of transformation capacity at Maheshwaram by 1x1500 MVA, 765/400 kV ICT as existing ICTs (2x1500 MVA) at Maheshwaram (GIS) are over loaded and N-1 contingency criterion is not getting satisfied for the 765/400 kV ICTs. As per the studies carried out as part of Rolling Plan exercise, under N-1 contingency of one ICT, loading on the other is around 114% of rating and therefore augmentation of 1x1500 MVA 765/400 kV ICT (3rd) at Maheshwaram is required.

Accordingly, augmentation of 1x1500 MVA (3rd) transformation capacity at Maheshwaram(PG) for improving the reliability and meeting the contingency criteria in meeting the peak demand of Telangana was discussed and agreed in the 14th CMETS-SR meeting held on 26.12.2022.

3.1.2 The estimated cost of the scheme is less than INR 500 Cr and accordingly, same was not sent to SRPC for deliberations in line with MoP office order no. 15/3/2018-Trans-Pt (5) dated 28-10-2021 regarding reconstitution of NCT.

3.1.3 Details of the scheme is summarized below:

<table>
<tr><th>Sl. No.</th><th>Items</th><th colspan="3">Details</th></tr>
<tr><td>1.</td><td>Name of Scheme</td><td colspan="3">Augmentation of transformation capacity by 1x1500 MVA (3rd), 765/400 kV ICT at Maheshwaram(PG) substation in Telangana</td></tr>
<tr><td rowspan="3">2.</td><td rowspan="3">Scope of the scheme</td><td colspan="3"></td></tr>
<tr><td>Sl. No.</td><td>Scope of the Transmission Scheme</td><td>Capacity /km</td></tr>
<tr><td>1.</td><td>Augmentation of 1x1500 MVA, 765/400 kV transformation capacity at Maheshwaram(PG) S/s</td><td>• 765/400 kV, 1500 MVA, ICT – 1 no.
• 765 kV ICT bays – 1 no.(GIS)
• 400 kV ICT bays – 1 no.(GIS)
• 400 kV GIS duct along with associated support structure – 710 m
• 765 kV GIS duct along with associated support structure – 800 m</td></tr>
</table>

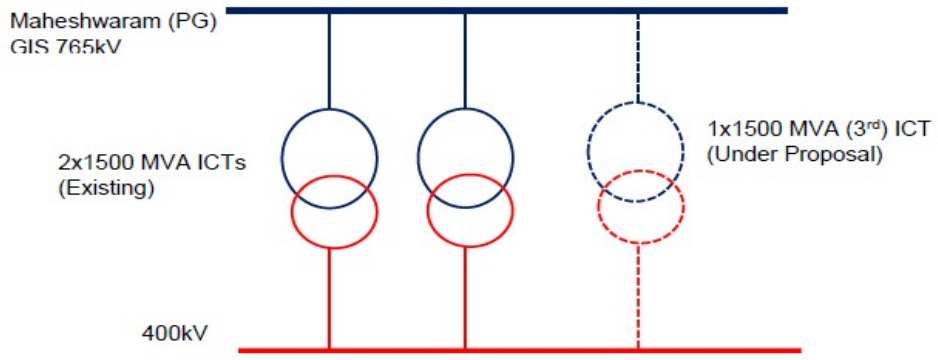
Sl. No.	Items	Details
3.	Depiction of the scheme on Transmission Grid Map	**Given at para 3.1.4**
4.	Upstream/downstream system associated with the scheme	Not applicable
5.	Objective / Justification	During the meeting held on 19.09.22 regarding intra-state proposals of APTRANSCO and TSTRANSCO wherein bus splitting scheme to reduce the high short circuit levels at 400 kV Maheshwaram (TS) bus & Mamidipally was agreed, it was highlighted that the existing ICTs (2x1500 MVA) at Maheshwaram (GIS) are over loaded and N-1 contingency criterion is not getting satisfied for the 765/400 kV ICTs. Accordingly, SRLDC requested for augmentation of transformation capacity at Maheshwaram by 1x1500 MVA, 765/400 kV ICT. Further, CTU has also highlighted in the ISTS Rolling Plan report for 2026-27 timeframe published on 31.03.2022 that 765/400 kV 2x1500 MVA ICTs at Maheshwaram substation are not meeting N-1 contingency criteria. As per the studies carried out as part of Rolling Plan exercise, under N-1 contingency of one ICT, loading on the other is around 114% of rating and therefore augmentation of 1x1500 MVA 765/400 kV ICT (3rd) at Maheshwaram is required. Accordingly, augmentation of 1x1500 MVA (3rd) transformation capacity at Maheshwaram(PG) for improving the reliability and meeting the contingency criteria in meeting the peak demand of Telangana was discussed and agreed in the 14th CMETS-SR meeting held on 26.12.2022.
6.	Estimated Cost	**Rs. 123.12 Crore**
7.	Impact on the total Annual Transmission charges in % along with the existing ATC	A. ATC (considering Levelized Tariff @15% of estimated cost): 18.468 Crore B. Present ATC: Rs. 46,327.09 Crore# C. A/B (%): 0.0398%
8.	Need of phasing, if any	Not Applicable
9.	Implementation timeframe	**21 months** from date of allocation to implementing agency / SPV Transfer (as the case may be). Tentative time-frame: **Mar'25** (Considering 2-3 months for necessary approvals & subsequent award of the project)
10.	Inclusion of any wild life/protected area along	None envisaged

Sl. No.	Items	Details
	the transmission line route	
11.	Deliberations with RPC along with their comments	The estimated cost of the scheme is less than INR 500 Cr and accordingly, same was not sent to SRPC for deliberations 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	As per the meeting held on 19.09.2022 and ISTS Rolling Plan report for 2026-27 timeframe, for improving the reliability and meeting the contingency criteria in meeting the peak demand of Telangana, augmentation of 1x1500 MVA, 765/400 kV transformation capacity at Maheshwaram(PG) S/s was proposed.

 # 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.

3.1.4 Schematic of the transmission scheme is shown below:

Augmentation of 1x1500 MVA, 765/400kV transformation capacity at Maheshwaram(PG) GIS S/s.



3.1.5 Detailed scope of the scheme is given below:

Sl. No.	*Scope of the Transmission Scheme*	*Capacity /km*
1.	Augmentation of 1x1500 MVA, 765/400 kV transformation capacity at Maheshwaram(PG) S/s	• 765/400 kV, 1500 MVA, ICT – 1 no. • 765 kV ICT bays – 1 no.(GIS) • 400 kV ICT bays – 1 no.(GIS) • 400 kV GIS duct along with associated support structure – 710 m • 765 kV GIS duct along with associated support structure – 800 m

3.1.6 Members may deliberate.

3.2 **Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7 GW*)***

3.2.1 Transmission system for evacuation of upto 15 GW power from Khavda RE Park has already been evolved in 3 phases (Ph-I: 3 GW, Ph-II: 5 GW & Ph-III: 7 GW). Against planned system of 15 GW in Khavda area, Stage-II connectivity applications for 18.605 GW (KPS-I: 9GW, KPS-II: 3.755GW & KPS-III: 5.85GW) have already been received till Jan'23. Considering the rapid pace of applications being received in Khavda area and the communication from GPCL vide e-mail dated 23.12.2022 to consider 30 GW potential capacity for power evacuation system of KHAVDA RE PARK, transmission system for balance 15GW Khavda REZ has now been planned (Ph-IV: 7GW & Ph-V: 8GW) so that there is no mismatch between RE generation and transmission. The present scheme has been planned to enable evacuation of additional 7 GW RE power from Khavda RE park under PhaseIV.

3.2.2 The schemes were discussed in the 46th WRPC meeting held on 03.02.2023 and the schemes were found to be in order and were agreed.

3.2.3 Details of the scheme is given below:

<table>
<tr><th>S. No.</th><th>Items</th><th colspan="3">Details</th></tr>
<tr><td>1.</td><td>Name of Scheme</td><td colspan="3">Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-IV (7GW)</td></tr>
<tr><td rowspan="3">2.</td><td rowspan="3">Scope of the scheme</td><td colspan="3">Part A</td></tr>
<tr><td>Sl. No.</td><td>Scope of the Transmission Scheme</td><td>Capacity / line length km</td></tr>
<tr><td>1.</td><td>Creation of 765kV bus section-II at KPS3 (GIS) along with 765kV Bus Sectionaliser & 1x330MVAr, 765kV Bus Reactors on Bus Section-II

Bus section – II shall be created at 765 kV & 400 kV level both with 3x1500 MVA, 765/400 kV ICTs at Bus Section-II</td><td>Bus Section-II at KPS3

765kV Bus Sectionaliser – 1 set

330MVAr, 765kV Bus Reactors – 1 no.

765kV reactor bays – 1 no.

765/400kV ICT – 3

765kV ICT bay – 3</td></tr>
<tr><td>2.</td><td>Creation of 400kV bus section-II at KPS3 (GIS)</td><td>Bus Section-II at KPS3

400kV Bus Sectionaliser –</td></tr>
</table>

S. No.	Items	Details		
		Sl. No.	**Scope of the Transmission Scheme**	**Capacity / line length km**
			along with 400kV Bus Sectionaliser & 1x125MVAr, 400kV Bus Reactors on Bus Section-II and 3 nos. 400kV bays at Bus Section-II for RE interconnection	1 set 125MVAr, 420kV Bus Reactors – 1 no. 400kV reactor bays – 1 nos. 400kV ICT bay – 3 (for ICTs at Sl. 1 above) 400kV line bays – 3
		3.	KPS3 (GIS) – Lakadia (AIS) 765 kV D/C line	185 km
		4.	2 nos. of 765 kV line bays each at KPS3 (GIS) & Lakadia (AIS) for KPS3 (GIS) – Lakadia (AIS) 765 kV D/C line	• 765 kV line bays (GIS) – 2 Nos. (for KPS2 end at Bus section-II) • 765 kV line bays (AIS) – 2 Nos. (for Lakadia end)
		5.	±300MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS3 400kV Bus section-2	• ±300MVAr STATCOM (with MSC/MSR) • 400kV bay – 1 no.
		6.	KPS1 (GIS)– Bhuj PS 765 kV 2nd D/C line	• 60 km
		7.	2 nos. of 765 kV line bays each at KPS1 (GIS) & Bhuj PS for KPS1 (GIS) – Bhuj PS 765 kV D/C line	• 765 kV line bays (GIS) – 2 Nos. (for KPS1 end at Bus section-II) • 765 kV line bays (AIS) – 2 Nos. (for Bhuj end)
		8.	330 MVAR switchable line reactors at KPS3 end of KPS3 (GIS) – Lakadia 765 kV D/C line (with NGR bypass arrangement)	• 330 MVAr, 765 kV switchable line reactor-2. • Switching equipments for 765 kV line reactor-2 • 1x110 MVAr spare bus

<table>
<tr><th>S. No.</th><th>Items</th><th>Details</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Sl. No.</th><th>Scope of the Transmission Scheme</th><th>Capacity / line length km</th></tr>
<tr><td></td><td></td><td>reactor available at KPS3 (GIS) to be used as spare</td></tr>
</table>
Note:

Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP.
TSP of KPS3 shall provide space for work envisaged at Sl. 1, 2, 4, 5 & 8
The TSP of present scheme shall arrange for additional land for installation of STATCOM (with MSC/MSR) as specified at Sl. 5 at KPS3 and TSP of KPS3 shall provide space for 1 no. 400kV bay for termination of STATCOM
TSP of KPS1 and Bhuj PS shall provide space for work envisaged at Sl. 7
TSP of Lakadia shall provide space for work envisaged at Sl. 4
The TSP of present scheme shall arrange for additional land adjoining Lakadia S/s for creation of 2nos. 765kV diameter towards implementation of 2 nos. 765kV line bays at Lakadia S/s (at Sl. 4) associated with KPS3 – Lakadia 765kV D/c line as no space is available in existing plot area of Lakadia S/s as per information received from M/s WRSS 21(A) Transco Ltd.

Part B
<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 2x1500MVA, 765/400kV & 2x500MVA, 400/220kV GIS S/s at a suitable location South of Olpad (between Olpad and Ichhapore) with 2x330MVAr, 765kV & 1x125MVAr, 420kV</td><td>765/400 kV, 1500 MVA ICT-2

400/220 kV, 500MVA ICT – 2

765 kV ICT bays- 2

400 kV ICT bays- 4</td></tr>
</table>
</td></tr>
</table>

S. No.	Items	Details		
			bus reactors (with associated ICT & reactor bays) **Future Scope**: Space for ➢ 765/400kV ICT along with bays- 4 no. ➢ 765 kV line bays along with switchable line reactors – 8 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 - 7 nos. ➢ 400 kV Bus Reactor along with bay: 2 no. ➢ 400kV Sectionalization bay: 1- set ➢ 220 kV line bays: 18 nos. ➢ 220kV Sectionalization bay: 2 set ➢ 220kV BC : 2 no. ➢ Establishment of 2400 MW, ± 525 kV South Olpad (HVDC) [VSC] terminal station (2x1200 MW)	220 kV ICT bays- 2 220 kV BC bay – 1 330 MVAR 765 kV bus reactor-2 125 MVAR 420 kV bus reactor-1 765 kV reactor bay- 2 765 kV line bay- 4 400 kV reactor bay- 1 400 kV line bay- 4 500 MVA, 765/400 kV 1-Ph Spare ICT-1 110 MVAR, 765 kV, 1-ph reactor (spare unit for line/bus reactor)-1
		2.	Vadodara(GIS) –South	140 km

S. No.	Items	Details		
			Olpad(GIS) 765 kV D/C line	
		3.	240 MVAR switchable line reactors on each ckt at Vadodara(GIS) end of Vadodara(GIS) – South Olpad(GIS) 765 kV D/C line (with NGR bypass arrangement)	• 240 MVAr, 765 kV switchable line reactor-2. • Switching equipments for 765 kV line reactor-2 • 1x80 MVAr spare bus reactor available at Vadodara (GIS) to be used as spare
		4.	2 nos. of 765 kV line bays at Vadodara(GIS) for Vadodara(GIS) – South olpad(GIS) 765 kV D/C line	• 765 kV line bays (GIS) – 2 Nos. (for Vadodara end)
		5.	LILO of Gandhar – Hazira 400kV D/c line at South Olpad (GIS) using twin HTLS conductor with minimum capacity of 1700MVA per ckt at nominal voltage	LILO route length~ 10km.
		6.	Ahmedabad – South Olpad(GIS) 765kV D/c line	250km.
		7.	240 MVAR switchable line reactors on each ckt at Ahmedabad & South Olpad(GIS) end of Ahmedabad – South Olpad(GIS) 765kV D/c line (with NGR bypass arrangement)	• 240 MVAr, 765 kV switchable line reactor-4 (2 for Ahmedabad and 2 for South Olpad(GIS)) • Switching equipments for 765 kV line reactor-4 (2 for Ahmedabad and 2 for South Olpad(GIS)) • 1x80 MVAr spare line reactor – 1 no. (for South Olpad end) • 1x80 MVAr spare line reactor being implemented for Lakadia – Ahmedabad

S. No.	Items	Details		
				line (under Khavda Ph-II Part B scheme) at Ahmedabad S/s to be used as spare
		8.	2 nos. of 765 kV line bays at Ahmedabad S/s for Ahmedabad – South Olpad(GIS) 765kV D/c line	• 765 kV line bays (AIS) – 2 Nos. (for Ahmedabad end)

Note:

- TSP of Vadodara S/s shall provide space for work envisaged at Sl. 3 & 4 given above
- TSP of Ahmedabad S/s shall provide space for work envisaged at Sl. 7 & 8 given above

Part C

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Establishment of 4X1500 MVA 765/400 kV & 2x500MVA 400/220kV Boisar-II (GIS) with 2X330 MVAR 765 kV bus reactor and 2X125 MVAR 420 kV bus reactor. (2x1500MVA, 765/400kV ICTs shall be on each 400kV section and 2x500MVA, 400/220kV ICTs shall be on 400kV bus section-II. 2x125MVAr Bus reactors shall be such that one bus reactor is placed on each 400kV bus section. 400kV	765/400 kV, 1500 MVA ICT-4 400/220 kV, 500MVA ICT - 2 765 kV ICT bays- 4 400 kV ICT bays- 6 (2 nos. on Bus Section-I and 4 nos. on Bus Section-II) 220 kV ICT bays- 2 220 kV BC bay – 1 330 MVAR 765 kV bus reactor-2 125 MVAR 420 kV bus reactor-2 765 kV reactor bay- 2 765 kV line bay- 6 400 kV reactor bay- 2 (one

S. No.	Items	Details		
		Sl. No.	**Scope of the Transmission Scheme**	**Capacity / line length km**
			Bus Sectionaliser to be kept under normally OPEN condition.) **Future Scope**: Space for ➢ 765/400kV ICT along with bays- 2 no. ➢ 765 kV line bays along with switchable line reactors – 8 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 -4 nos. ➢ 400 kV Bus Reactor along with bay: 2 no. ➢ 220 kV line bays: 12 nos. ➢ 220kV Sectionalization bay: 1 set ➢ 220kV BC : 1 no.	on each bus section) 400 kV line bay- 6 (4 nos. on bus section-I and 2 nos. on bus section-II) 500 MVA, 765/400 kV 1-Ph Spare ICT-1 110 MVAR, 765 kV, 1-ph reactor (spare unit for line/ bus reactor)-1
		2.	South Olpad(GIS) – Boisar-II(GIS) 765kV D/c line	225km
		3.	2 nos. of 765kV line	765 kV line bays (GIS) – 2

S. No.	Items	Details		
		Sl. No.	**Scope of the Transmission Scheme**	**Capacity / line length km**
			bays at South Olpad(GIS) for termination of South Olpad(GIS) – Boisar-II(GIS) 765kV D/c line	Nos. (for South Olpad end)
		4.	240 MVAR switchable line reactors on each ckt at South Olpad(GIS) & Boisar-II(GIS) end of South Olpad(GIS) – Boisar-II(GIS) 765kV D/c line (with NGR bypass arrangement)	• 240 MVAr, 765 kV switchable line reactor-4 (2 for Boisar-II(GIS) and 2 for South Olpad(GIS)) • Switching equipments for 765 kV line reactor-4 (2 for Boisar-II(GIS) and 2 for South Olpad(GIS)) • 1x80 MVAr spare line reactor – 1 no. (for Boisar-II end) • 1x80 MVAr spare line reactor proposed for Ahmedabad – South Olpad(GIS) 765kV line (under Khavda Ph-IV Part B scheme) at South Olpad(GIS) S/s to be used as spare
		5.	LILO of Navsari(New) – Padghe(PG) 765kV D/c line at Boisar-II	LILO route length 25km.
		6.	Boisar-II (Sec-II) – Velgaon(MH) 400kV D/c (Quad ACSR/AAAC/ AL59 moose equivalent) line	10km.
		7.	2 nos. of 400kV line bays at Velgaon(MH) for termination of Boisar-II – Velgaon(MH) 400kV D/c (Quad ACSR/AAAC/	• 400 kV line bays (GIS) – 2 Nos. (for Velgaon(MH) end)

S. No.	Items	Details		
		Sl. No.	**Scope of the Transmission Scheme**	**Capacity / line length km**
			AL59 moose equivalent) line	
		8.	LILO of Babhaleswar – Padghe(M) 400kV D/c line at Boisar-II (Sec-I) using twin HTLS conductor with minimum capacity of 1700MVA per ckt at nominal voltage	LILO route length 65km.
		9.	80 MVAR switchable line reactors at Bosar-II end of Boisar-II – Babhaleswar 400kV D/c line (with NGR bypass arrangement) formed after above LILO	• 80 MVAr, 400 kV switchable line reactor-2. • Switching equipments for 400 kV line reactor-2
		10.	±200MVAr STATCOM with 2x125 MVAr MSC, 1x125 MVAr MSR at 400 kV bus section-I of Boisar-II and ±200MVAr STATCOM with 2x125 MVAr MSC, 1x125 MVAr MSR at 400 kV bus section-II of Boisar-II	• ±200MVAr STATCOM (with MSC/MSR) on 400kV section-I • 400kV bay – 1 no. on section-I • ±200MVAr STATCOM (with MSC/MSR) on 400kV section-II • 400kV bay – 1 no. on section-II
		11.	± 300 MVAr STATCOM with 3x125 MVAr MSC, 1x125 MVAr MSR at 400 kV level of Navsari(New) (PG) S/s with 1 No. of 400 kV bay (GIS)	• ±300MVAr STATCOM (with MSC/MSR) • 400kV bay – 1 no.
		Note: • Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be		

<table>
<tr><th>S. No.</th><th>Items</th><th>Details</th></tr>
<tr><td></td><td></td><td>executed by the TSP.
• MSETCL shall carry out reconductoring of the balance portion of Padghe(M) – Boisar-II 400kV D/c line (i.e. from LILO point upto Padghe(M)) and shall also carry out corresponding upgradation of 400kV bays at Padghe(M) as may be required in matching time-frame of the LILO line. MSETCL has confirmed maximum capacity of line which can be achieved after reconductoring considering clearances in existing towers of Babhaleswar – Padghe(M) 400kV D/c line as 1700MVA per ckt.
• MSETCL shall implement the LILO of both circuits of Boisar-II – Velgaon 220kV D/c line at Boisar-II (ISTS) S/s along with 4 nos. 220kV GIS bays at Boisar-II in matching time-frame of Boisar-II (ISTS) S/s
• TSP of South Olpad(GIS) S/s shall provide space for work envisaged at Sl. 3 & 4
• MSETCL shall provide space for work envisaged at Sl. 7 at Velgaon S/s.
• TSP of the subject scheme shall implement Inter-tripping scheme on South Olpad(GIS) – Boisar-II(GIS) 765kV D/c line (for tripping of the switchable line reactor at either end along with the main line breaker).
• TSP of Navsari(New) S/s shall provide space for scope mentioned at Sl. 11
Part-D
<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 & 3x500MVA 400/220kV Pune-III (GIS) with 2X330 MVAR 765 kV bus reactor and 2X125 MVAR 420 kV bus reactor.
Future Scope:
Space for
➢ 765/400kV ICT</td><td>765/400 kV, 1500 MVA ICT-2
400/220 kV, 500MVA ICT - 3
765 kV ICT bays- 2
400 kV ICT bays- 5
220 kV ICT bays- 3
220 kV BC bay – 1
330 MVAR 765 kV bus</td></tr>
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S. No.	Items	Details		
		Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
			along with bays- 4 no. ➢ 765 kV line bays along with switchable line reactors – 8 nos. ➢ 765kV Bus Reactor along with bay: 2 no. ➢ 765kV Sectionaliser bay: 1 -set ➢ 400 kV line bays along with switchable line reactor – 12 nos. ➢ 400/220kV ICT along with bays -3 nos. ➢ 400 kV Bus Reactor along with bay: 2 no. ➢ 400kV Sectionalization bay: 1- set ➢ 220 kV line bays: 12 nos. ➢ 220kV Sectionalization bay: 1 set ➢ 220kV BC: 1 no. ➢ STATCOM (±300MVAr) along with MSC (3x125 MVAr) & MSR (1x125 MVAr): alongwith 1 no. 400kV bay: 1 no. ➢ 80 MVAR, 765 kV, 1-ph reactor (spare unit for line reactor)-1	reactor-2 125 MVAR 420 kV bus reactor-2 765 kV reactor bay- 2 765 kV line bay- 6 400 kV reactor bay- 2 400 kV line bay- 2 500 MVA, 765/400 kV Spare1-Ph ICT-1 110 MVAR, 765 kV, 1-ph reactor (spare unit for line/ bus reactor)-1
		2.	Boisar-II – Pune-III	200km

S. No.	Items	Details		
		Sl. No.	**Scope of the Transmission Scheme**	**Capacity / line length km**
			765kV D/c line	
		3.	330 MVAR switchable line reactors at Pune-III end of Boisar-II – Pune-III 765kV D/c line (with NGR bypass arrangement).	• 330 MVAr, 765 kV switchable line reactor- 2. • Switching equipments for 765 kV line reactor- 2 • 1x110 MVAr spare bus reactor available at Pune-III (GIS) to be used as spare
		4.	2 nos. of 765kV line bays at Boisar-II for termination of Boisar-II – Pune-III 765kV D/c line	• 765 kV line bays (GIS) – 2 Nos. (for Boisar-II end)
		5.	LILO of Narendra(New) – Pune(GIS) 765kV D/c line at Pune-III	LILO route length 10km.
		6.	330 MVAR switchable line reactors at Pune-III end of Narendra (New) – Pune-III (GIS) 765kV D/ c line (with NGR bypass arrangement).	• 330 MVAr, 765 kV switchable line reactor- 2. • Switching equipments for 765 kV line reactor- 2 • 1x110 MVAr spare bus reactor available at Pune-III (GIS) to be used as spare
		8.	LILO of Hinjewadi-Koyna 400kV line at Pune-III(GIS) S/s	LILO route length 40km.
		9.	80MVAr, 420kV switchable Line Reactors on each ckt at Pune-III(GIS) end of Pune-III(GIS) – Koyna 400kV line formed after above LILO (with NGR bypass	• 80 MVAr, 420 kV switchable line reactor- 2. • Switching equipments for 400 kV line reactor- 2

<table>
<tr><th>S. No.</th><th>Items</th><th colspan="3">Details</th></tr>
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<table>
<tr><th>Sl. No.</th><th>Scope of the Transmission Scheme</th><th>Capacity / line length km</th></tr>
<tr><td></td><td>arrangement).</td><td></td></tr>
<tr><td colspan="3">Note:
• Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP.
• Logic for Inter tripping scheme for tripping of the 330MVAr switchable line reactor alongwith main line breaker at Pune(GIS) end of Pune(GIS) – Narendra (New) 765kV D/c line shall be implemented by the owner of the line after LILO of Narendra(New) – Pune(GIS) 765kV D/c line at Pune-III</td></tr>
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<tr><th>S. No.</th><th>Items</th><th>Details</th></tr>
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MSETCL shall implement the following 220kV lines along with 5 nos. 220kV GIS bays at Pune-III (GIS) S/s in matching time-frame of Pune-III S/s:

LILO of both circuits of Jejuri-Phursungi 220kV D/c line at Pune-III S/s with HTLS conductor (twin zebra equivalent) along with reconductoring of balance line section viz. LILO point to Phursungi and LILO point to Jejuri with HTLS conductor (twin zebra equivalent)
Nanded city - Pune PG III 220kV S/c line with HTLS conductor (twin zebra equivalent)

TSP of Boisar-II S/s shall provide space for work envisaged at Sl. 4

<u>Part-E1</u>

Augmentation of transformation capacity at KPS1(GIS) by 1x1500MVA, 765/400kV ICT (8th)

<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>Augmentation of transformation capacity at KPS1(GIS) by 1x1500MVA, 765/400kV ICT (8th) on bus section-I</td><td>765/400kV ICT – 1
765kV ICT bay –1 section-I
400kV ICT bay – 1 section-I</td></tr>
</table>
Note: Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP. Further, TSP of KPS1 shall provide space to carry out above augmentation work.
<u>Part-E2</u>

Augmentation of transformation capacity at KPS2(GIS) by 2x1500MVA, 765/400 kV ICT on Bus Section-I (5th) & 2x1500MVA, 765/400 kV ICT on Bus section-II (7th & 8th) & 2 nos. 400kV bays at Bus Section-I for RE interconnection and 3 nos. 400kV bays at Bus Section-II for RE interconnection

<table>
<tr><th>Sl. No.</th><th>Scope of the Transmission Scheme</th><th>Capacity / line length km</th></tr>
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S. No.	Items	Details
3.	Depiction of the scheme on Transmission Grid Map	**Given below.**
4.	Upstream/ downstream system associated with the scheme	Downstream System consists of Transmission system for evacuation of 3 GW RE injection at Khavda under Phase-I, 5GW RE injection at Khavda under Phase-II and 7GW RE injection at Khavda under Phase-III.
5.	Objective / Justification	Govt. of India has set a target for establishing 500 GW capacity from non-fossil energy sources by 2030. In this direction, in December 2020, Hon'ble Prime Minister laid the foundation stone of the world's largest renewable energy park in Gujarat's Kutch. This 30 Gigawatt (GW) capacity hybrid renewable energy park is being built along the Indo-Pak border at Khavda using both wind and solar energy and is expected to play a major role in fulfilling India's vision of generating 500 GW of non-fossil generation capacity by 2030. Transmission system for evacuation of upto 15GW power from Khavda RE Park has already been evolved in 3 phases (Ph-I: 3GW, Ph-II: 5GW & Ph-III: 7GW). While Phases I & II (Total 8GW) are under implementation, Phase-III (7GW) is currently under bidding. Against planned system of 15GW in Khavda area, Stage-II connectivity applications for **19.205 GW** (KPS-I: 9GW, KPS-II: 3.755GW & KPS-III: 6.45GW) have already been received till Apr'23. Considering the rapid pace of applications being received in Khavda area and the communication from GPCL vide e-mail dated 23.12.2022 to consider 30 GW potential capacity for power evacuation system of KHAVDA RE PARK, transmission system for balance 15 GW Khavda REZ has been planned (Ph-IV: 7 GW & Ph-V: 8 GW) so that there is no mismatch between RE generation and transmission. The present scheme has been planned to enable evacuation of additional 7 GW RE power from Khavda RE park under Phase-IV.
6.	Estimated Cost	Part A: Rs. 3,692 Crore Part B: Rs. 4,766 Crore Part C: Rs. 5,340 Crore Part D: Rs. 3,455 Crore Part E1: Rs. 216 Crore Part E2: Rs. 697 Crore

S. No.	Items	Details
		Part E3: Rs. 216 Crore Part E4: Rs. 216 Crore# **Total: 18,598 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 2789.7 Crore B. Present ATC: INR 45,374.29 Crore* C. A/B (%): About 6.15%
8.	Need of phasing, if any	Not Applicable
9.	Implementation timeframe	Parts A, B, C & D: 24 months and matching with each other Part E1: 24 months Part E2: 21 months Part E3: 24 months Part E4: 24 months
10.	Inclusion of any wild life/protected area along the transmission line route	
11.	Deliberations with RPC along with their comments	The schemes were discussed in the 46th WRPC meeting held on 03.02.2023 and the schemes were approved. The modified scheme as per deliberations in 12th NCT meeting held on 28.03.2023 and meetings held on 20.04.2023 & 09.05.2023 amongst CEA, CTUIL & GRID-INDIA has been sent to WRPC vide letter dated 12.05.2023 for views within 10 days. However, no views have been received from WRPC in this regard.
12.	System Study for evolution of the proposal	The modified scheme was discussed and agreed in meetings held on 20.04.2023 & 09.05.2023 amongst CEA, CTUIL & GRID-INDIA and in the 19th Consultation Meeting for Evolving Transmission Schemes in Western Region (CMETS-WR) held on 30.05.2023.

**Total YTC allowed for as per notification of transmission charges payable by DICs for billing month of February, 2023 dated 25.01.2023 published on NLDC website (available at https://posoco.in/transmission-pricing/notification-of-transmission-charges-for-the-dics/.)*

#Cost of Part E4 is subject to change based on inputs to be received from POWERGRID regarding bays / GIS bus duct length, etc

Package wise details of the scheme are as given below:

Part A: (Cost: Rs. 3,692 Crs)

Implementation timeframe: 24 months

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Creation of 765kV bus section-II at KPS3 (GIS) along with 765kV Bus Sectionaliser & 1x330MVAr, 765kV Bus Reactors on Bus Section-II Bus section – II shall be created at 765 kV & 400 kV level both with 3x1500 MVA, 765/400 kV ICTs at Bus Section-II	Bus Section-II at KPS3 765kV Bus Sectionaliser – 1 set 330MVAr, 765kV Bus Reactors – 1 no. 765kV reactor bays – 1 no. 765/400kV ICT – 3 765kV ICT bay – 3
2.	Creation of 400kV bus section-II at KPS3 (GIS) along with 400kV Bus Sectionaliser & 1x125MVAr, 400kV Bus Reactors on Bus Section-II and 3 nos. 400kV bays at Bus Section-II for RE interconnection	Bus Section-II at KPS3 400kV Bus Sectionaliser – 1 set 125MVAr, 420kV Bus Reactors – 1 no. 400kV reactor bays – 1 nos. 400kV ICT bay – 3 (for ICTs at Sl. 1 above) 400kV line bays – 3
3.	KPS3 (GIS) – Lakadia (AIS) 765 kV D/C line	185 km
4.	2 nos. of 765 kV line bays each at KPS3 (GIS) & Lakadia (AIS) for KPS3 (GIS) – Lakadia (AIS) 765 kV D/C line	• 765 kV line bays (GIS) – 2 Nos. (for KPS2 end at Bus section-II) • 765 kV line bays (AIS) – 2 Nos. (for Lakadia end)
5.	±300MVAr STATCOM with 1x125 MVAr MSC, 2x125 MVAr MSR at KPS3 400kV Bus section-2	• ±300MVAr STATCOM (with MSC/MSR) • 400kV bay – 1 no.
6.	KPS1 (GIS)– Bhuj PS 765 kV 2nd D/C line	• 60 km
7.	2 nos. of 765 kV line bays each at KPS1 (GIS) & Bhuj PS for KPS1 (GIS) – Bhuj PS 765 kV D/C line	• 765 kV line bays (GIS) – 2 Nos. (for KPS1 end at Bus section-II) • 765 kV line bays (AIS) – 2 Nos. (for Bhuj end)
8.	330 MVAR switchable line reactors at KPS3 end of KPS3 (GIS) – Lakadia 765 kV D/C line (with NGR bypass arrangement)	• 330 MVAr, 765 kV switchable line reactor- 2. • Switching equipments for 765 kV

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
		line reactor- 2 • 1x110 MVAr spare bus reactor available at KPS3 (GIS) to be used as spare

Note:

- Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP.
- TSP of KPS3 shall provide space for work envisaged at Sl. 1, 2, 4, 5 & 8
- The TSP of present scheme shall arrange for additional land for installation of STATCOM (with MSC/MSR) as specified at Sl. 5 at KPS3 and TSP of KPS3 shall provide space for 1 no. 400kV bay for termination of STATCOM
- TSP of KPS1 and Bhuj PS shall provide space for work envisaged at Sl. 7
- TSP of Lakadia shall provide space for work envisaged at Sl. 4
- The TSP of present scheme shall arrange for additional land adjoining Lakadia S/s for creation of 2nos. 765kV diameter towards implementation of 2 nos. 765kV line bays at Lakadia S/s (at Sl. 4) associated with KPS3 – Lakadia 765kV D/c line as no space is available in existing plot area of Lakadia S/s as per information received from M/s WRSS 21(A) Transco Ltd.

<u>Part B:</u> (Cost: Rs. 4,766 Crs)

Implementation timeframe: 24 months

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Establishment of 2x1500MVA, 765/400kV & 2x500MVA, 400/220kV GIS S/s at a suitable location South of Olpad (between Olpad and Ichhapore) with 2x330MVAr, 765kV & 1x125MVAr, 420kV bus reactors (with associated ICT & reactor bays) **Future Scope**: Space for ➢ 765/400kV ICT along with bays- 4 no. ➢ 765 kV line bays along with switchable line reactors – 8 nos. ➢ 765kV Bus Reactor along with bay: 2 no. ➢ 765kV Sectionaliser bay: 1 -set ➢ 400 kV line bays along with switchable line	765/400 kV, 1500 MVA ICT-2 400/220 kV, 500MVA ICT – 2 765 kV ICT bays- 2 400 kV ICT bays- 4 220 kV ICT bays- 2 220 kV BC bay – 1 330 MVAR 765 kV bus reactor-2 125 MVAR 420 kV bus reactor-1

	reactor – 8 nos. ➢ 400/220kV ICT along with bays - 7 nos. ➢ 400 kV Bus Reactor along with bay: 2 no. ➢ 400kV Sectionalization bay: 1- set ➢ 220 kV line bays: 18 nos. ➢ 220kV Sectionalization bay: 2 set ➢ 220kV BC: 2 no. ➢ Establishment of 2400 MW, ± 525 kV South Olpad (HVDC) [VSC] terminal station (2x1200 MW)	765 kV reactor bay- 2 765 kV line bay- 4 400 kV reactor bay- 1 400 kV line bay- 4 500 MVA, 765/400 kV 1-Ph Spare ICT-1 110 MVAR, 765 kV, 1-ph reactor (spare unit for line/bus reactor)-1 Nos.
2.	Vadodara(GIS) –South Olpad(GIS) 765 kV D/C line	140 km
3.	240 MVAR switchable line reactors on each ckt at Vadodara(GIS) end of Vadodara(GIS) –South Olpad(GIS) 765 kV D/C line (with NGR bypass arrangement)	• 240 MVAr, 765 kV switchable line reactor- 2. • Switching equipments for 765 kV line reactor- 2 • 1x80 MVAr spare bus reactor available at Vadodara (GIS) to be used as spare
4.	2 nos. of 765 kV line bays at Vadodara(GIS) for Vadodara(GIS) – South olpad(GIS) 765 kV D/C line	• 765 kV line bays (GIS) – 2 Nos. (for Vadodara end)
5.	LILO of Gandhar – Hazira 400kV D/c line at South Olpad (GIS) using twin HTLS conductor with minimum capacity of 1700MVA per ckt at nominal voltage	LILO route length~ 10km.
6.	Ahmedabad – South Olpad(GIS) 765kV D/c line	250km.
7.	240 MVAR switchable line reactors on each ckt at Ahmedabad & South Olpad(GIS) end of Ahmedabad – South Olpad(GIS) 765kV D/c line (with NGR bypass arrangement)	• 240 MVAr, 765 kV switchable line reactor- 4 (2 for Ahmedabad and 2 for South Olpad(GIS)) • Switching equipments for 765 kV line reactor- 4 (2 for Ahmedabad and 2 for South Olpad(GIS)) • 1x80 MVAr spare line reactor – 1 no. (for South Olpad end) • 1x80 MVAr spare line reactor being implemented

		for Lakadia – Ahmedabad line (under Khavda Ph-II Part B scheme) at Ahmedabad S/s to be used as spare
8.	2 nos. of 765 kV line bays at Ahmedabad S/s for Ahmedabad – South Olpad(GIS) 765kV D/c line	• 765 kV line bays (AIS) – 2 Nos. (for Ahmedabad end)

Note:

- TSP of Vadodara S/s shall provide space for work envisaged at Sl. 3 & 4 given above
- TSP of Ahmedabad S/s shall provide space for work envisaged at Sl. 7 & 8 given above

Part C: (Cost: Rs. 5,340 Crs)

Implementation timeframe: 24 months

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Establishment of 4x1500 MVA 765/400 kV & 2x500MVA 400/220kV Boisar-II (GIS) with 2X330 MVAR 765 kV bus reactor and 2X125 MVAR 420 kV bus reactor. (2x1500MVA, 765/400kV ICTs shall be on each 400kV section and 2x500MVA, 400/220kV ICTs shall be on 400kV bus section-II. 2x125MVAr Bus reactors shall be such that one bus reactor is placed on each 400kV bus section. 400kV Bus Sectionaliser to be kept under normally OPEN condition.) **Future Scope**: Space for ➢ 765/400kV ICT along with bays- 2 no. ➢ 765 kV line bays along with switchable line reactors – 8 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 -4 nos. ➢ 400 kV Bus Reactor along with bay: 2 no. ➢ 220 kV line bays: 12 nos. ➢ 220kV Sectionalization bay: 1 set ➢ 220kV BC : 1 no.	765/400 kV, 1500 MVA ICT-4 400/220 kV, 500MVA ICT - 2 765 kV ICT bays- 4 400 kV ICT bays- 6 (2 nos. on Bus Section-I and 4 nos. on Bus Section-II) 220 kV ICT bays- 2 220 kV BC bay – 1 330 MVAR 765 kV bus reactor-2 125 MVAR 420 kV bus reactor-2 765 kV reactor bay- 2 765 kV line bay- 6 400 kV reactor bay- 2 (one on each bus section) 400 kV line bay- 6 (4 nos. on bus Section-I and 2 nos. on bus

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
		section-II) 500 MVA, 765/400 kV 1-Ph Spare ICT-1 110 MVAR, 765 kV, 1-ph reactor (spare unit for line/bus reactor)-1
2.	South Olpad(GIS) – Boisar-II(GIS) 765kV D/c line	225km
3.	2 nos. of 765kV line bays at South Olpad(GIS) for termination of South Olpad(GIS) – Boisar-II(GIS) 765kV D/c line	765 kV line bays (GIS) – 2 Nos. (for South Olpad end)
4.	240 MVAR switchable line reactors on each ckt at South Olpad(GIS) & Boisar-II(GIS) end of South Olpad(GIS) – Boisar-II(GIS) 765kV D/c line (with NGR bypass arrangement)	• 240 MVAr, 765 kV switchable line reactor- 4 (2 for Boisar-II(GIS) and 2 for South Olpad(GIS)) • Switching equipments for 765 kV line reactor- 4 (2 for Boisar-II(GIS) and 2 for South Olpad(GIS)) • 1x80 MVAr spare line reactor – 1 no. (for Boisar-II end) • 1x80 MVAr spare line reactor proposed for Ahmedabad – South Olpad(GIS) 765kV line (under Khavda Ph-IV Part B scheme) at South Olpad(GIS) S/s to be used as spare
5.	LILO of Navsari(New) – Padghe(PG) 765kV D/c line at Boisar-II	LILO route length 25km.
6.	Boisar-II (Sec-II) – Velgaon(MH) 400kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line	10km.
7.	2 nos. of 400kV line bays at Velgaon(MH) for termination of Boisar-II – Velgaon(MH) 400kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line	• 400 kV line bays (GIS) – 2 Nos. (for Velgaon(MH) end)
8.	LILO of Babhaleswar – Padghe(M) 400kV D/c line	LILO route length 65 km.

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
	at Boisar-II (Sec-I) using twin HTLS conductor with minimum capacity of 1700MVA per ckt at nominal voltage	
9.	80 MVAR switchable line reactors at Bosar-II end of Boisar-II – Babhaleswar 400kV D/c line (with NGR bypass arrangement) formed after above LILO	• 80 MVAr, 400 kV switchable line reactor- 2. • Switching equipments for 400 kV line reactor- 2
10.	±200MVAr STATCOM with 2x125 MVAr MSC, 1x125 MVAr MSR at 400 kV bus section-I of Boisar-II and ±200MVAr STATCOM with 2x125 MVAr MSC, 1x125 MVAr MSR at 400 kV bus section-II of Boisar-II	• ±200 MVAr STATCOM (with MSC/MSR) on 400kV Section-I • 400kV bay – 1 no. on Section-I • ±200 MVAr STATCOM (with MSC/MSR) on 400 kV section-II • 400 kV bay – 1 no. on section-II
11.	± 300 MVAr STATCOM with 3x125 MVAr MSC, 1x125 MVAr MSR at 400 kV level of Navsari(New) (PG) S/s with 1 No. of 400 kV bay (GIS)	• ±300 MVAr STATCOM (with MSC/MSR) • 400 kV bay – 1 no.

Note:

- Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP.
- MSETCL shall carry out reconductoring of the balance portion of Padghe(M) – Boisar-II 400kV D/c line (i.e. from LILO point upto Padghe(M)) and shall also carry out corresponding upgradation of 400kV bays at Padghe(M) as may be required in matching time-frame of the LILO line. MSETCL has confirmed maximum capacity of line which can be achieved after reconductoring considering clearances in existing towers of Babhaleswar – Padghe(M) 400kV D/c line as 1700MVA per ckt.
- MSETCL shall implement the LILO of both circuits of Boisar-II – Velgaon 220kV D/c line at Boisar-II (ISTS) S/s along with 4 nos. 220kV GIS bays at Boisar-II in matching time-frame of Boisar-II (ISTS) S/s
- TSP of South Olpad(GIS) S/s shall provide space for work envisaged at Sl. 3 & 4
- MSETCL shall provide space for work envisaged at Sl. 7 at Velgaon S/s.
- TSP of the subject scheme shall implement Inter-tripping scheme on South Olpad(GIS) – Boisar-II(GIS) 765kV D/c line (for tripping of the switchable line reactor at either end along with the main line breaker).
- TSP of Navsari(New) S/s shall provide space for scope mentioned at Sl. 11

Part-D: (Cost: Rs. 3,455 Crs)
Implementation timeframe: 24 months

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Establishment of 2X1500 MVA 765/400 kV & 3x500MVA 400/220kV Pune-III (GIS) with 2X330 MVAR 765 kV bus reactor and 2X125 MVAR 420 kV bus reactor. **Future Provisions**: Space for ➢ 765/400 kV ICT along with bays- 4 no. ➢ 765 kV line bays along with switchable line reactors – 8 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 -3 nos. ➢ 400 kV Bus Reactor along with bay: 2 no. ➢ 400 kV Sectionalization bay: 1- set ➢ 220 kV line bays: 12 nos. ➢ 220 kV Sectionalization bay: 1 set ➢ 220 kV BC: 1 no. ➢ STATCOM (±300 MVAr) along with MSC (3x125 MVAr) & MSR (1x125 MVAr): alongwith 1 no. 400kV bay: 1 no. ➢ 80 MVAR, 765 kV, 1-ph reactor (spare unit for line reactor)-1	765/400 kV, 1500 MVA ICT-2 400/220 kV, 500MVA ICT - 3 765 kV ICT bays- 2 400 kV ICT bays- 5 220 kV ICT bays- 3 220 kV BC bay – 1 330 MVAR 765 kV bus reactor-2 125 MVAR 420 kV bus reactor-2 765 kV reactor bay- 2 765 kV line bay- 6 400 kV reactor bay- 2 400 kV line bay- 2 500 MVA, 765/400 kV Spare1-Ph ICT-1 110 MVAR, 765 kV, 1-ph reactor (spare unit for line/bus reactor)-1
2.	Boisar-II – Pune-III 765kV D/c line	200km
3.	330 MVAR switchable line reactors at Pune-III end of Boisar-II – Pune-III 765kV D/c line (with NGR bypass arrangement).	• 330 MVAr, 765 kV switchable line reactor- 2. • Switching equipments for 765 kV line reactor- 2 • 1x110 MVAr spare bus reactor available at Pune-III (GIS) to be used as spare

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
4.	2 nos. of 765kV line bays at Boisar-II for termination of Boisar-II – Pune-III 765kV D/c line	• 765 kV line bays (GIS) – 2 Nos. (for Boisar-II end)
5.	LILO of Narendra(New) – Pune(GIS) 765kV D/c line at Pune-III	LILO route length 10km.
6.	330 MVAR switchable line reactors at Pune-III end of Narendra (New) – Pune-III(GIS) 765kV D/c line (with NGR bypass arrangement).	• 330 MVAr, 765 kV switchable line reactor- 2. • Switching equipments for 765 kV line reactor- 2 • 1x110 MVAr spare bus reactor available at Pune-III (GIS) to be used as spare
8.	LILO of Hinjewadi-Koyna 400kV line at Pune-III(GIS) S/s	LILO route length 40 km.
9.	80MVAr, 420kV switchable Line Reactors on each ckt at Pune-III(GIS) end of Pune-III(GIS) – Koyna 400kV line formed after above LILO (with NGR bypass arrangement).	• 80 MVAr, 420 kV switchable line reactor- 2. • Switching equipments for 400 kV line reactor- 2

***Note**:*

- *Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP.*
- *Logic for Inter tripping scheme for tripping of the 330MVAr switchable line reactor alongwith main line breaker at Pune(GIS) end of Pune(GIS) – Narendra (New) 765kV D/c line shall be implemented by the owner of the line after LILO of Narendra(New) – Pune(GIS) 765kV D/c line at Pune-III*
- *MSETCL shall implement the following 220kV lines along with 5 nos. 220kV GIS bays at Pune-III (GIS) S/s in matching time-frame of Pune-III S/s:*
    - *LILO of both circuits of Jejuri-Phursungi 220kV D/c line at Pune-III S/s with HTLS conductor (twin zebra equivalent) along with reconductoring of balance line section viz. LILO point to Phursungi and LILO point to Jejuri with HTLS conductor (twin zebra equivalent)*
    - *Nanded city - Pune PG III 220kV S/c line with HTLS conductor (twin zebra equivalent)*
- *TSP of Boisar-II S/s shall provide space for work envisaged at Sl. 4*

Part-E1: (Cost: Rs. 216 Crs)

Implementation timeframe: 24 months

- Augmentation of transformation capacity at KPS1(GIS) by 1x1500MVA, 765/400kV ICT (8th)

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Augmentation of transformation capacity at KPS1(GIS) by 1x1500MVA, 765/400kV ICT (8th) on bus section-I	765/400kV ICT – 1 765kV ICT bay –1 on bus section-I 400kV ICT bay – 1 on bus section-I

Note: *Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP. Further, TSP of KPS1 shall provide space to carry out above augmentation work.*

Part-E2: (Cost: Rs. 697 Crs)

Implementation timeframe: 21 months

- Augmentation of transformation capacity at KPS2(GIS) by 2x1500MVA, 765/400 kV ICT on Bus section-I (5th & 6th) & 2x1500MVA, 765/400 kV ICT on Bus section-II (7th & 8th) & 2 nos. 400kV bays at Bus Section-I for RE interconnection and 3 nos. 400kV bays at Bus Section-II for RE interconnection

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Augmentation of transformation capacity at KPS2(GIS) by 2x1500MVA, 765/400 kV ICT on Bus section-I (5th & 6th) & 2x1500MVA, 765/400 kV ICT on Bus section-II (7th & 8th) & 2 nos. 400kV bays at Bus Section-I for RE interconnection and 3 nos. 400kV bays at Bus Section-II for RE interconnection	765/400kV ICT – 4 765kV ICT bay – 4 (2 nos. on section-I & 2 nos. on section-II) 400kV ICT bay – 4 (2 nos. on section-I & 2 nos. on section-II) 400kV line bays – 5 (2 nos. on section-I & 3 nos. on section-II)

Note:

1. Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP. Further, TSP of KPS2 shall provide space to carry out above augmentation work.
2. 2 nos. 400kV bays at Bus Section-I for RE interconnection and 1 no. 400kV bays at Bus Section-II for RE interconnection are already under implementation at KPS2

Part-E3: (Cost: Rs. 216 Crs)

Implementation timeframe: 24 months

- Augmentation of transformation capacity at KPS3(GIS) by 1x1500MVA, 765/400kV ICT (7th) on Bus section-I

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Augmentation of transformation capacity at KPS3(GIS) by 1x1500MVA, 765/400kV ICT (7th) on Bus section-I	765/400kV ICT – 1 765kV ICT bay – 1 on Bus section-I 400kV ICT bay – 1 on Bus section-I

Note: *Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP. Further, TSP of KPS3 shall provide space to carry out above augmentation work.*

Part-E4: **(Cost: Rs. 216 Crs)**

Implementation timeframe: 24 months

- Augmentation of transformation capacity at Padghe (GIS) 765/400 kV substation by 1x1500 MVA ICT (4th) along with associated bays

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Augmentation of transformation capacity at Padghe(PG)(GIS) by 1x1500MVA, 765/400kV ICT (4th)	765/400kV ICT – 1 765kV ICT bay – 1 400kV ICT bay – 1

Note: *Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP. Further, POWERGRID shall provide space to carry out above augmentation work.*

3.2.1 Members may deliberate.

3.3 **Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW)**

3.3.1 Transmission system for evacuation of upto 15 GW power from Khavda RE Park has already been evolved in 3 phases (Ph-I: 3 GW, Ph-II: 5 GW & Ph-III: 7 GW). Against planned system of 15 GW in Khavda area, Stage-II connectivity applications for 18.605 GW (KPS-I: 9GW, KPS-II: 3.755GW & KPS-III: 5.85GW) have already been received till Jan'23. Considering the rapid pace of applications being received in Khavda area and the communication from GPCL vide e-mail dated 23.12.2022 to consider 30 GW potential capacity for power evacuation system of KHAVDA RE PARK, transmission system for balance 15 GW Khavda REZ has now been planned (Ph-IV: 7 GW & Ph-V: 8 GW) so that there is no mismatch between RE generation and transmission. The present scheme has been planned to enable evacuation of additional 7 GW RE power from Khavda RE park under Phase IV.

3.3.2 The schemes were discussed in the 46th WRPC meeting held on 03.02.2023 and the schemes were found to be in order and were agreed.

3.3.3 Details of the scheme is given below:

<table>
<tr><th>S. No.</th><th>Items</th><th>Details</th></tr>
<tr><td>1.</td><td>Name of Scheme</td><td>Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8GW)</td></tr>
<tr><td>2.</td><td>Scope of the scheme</td><td><u>Part A</u>
Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW): Part A
<table>
<tr><th>Sl.</th><th>Scope</th><th>Length(km) / MVA</th></tr>
<tr><td>1.</td><td>Establishment of 6000 MW, ± 800 kV KPS2 (HVDC) [LCC] terminal station (4x1500 MW) along with associated interconnections with 400kV HVAC Switchyard*.</td><td>6000 MW, ± 800 kV KPS2 (HVDC) [LCC] Terminal station</td></tr>
<tr><td>2.</td><td>Establishment of 6000 MW, ± 800 kV Nagpur (HVDC) [LCC] terminal station (4x1500 MW) along with associated interconnections with 400kV HVAC Switchyard*</td><td>6000 MW, ± 800 kV Nagpur (HVDC) [LCC] terminal station</td></tr>
<tr><td>3.</td><td>±800 kV HVDC Bipole line (Hexa lapwing) between KPS2(HVDC) and Nagpur (HVDC) (1200km.)</td><td>1200km.</td></tr>
</table></td></tr>
</table>

S. No.	Items	Details		
		Sl.	**Scope**	**Length(km) / MVA**
			(with Dedicated Metallic Return) (capable to evacuate 6000MW with overload as specified)	
		4.	Establishment of 6x1500 MVA, 765/400 kV ICTs at Nagpur–S/s along with 2x330 MVAr (765 kV) & 2x125 MVAr, 420 kV bus reactors along with associated interconnections with HVDC Switchyard*. The 400 kV bus shall be established in 2 sections through 1 set of 400kV bus sectionaliser so that 3x1500MVA ICTs are placed in each section. The bus sectionaliser shall be normally CLOSED and may be opened based on Grid requirement. **Future Scope at Nagpur: Space for** o 765/400 kV, 1500 MVA ICT- 4 (1 on 400kV bus section-II & 3 on future 400kV bus section-III) o 765 kV line bays along with switchable line reactors – 10 nos. o 765kV Bus Reactor along with bay: 2 no. o 400 kV line bays along with switchable line reactor – 12 nos. o 400 kV Bus sectionaliser- 1 Set o 400/220kV ICT along with bays -9 nos. (3 nos. on 400kV bus sections II & 6 nos. on future bus section-III) o 400 kV Bus Reactor along with bay: 4 no. (1 each on	o 765/400 kV, 1500 MVA ICT-6 (3 on each 400kV section) o 765 kV ICT bays- 6 o 400 kV ICT bays- 6 (3 on each section) o 330 MVAR 765 kV bus reactor-2 o 125 MVAR 420 kV bus reactor-2 (one on each section) o 765 kV reactor bay- 2 o 765 kV line bay- 4 o 400 kV reactor bay- 2 (one on each section) o 400 kV Bus sectionaliser- 1 Set o 500 MVA, 765/400 kV Spare ICT-1 o 110 MVAR, 765 kV, 1-ph reactor (spare unit for line/bus reactor)-1

S. No.	Items	Details		
		Sl.	**Scope**	**Length(km) / MVA**
			400kV bus sections I & II and 2 on future 400kV bus section-III) o 220 kV line bays: 16 nos. o 220kV Sectionalization bay: 2 set o 220kV BC & TBC: 3 nos. o 80 MVAR, 765 kV, 1-ph reactor (spare unit for line reactor)-1	
		5.	LILO of Wardha – Raipur 765kV one D/c line (out of 2xD/c lines) at Nagpur	LILO route length 30 km.
		6.	Installation of 240MVAr switchable line reactor at Nagpur end on each ckt of Nagpur – Raipur 765kV D/c line	• 240 MVAr, 765 kV switchable line reactors- 2 (Nagpur end) • Switching equipments for 765 kV line reactor- 2 (Nagpur end) • 80 MVAR, 765 kV, 1-ph reactor (spare unit for line reactor)-1
		7.	Conversion of 330 MVAr Fixed LR at Wardha (on each ckt of Wardha – Raipur 765 kV D/c line being LILOed at Nagpur) into Bus Reactors at Wardha S/s	• 765 kV reactor bay- 2 & Conversion of 330MVAr Fixed LR at Wardha (on each ckt of Wardha – Raipur 765kV D/c line being LILOed at Nagpur) into

<table>
<tr><th>S. No.</th><th>Items</th><th>Details</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><th>Sl.</th><th>Scope</th><th>Length(km) / MVA</th></tr>
<tr><td></td><td></td><td>Bus Reactors through creation of 2 new diameters and shifting of Reactors</td></tr>
</table>
* The 400kV interconnections (along with all associated equipment/ bus extension, etc.) between HVDC & HVAC switchyards shall be implemented by the TSP
Implementation time-frame: 42 months for Bipole-1 (2x1500MW) and 48 months for Bipole-2 (2x1500MW)
Note:

The 2x1500MW poles shall emanate from 400kV bus section 1 of KPS2 and terminate at bus section 1 of Nagpur. Similarly, the 2x1500MW poles shall emanate from 400kV bus section 2 of KPS2 and terminate at bus section 2 of Nagpur.
HVDC System will be designed considering 100% power reversal capability. The rated power transmission capacity as well as the rated transmission voltage shall be defined and guaranteed at rectifier end of AC yard.
TSP of KPS2 shall provide space for establishment of HVDC system as per above scope
POWERGRID shall provide space for implementation of scope at Sl. 7 at Wardha S/s

<u>Part B</u>
Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW) : Part B

Augmentation of transformation capacity at KPS2(GIS) by 1x1500MVA, 765/400 kV ICT on Bus Section-I (9th) and at

</td></tr>
</table>

<table>
<tr><th>S. No.</th><th>Items</th><th>Details</th></tr>
<tr><td></td><td></td><td>KPS3(GIS) by 1x1500MVA, 765/400 kV ICT on Bus section-II (8th)
<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>Augmentation of transformation capacity at KPS2(GIS) by 1x1500MVA, 765/400 kV ICT on Bus section-I (9th)</td><td>765/400 kV ICT – 1
765kV ICT bay – 1 on Bus Section-I
400kV ICT bay – 1 on Bus Section-I</td></tr>
<tr><td></td><td>Augmentation of transformation capacity at KPS3(GIS) by 1x1500MVA, 765/400 kV ICT on Bus section-II (8th)</td><td>765/400 kV ICT – 1
765 kV ICT bay – 1 on Bus section-II
400 kV ICT bay – 1 on Bus section-II</td></tr>
</table>
Implementation time-frame: Implementation to be taken up as per evacuation requirement at KPS2/KPS3
Note: Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP. Further, TSP of KPS2 & KPS3 shall provide space to carry out above augmentation works.
<u>Part C</u>
Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW): Part C
<table>
<tr><th>Sl.</th><th>Scope</th><th>Length(km) / MVA</th></tr>
<tr><td>1.</td><td>Establishment of 2400 MW, ± 525 kV KPS3 (HVDC) [VSC] terminal station (2x1200 MW) at a suitable location near KPS3 substation with associated interconnections with 400kV HVAC Switchyard*</td><td>2400 MW, ± 525 kV KPS3 (HVDC) [VSC] Terminal station</td></tr>
</table>
</td></tr>
</table>

S. No.	Items	Details		
		Sl.	**Scope**	**Length(km) / MVA**
		2.	Establishment of 2400 MW, ± 525 kV South Olpad (HVDC) [VSC] terminal station (2x1200 MW) along with associated interconnections with 400kV HVAC Switchyard of South Olpad S/s*	2400 MW, ± 525 kV South Olpad (HVDC) [VSC] terminal station
		3.	Establishment of KPS3(HVDC) S/s along with 2x125MVAr, 420kV bus reactors along with associated interconnections with HVDC Switchyard*. The 400kV bus shall be established in 2 sections through 1 set of 400kV bus sectionaliser to be kept normally OPEN. 400/33 kV, 2x50 MVA transformers for exclusively supplying auxiliary power to HVDC terminal. **Future Scope at KPS3 (HVDC) S/s** **Space for:** ○ 400 kV line bays – 4 nos. (2 on each section) ○ 400 kV reactor bay- 2 (one on each section)	○ 400/33 kV, 2x50 MVA ICT along with bays- 1 ○ 125 MVAR 420 kV bus reactor-2 (one on each section) ○ 400 kV reactor bay- 2 (one on each section) ○ 400 kV Bus sectionaliser- 1 Set

<table>
<tr><th>S. No.</th><th>Items</th><th colspan="3">Details</th></tr>
<tr><td></td><td></td><td colspan="3"><table>
<tr><th>Sl.</th><th>Scope</th><th>Length(km) / MVA</th></tr>
<tr><td>4.</td><td>KPS3 – KPS3(HVDC) 400 kV 2xD/c (Quad ACSR/AAAC/AL59 moose equivalent) line along with the line bays at both substations</td><td>Line length- 2 km
400 kV GIS line bays - 4 nos at KPS3 (2 nos. on each bus section)
400 kV GIS line bays - 4 nos at KPS3(HVDC) (2 nos. on each bus section)</td></tr>
<tr><td>5.</td><td>±525 kV HVDC Bipole line between KPS3(HVDC) and South Olpad (HVDC) (with Dedicated Metallic Return) (capable to evacuate 2400MW)</td><td>600km.</td></tr>
</table>
* The 400kV interconnections (along with all associated equipment/ bus extension, etc.) between HVDC & HVAC switchyards shall be implemented by the TSP
Implementation time-frame: 42 months
Note:

The 1200MW pole-1 shall emanate from 400kV bus section 1 of KPS3(HVDC) and terminate at South Olpad S/s. Similarly, the 1500MW pole-2 shall emanate from 400kV bus section 2 of KPS3(HVDC) and terminate at South Olpad S/s.
HVDC System will be designed with 100% power reversal capability as well as black start, automatic grid restoration & dynamic reactive power support capability.
The rated power transmission capacity shall be defined and guaranteed at inverter end of AC yard and the rated transmission voltage shall be defined and guaranteed at rectifier end of AC yard.
TSP of KPS3 shall provide space for scope at Sl. 4 as per above scope
TSP of South Olpad S/s shall provide space for scope at Sl. 2 as per above scope
</td></tr>
<tr><td>3.</td><td>Depiction of the</td><td colspan="3">Given below.</td></tr>
</table>

S. No.	Items	Details
	scheme on Transmission Grid Map	
4.	Upstream/downstream system associated with the scheme	Downstream System consists of Transmission system for evacuation of 3 GW RE injection at Khavda under Phase-I, 5GW RE injection at Khavda under Phase-II, 7GW RE injection at Khavda under Phase-III and 7GW RE injection at Khavda under Phase-IV
5.	Objective / Justification	Govt. of India has set a target for establishing 500 GW capacity from non-fossil energy sources by 2030. In this direction, in December 2020, Hon'ble Prime Minister laid the foundation stone of the world's largest renewable energy park in Gujarat's Kutch. This 30 Gigawatt (GW) capacity hybrid renewable energy park is being built along the Indo-Pak border at Khavda using both wind and solar energy and is expected to play a major role in fulfilling India's vision of generating 500 GW of non-fossil generation capacity by 2030. Transmission system for evacuation of upto 15GW power from Khavda RE Park has already been evolved in 3 phases (Ph-I: 3GW, Ph-II: 5GW & Ph-III: 7GW). While Phases I & II (Total 8GW) are under implementation, Phase-III (7GW) is currently under bidding. Against planned system of 15GW in Khavda area, Stage-II connectivity applications for **19.205GW** (KPS-I: 9GW, KPS-II: 3.755GW & KPS-III: 6.45GW) have already been received till Apr'23. Considering the rapid pace of applications being received in Khavda area and the communication from GPCL vide e-mail dated 23.12.2022 to consider 30 GW potential capacity for power evacuation system of KHAVDA RE PARK, transmission system for balance 15GW Khavda REZ has been planned (Ph-IV: 7GW & Ph-V: 8GW) so that there is no mismatch between RE generation and transmission. The present scheme has been planned to enable evacuation of additional 8 GW RE power from Khavda RE park under Phase-V.
6.	Estimated Cost	*Costing shall be intimated separately based on feedback sought from various HVDC OEMs regarding latest budgetary quote for LCC as well as VSC HVDC links*
7.	Impact on the total Annual Transmission charges in % along	-

S. No.	Items	Details
	with the existing ATC	
8.	Need of phasing, if any	Not Applicable
9.	Implementation timeframe	Part A: 42 months for Bipole-1 (2x1500MW) and 48 months for Bipole-2 (2x1500MW) Part B: Implementation to be taken up as per evacuation requirement at KPS2/KPS3 Part C: 42 months
10.	Inclusion of any wild life/protected area along the transmission line route	Refer **Flag-II**
11.	Deliberations with RPC along with their comments	The schemes were discussed in the 46th WRPC meeting held on 03.02.2023 and the schemes were approved. The modified scheme as per deliberations in 12th NCT meeting held on 28.03.2023 and meetings held on 20.04.2023 & 09.05.2023 amongst CEA, CTUIL & GRID-INDIA has been sent to WRPC vide letter dated 12.05.2023 for views within 10 days. However, no views have been received from WRPC in this regard.
12.	System Study for evolution of the proposal	The modified scheme was discussed and agreed in meetings held on 20.04.2023 & 09.05.2023 amongst CEA, CTUIL & GRID-INDIA and in the 19th Consultation Meeting for Evolving Transmission Schemes in Western Region (CMETS-WR) held on 30.05.2023.

<u>Part A</u> Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8GW) : Part A

Sl.	Scope	Length(km) / MVA
1.	Establishment of 6000 MW, ± 800 kV KPS2 (HVDC) [LCC] terminal station (4x1500 MW) along with associated interconnections with 400kV HVAC Switchyard*.	6000 MW, ± 800 kV KPS2 (HVDC) [LCC] Terminal station
2.	Establishment of 6000 MW, ± 800 kV Nagpur (HVDC) [LCC] terminal station (4x1500 MW) along with associated interconnections with 400kV HVAC Switchyard*	6000 MW, ± 800 kV Nagpur (HVDC) [LCC] terminal station
3.	±800 kV HVDC Bipole line (Hexa lapwing) between KPS2(HVDC) and Nagpur (HVDC) (1200km.) (with Dedicated Metallic Return) (capable to evacuate 6000MW with overload as specified)	1200km.

Sl.	Scope	Length(km) / MVA
4.	Establishment of 6x1500MVA, 765/400kV ICTs at Nagpur-S/s along with 2x330 MVAr (765kV) & 2x125MVAr, 420kV bus reactors along with associated interconnections with HVDC Switchyard*. The 400kV bus shall be established in 2 sections through 1 set of 400kV bus sectionaliser so that 3x1500MVA ICTs are placed in each section. The bus sectionaliser shall be normally CLOSED and may be opened based on Grid requirement. **Future Scope at Nagpur: Space for** o 765/400 kV, 1500 MVA ICT-4 (1 on 400kV bus section-II & 3 on future 400kV bus section-III) o 765 kV line bays along with switchable line reactors – 10 nos. o 765kV Bus Reactor along with bay: 2 no. o 400 kV line bays along with switchable line reactor – 12 nos. o 400 kV Bus sectionaliser- 1 Set o 400/220kV ICT along with bays -9 nos. (3 nos. on 400kV bus sections II & 6 nos. on future bus section-III) o 400 kV Bus Reactor along with bay: 4 no. (1 each on 400kV bus sections I & II and 2 on future 400kV bus section-III) o 220 kV line bays: 16 nos. o 220kV Sectionalization bay: 2 set o 220kV BC & TBC: 3 nos. o 80 MVAR, 765 kV, 1-ph reactor (spare unit for line reactor)-1	o 765/400 kV, 1500 MVA ICT-6 (3 on each 400kV section) o 765 kV ICT bays- 6 o 400 kV ICT bays- 6 (3 on each section) o 330 MVAR 765 kV bus reactor-2 o 125 MVAR 420 kV bus reactor-2 (one on each section) o 765 kV reactor bay- 2 o 765 kV line bay- 4 o 400 kV reactor bay- 2 (one on each section) o 400 kV Bus sectionaliser- 1 Set o 500 MVA, 765/400 kV Spare ICT-1 o 110 MVAR, 765 kV, 1-ph reactor (spare unit for line/bus reactor)-1
5.	LILO of Wardha – Raipur 765kV one D/c line (out of 2xD/c lines) at Nagpur	LILO route length 30km.

Sl.	Scope	Length(km) / MVA
6.	Installation of 240MVAr switchable line reactor at Nagpur end on each ckt of Nagpur – Raipur 765kV D/c line	• 240 MVAr, 765 kV switchable line reactors- 2 (Nagpur end) • Switching equipments for 765 kV line reactor- 2 (Nagpur end) • 80 MVAR, 765 kV, 1-ph reactor (spare unit for line reactor)-1
7.	Conversion of 330MVAr Fixed LR at Wardha (on each ckt of Wardha – Raipur 765kV D/c line being LILOed at Nagpur) into Bus Reactors at Wardha S/s	• 765 kV reactor bay- 2 & Conversion of 330MVAr Fixed LR at Wardha (on each ckt of Wardha – Raipur 765kV D/c line being LILOed at Nagpur) into Bus Reactors through creation of 2 new diameters and shifting of Reactors

** The 400kV interconnections (along with all associated equipment/ bus extension, etc.) between HVDC & HVAC switchyards shall be implemented by the TSP*

Implementation time-frame: 42 months for Bipole-1 (2x1500MW) and 48 months for Bipole-2 (2x1500MW)

Note:

- *The 2x1500MW poles shall emanate from 400kV bus section 1 of KPS2 and terminate at bus section 1 of Nagpur. Similarly, the 2x1500MW poles shall emanate from 400kV bus section 2 of KPS2 and terminate at bus section 2 of Nagpur.*
- *HVDC System will be designed considering 100% power reversal capability. The rated power transmission capacity as well as the rated transmission voltage shall be defined and guaranteed at rectifier end of AC yard.*
- *TSP of KPS2 shall provide space for establishment of HVDC system as per above scope*
- *POWERGRID shall provide space for implementation of scope at Sl. 7 at Wardha S/s*

<u>Part B</u>

Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8 GW) : Part B

- Augmentation of transformation capacity at KPS2(GIS) by 1x1500MVA, 765/400 kV ICT on Bus section-I (9^{th}) and at KPS3(GIS) by 1x1500MVA, 765/400 kV ICT on Bus section-II (8^{th})

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Augmentation of transformation capacity at KPS2(GIS) by 1x1500MVA, 765/400 kV ICT on Bus section-I (9th)	765/400kV ICT – 1 765kV ICT bay – 1 on Bus section-I 400kV ICT bay – 1 on Bus section-I
	Augmentation of transformation capacity at KPS3(GIS) by 1x1500MVA, 765/400 kV ICT on Bus section-II (8th)	765/400kV ICT – 1 765kV ICT bay – 1 on Bus section-II 400kV ICT bay – 1 on Bus section-II

Implementation time-frame: Implementation to be taken up as per evacuation requirement at KPS2/KPS3

Note: *Bay(s) as may be required for completion of diameter (GIS) in one-and-half breaker scheme, shall also be executed by the TSP. Further, TSP of KPS2 & KPS3 shall provide space to carry out above augmentation works.*

Part C

Transmission System for Evacuation of Power from potential renewable energy zone in Khavda area of Gujarat under Phase-V (8GW) : Part C

Sl.	Scope	Length(km) / MVA
1.	Establishment of 2400 MW, ± 525 kV KPS3 (HVDC) [VSC] terminal station (2x1200 MW) at a suitable location near KPS3 substation with associated interconnections with 400kV HVAC Switchyard*	2400 MW, ± 525 kV KPS3 (HVDC) [VSC] Terminal station
2.	Establishment of 2400 MW, ± 525 kV South Olpad (HVDC) [VSC] terminal station (2x1200 MW) along with associated interconnections with 400kV HVAC Switchyard of South Olpad S/s*	2400 MW, ± 525 kV South Olpad (HVDC) [VSC] terminal station

Sl.	Scope	Length(km) / MVA
3.	Establishment of KPS3(HVDC) S/s along with 2x125MVAr, 420kV bus reactors along with associated interconnections with HVDC Switchyard*. The 400kV bus shall be established in 2 sections through 1 set of 400kV bus sectionaliser to be kept normally OPEN. 400/33 kV, 2x50 MVA transformers for exclusively supplying auxiliary power to HVDC terminal. **Future Scope at KPS3 (HVDC) S/s** **Space for:** o 400 kV line bays – 4 nos. (2 on each section) o 400 kV reactor bay- 2 (one on each section)	o 400/33 kV, 2x50 MVA ICT along with bays- 1 o 125 MVAR 420 kV bus reactor-2 (one on each section) o 400 kV reactor bay- 2 (one on each section) o 400 kV Bus sectionaliser- 1 Set
4.	KPS3 – KPS3(HVDC) 400kV 2xD/c (Quad ACSR/ AAAC/AL59 moose equivalent) line along with the line bays at both substations	Line length- 2 km 400 kV GIS line bays - 4 nos at KPS3 (2 nos. on each bus section) 400 kV GIS line bays - 4 nos at KPS3(HVDC) (2 nos. on each bus section)
5.	±525 kV HVDC Bipole line between KPS3(HVDC) and South Olpad (HVDC) (with Dedicated Metallic Return) (capable to evacuate 2400MW)	600km.

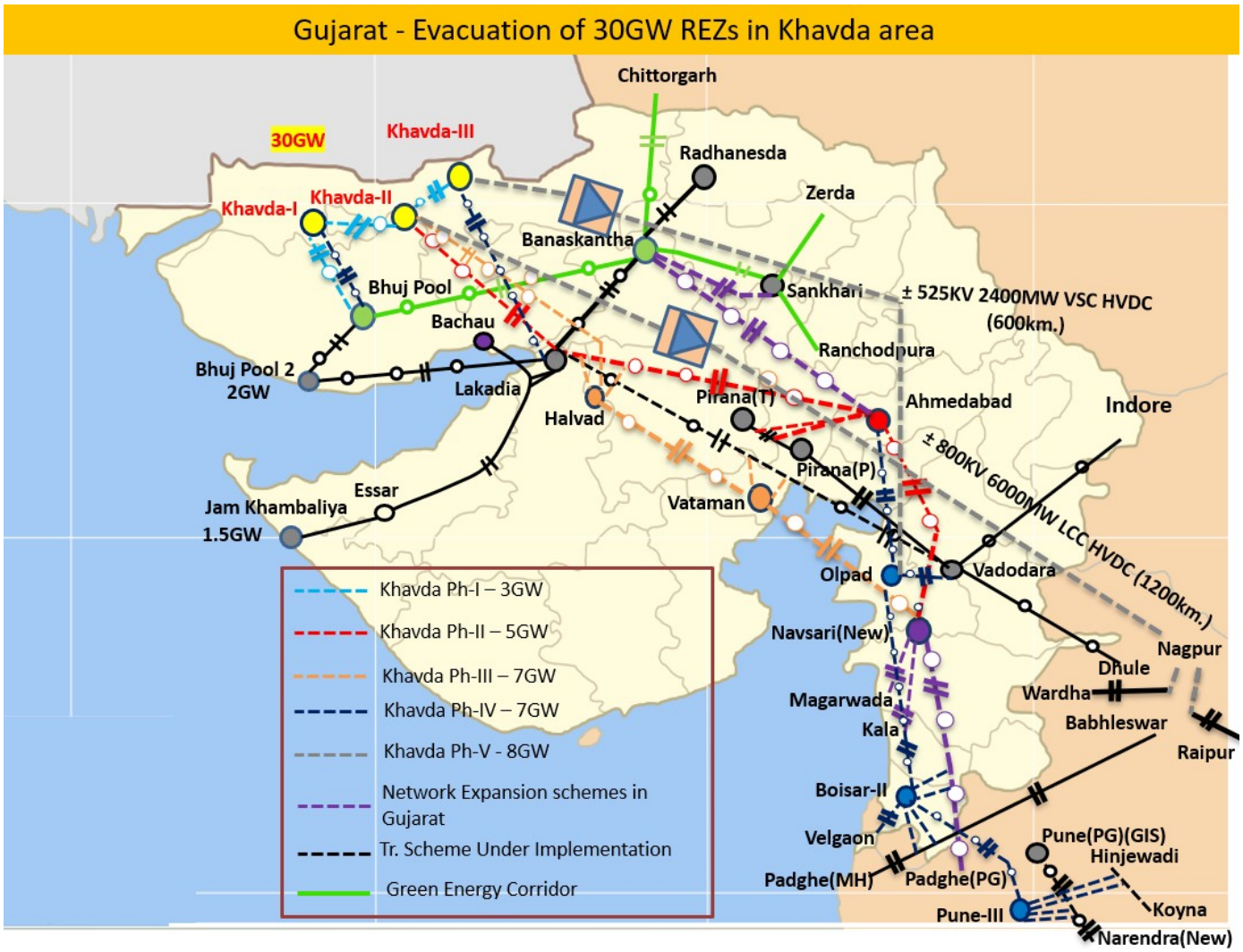
* *The 400kV interconnections (along with all associated equipment/ bus extension, etc.) between HVDC & HVAC switchyards shall be implemented by the TSP*

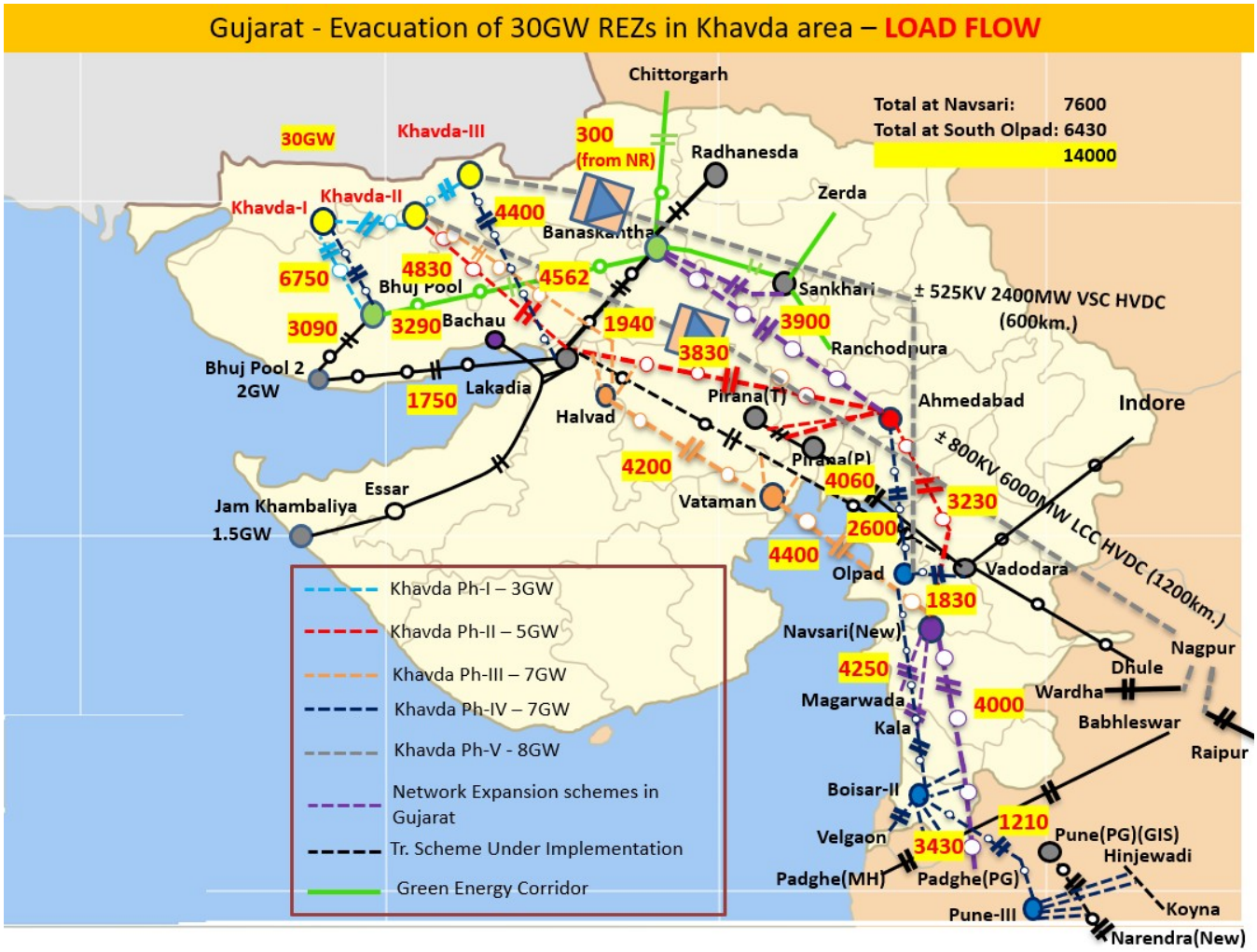
Implementation time-frame: 42 months

Note:

- *The 1200MW pole-1 shall emanate from 400kV bus section 1 of KPS3(HVDC) and terminate at South Olpad S/s. Similarly, the 1500MW pole-2 shall emanate from 400kV bus section 2 of KPS3(HVDC) and terminate at South Olpad S/s.*
- *HVDC System will be designed with 100% power reversal capability as well as black start, automatic grid restoration & dynamic reactive power support capability.*
- *The rated power transmission capacity shall be defined and guaranteed at inverter end of AC yard and the rated transmission voltage shall be defined and guaranteed at rectifier end of AC yard.*
- *TSP of KPS3 shall provide space for scope at Sl. 4 as per above scope*
- *TSP of South Olpad S/s shall provide space for scope at Sl. 2 as per above scope*

3.3.4 Members may deliberate.




Gujarat - Evacuation of 30GW REZs in Khavda area – LOAD FLOW
Chittorgarh
Total at Navsari: 7600
Total at South Olpad: 6430
14000
30GW
Khavda-III
300
(from NR)
Radhanesda
Khavda-I
Khavda-II
4400
Zerda
Banaskantha
6750
4830
4562
Bhuj Pool
Sankhari
± 525KV 2400MW VSC HVDC
(600km.)
3090
3290
Bachau
1940
3900
3830
Ranchodpura
Bhuj Pool 2
2GW
1750
Lakadia
Halvad
Pirana(T)
Ahmedabad
Indore
Pirana(P)
± 800KV 6000MW LCC HVDC (1200km.)
4200
4060
3230
Essar
Jam Khambaliya
1.5GW
Vataman
2600
4400
Olpad
Vadodara
1830
Navsari(New)
Nagpur
Dhule
4250
Wardha
Magarwada
4000
Babhleswar
Kala
Raipur
Boisar-II
1210
Velgaon
3430
Pune(PG)(GIS)
Hinjewadi
Padghe(MH)
Padghe(PG)
Koyna
Pune-III
Narendra(New)
Khavda Ph-I – 3GW
Khavda Ph-II – 5GW
Khavda Ph-III – 7GW
Khavda Ph-IV – 7GW
Khavda Ph-V - 8GW
Network Expansion schemes in Gujarat
Tr. Scheme Under Implementation
Green Energy Corridor

3.4 Western Region Network Expansion scheme in Kallam area of Maharashtra

3.4.1 Govt. of India has set a target for establishing 500 GW capacity from non-fossil energy sources by 2030. In this direction, 2GW capacity has been identified at Kallam PS. Transmission System for evacuation of power from RE Projects in Osmanabad area (1 GW) in Maharashtra is presently under implementation by Kallam Transmission Ltd. (expected by Oct'23). Further, augmentation of transformation capacity at Kallam PS by 2x500 MVA, 400/220 kV ICTs (3rd & 4th) along with 220kV bays for RE interconnection is also under implementation which shall enable injection of additional 1 GW at 220kV level of Kallam PS (expected by May'24). Additional connectivity has also been granted to M/s Torrent at 400 kV level (1 no. bay) and hence there is cumulative requirement of evacuation of about 3.25 GW (2 GW at 220 kV level and 1.25 GW at 400 kV level) from Kallam PS.

The subject Transmission system shall enable evacuation of power beyond 1 GW at Kallam PS (upto 3.25GW) by alleviating constraints in the area.

3.4.2 Detailed scope of the scheme is as given below:

<table>
<tr><th>S. No.</th><th>Items</th><th colspan="3">Details</th></tr>
<tr><td>1.</td><td>Name of Scheme</td><td colspan="3">Western Region Network Expansion scheme in Kallam area of Maharashtra</td></tr>
<tr><td>2.</td><td>Scope of the scheme</td><td>Sl. No.</td><td>Scope of the Transmission Scheme</td><td>Capacity / line length km</td></tr>
<tr><td></td><td></td><td>1.</td><td>LILO of both circuits of Parli(M) – Karjat(M)/Lonikand-II(M) 400kV D/c line (twin moose) at Kallam PS</td><td>LILO route length~ 15km.</td></tr>
<tr><td></td><td></td><td>2.</td><td>4 nos. 400kV line bays at Kallam PS for LILO of both circuits of Parli(M) – Karjat(M)/ Lonikand-II(M) 400kV D/c line (twin moose) at Kallam PS</td><td>400 kV line bays (AIS) – 4 Nos. (for Kallam PS end)</td></tr>
<tr><td></td><td></td><td>3.</td><td>63MVAr, 420kV switchable line reactor (with NGR bypassing arrangement) on each ckt at Kallam PS end of Karjat – Kallam 400kV D/c line (~140km.)</td><td>• 63 MVAr, 420 kV switchable line reactor- 2 (at Kallam end)
• Switching equipments for 420 kV line reactor- 2 (at Kallam end)</td></tr>
<tr><td></td><td></td><td colspan="3"></td></tr>
</table>

S. No.	Items	Details
		Note: 1. TSP of Kallam PS (Kallam Transmission Ltd.) shall provide requisite space at Kallam PS for above scope of work 2. The 50MVAr fixed line reactor on each ckt at Parli(M) end of Kallam – Parli(M) 400kV D/c line shall be converted into switchable (with NGR bypass arrangement & provision of inter-tripping scheme to trip the line reactors along with the main line breakers) by MSETCL in matching time-frame of above scheme. ***Space confirmation for above conversion is awaited from MSETCL.***
3.	Depiction of the scheme on Transmission Grid Map	**Depicted below.**
4.	Upstream/downstream system associated with the scheme	Kallam PS (under implementation and presently expected by Oct-23)
5.	Objective / Justification	Govt. of India has set a target for establishing 500 GW capacity from non-fossil energy sources by 2030. In this direction, 2GW capacity has been identified at Kallam PS. Transmission System for evacuation of power from RE Projects in Osmanabad area (1 GW) in Maharashtra is presently under implementation by Kallam Transmission Ltd. (expected by Oct'23). Further, augmentation of transformation capacity at Kallam PS by 2x500 MVA, 400/220 kV ICTs (3rd & 4th) along with 220kV bays for RE interconnection is also under implementation which shall enable injection of additional 1GW at 220kV level of Kallam PS (expected by May'24). Additional connectivity has also been granted to M/s Torrent at 400kV level (1 no. bay) and hence there is cumulative requirement of evacuation of about 3.25GW (2GW at 220kV level and 1.25GW at 400kV level) from Kallam PS. The subject Transmission system shall enable evacuation of power beyond 1GW at Kallam PS (upto 3.25GW) by alleviating constraints in the area.
6.	Estimated Cost	Rs. 160 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 24 Crore B. Present ATC: INR 45,374.29 Crore* C. A/B (%): About 0.053%
8.	Need of phasing, if any	Not Applicable
9.	Implementation	Generally, minimum implementation schedule of 24 months is

S. No.	Items	Details
	timeframe	specified for transmission projects. However, as a special case, a reduced implementation time-frame of **18 months** may be specified in order to ensure matching with associated generation considering the small length of LILO line and no visible forest/wildlife involvement.
10.	Inclusion of any wild life/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	The estimated cost of the scheme is less than INR 500 Cr. Accordingly, the same is not required to be sent to WRPC 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	The scheme was discussed and agreed in joint study meeting amongst CEA, CTU, GRID-INDIA and MSETCL held on 23.05.2023 and in the 19th Consultation Meeting for Evolving Transmission Schemes in Western Region (CMETS-WR) held on 30.05.2023.

3.4.3 Summary of the scheme is given below:

Cost of the scheme: Rs. 160 Crs

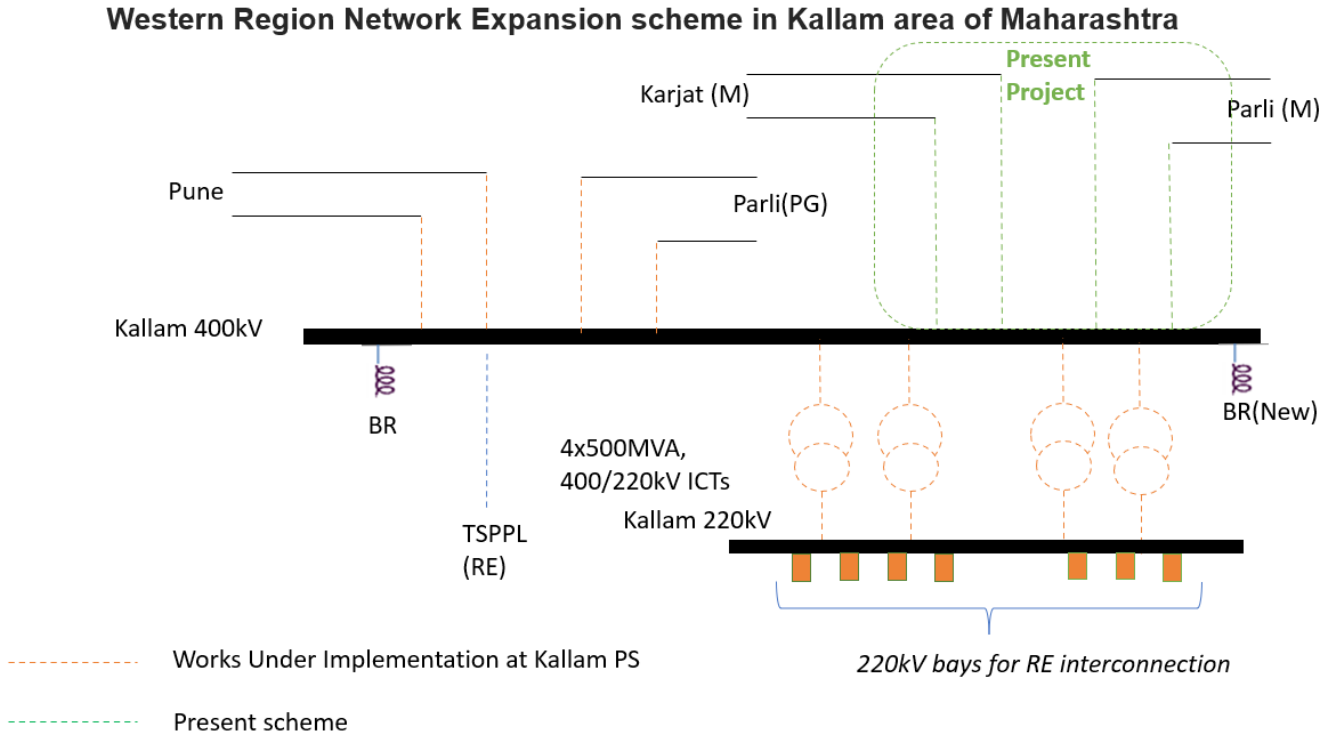
Implementation timeframe: 18 months.

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	LILO of both circuits of Parli(M) – Karjat(M)/Lonikand-II(M) 400kV D/c line (twin moose) at Kallam PS	LILO route length~ 15 km.
2.	4 nos. 400kV line bays at Kallam PS for LILO of both circuits of Parli(M) – Karjat(M)/Lonikand-II(M) 400kV D/c line (twin moose) at Kallam PS	400 kV line bays (AIS) – 4 Nos. (for Kallam PS end)
3.	63 MVAr, 420 kV switchable line reactor (with NGR bypassing arrangement) on each ckt at Kallam PS end of Karjat – Kallam 400kV D/c line (~140km.)	• 63 MVAr, 420 kV switchable line reactor- 2 (at Kallam end) • Switching equipments for 420 kV line reactor- 2 (at Kallam end)

Note:

1. TSP of Kallam PS (Kallam Transmission Ltd.) shall provide requisite space at Kallam PS for above scope of work

2. The 50 MVAr fixed line reactor on each ckt at Parli(M) end of Kallam – Parli(M) 400kV D/c line shall be converted into switchable (with NGR bypass arrangement & provision of inter-tripping scheme to trip the line reactors along with the main line breakers) by MSETCL in matching time-frame of above scheme. ***Space confirmation for above conversion is awaited from MSETCL.***



Members may deliberate.

3.5 Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5 GW) (Jaisalmer/Barmer Complex)

3.5.1 The transmission scheme shall facilitate evacuation of about 7.5 GW power from Rajasthan REZ Ph-IV (Part2) envisaged in Jaisalmer/Barmer Complex. In the 12th NCT meeting held on 24.03.23, above scheme was discussed. In the meeting, various issues like system strength (SCR), requirement of Barmer-I PS as well as high angular separation in the proposed 765 kV Jalore-Mandsaur D/C (length 320 kms) inter-regional transmission line were raised. Subsequently, various joint study meetings were held for review and phasing of transmission scheme among CEA, CTUIL and GRID-INDIA and revised studies have be carried out considering modification suggested by Grid-India and CEA After conducting studies with incorporation of increased load of Rajasthan as suggested by Grid- India, CTUIL stated that transmission system is adequate for evacuation of about 5.5 GW RE power (solar) in summer & winter scenario. The transmission system for WR portion was discussed in a meeting amongst CEA, CTUIL, MPPTCL and GRID-INDIA on 01.12.2022, wherein the above system was in-principally agreed.

3.5.2 The transmission scheme was discussed and agreed in the 61st NRPC meeting held on 26.12.22. Modified transmission scheme was discussed and agreed in 65th NRPC meeting held on 21.04.23 subject to decision in CMETS-NR meeting. The scheme was further agreed in 46th WRPC meeting held on 03.02.23

3.5.3 Details of the scheme is summarized below:

S. No.	Items	Details
1.	Name of Scheme	Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 : 5.5GW) (Jaisalmer/Barmer Complex)
2.	Scope of the scheme	**Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :5.5GW) (Jaisalmer/Barmer Complex)** **Fatehgarh-IV (Section-2): 4 GW and Barmer-I PS: 1.5 GW** **A. Fatehgarh-IV: 4 GW (Considering 2 GW injection at 400 kV and 2 GW injection at 220 kV)** • Establishment of 4x1500 MVA, 765/400 kV & 5x500 MVA^, 400/220 kV Fatehgarh- IV (Section-2) Pooling Station along with 2x240 MVAr (765 kV) Bus Reactor & 2x125 MVAr (400 kV) Bus Reactor* • 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 (~200 km) • LILO of both ckts of 765 kV Fatehgarh-III- Beawar D/c line (2nd) at Fatehgarh-IV (Section-2) PS along with 330 MVAr switchable line reactors at Fatehgarh-IV PS end of each ckt of 765 kV Fatehgarh-IV- Beawar D/c line** (formed after LILO) (~15 km)

S. No.	Items	Details
		• Beawar- Mandsaur PS 765 kV D/c line along with 240 MVAr switchable line reactor on each circuit at each end (~260 km) • Augmentation by 1x1500 MVA, 765/400 kV ICT at Fatehgarh-II PS (7th) • 6 nos. of 220 kV line bays at Fatehgarh-IV PS (for RE connectivity) • 220 kV Sectionalization bay (1 set) along with BC (2 nos.) and TBC (2 nos.) at Fatehgarh- IV (Section-2) Pooling Station • 1 set 400kV Sectionalization bay at Fatehgarh- IV (Section-2) Pooling Station ***Future provisions at Fatehgarh-IV PS is already approved in 8th NCT meeting dated 25.03.22*** ***^incl 1x500MVA ICT to fulfill 'N-1' requirement*** ****Incl. spare one ICT unit (500 MVA) and spare one reactor unit (80 MVAr) at Fatehgarh-IV PS*** *****Incl spare one reactor unit (110 MVAr) at Fatehgarh-IV PS*** **B. Barmer-I : 3.5 GW (3 GW Solar + 3GW Wind + 1 GW BESS)** • Establishment of 3x1500 MVA, 765/400 kV & 2x500 MVA, 400/220 kV Barmer-I Pooling Station along with 2x240 MVAr (765 kV) Bus Reactor & 2x125 MVAr (400 kV) Bus Reactor* **Future provisions at Barmer-I S/s:** **Space for** ➢ 765/400 kV ICT along with bays- 3 no. ➢ 765 kV line bays along with switchable line reactors – 4 nos. ➢ 765 kV Bus Reactor along with bay: 1 no. ➢ 400 kV line bays –4 ➢ 400 kV line bays along with switchable line reactor –4 nos. ➢ 400/220 kV ICT along with bays -8 nos. ➢ 400 kV Bus Reactor along with bay: 1 no. ➢ 400 kV Sectionalization bays: 2 sets ➢ 220 kV line bays for connectivity of RE Applications -10 nos. ➢ 220 kV Sectionalization bay: 3 sets ➢ BC (3 nos.) & TBC (3 nos.) ➢ STATCOM (2x±300 MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) • Fatehgarh-III (Section-2) PS – Barmer-I PS 400 kV D/c line (Quad)(~50 km) • 4 nos. of 220 kV line bays at Barmer-I PS (for RE connectivity) • 220 kV BC (1 nos.) and TBC (1 nos.) at Barmer-I Pooling Station ****Incl. spare one ICT unit (500 MVA) and spare one reactor unit***

S. No.	Items	Details
		(80 MVAr) at Barmer-I PS **C. Common Transmission System for Fatehgarh-IV and Barmer-I in NR** • Establishment of 2x1500 MVA, 765/400 kV Substation at suitable location near Sirohi along with 2x240 MVAr (765 kV) & 2x125 MVAr (400 kV) Bus Reactor * **<u>Future provisions at Sirohi S/s:</u>** Space for: ➢ 765/400 kV ICT along with bays- 4 no. ➢ 765 kV line bays along with switchable line reactors – 4 no. ➢ 765 kV Bus Reactor along with bay: 1 no. ➢ 400 kV line bays along with switchable line reactor –4 no. ➢ 400 kV line bays –4 no. ➢ 400 kV Bus Reactor along with bay: 1 no. ➢ 400 kV Sectionalization bay: 2 sets ➢ 400/220 kV ICT along with bay - 6 no. ➢ 220 kV line bays -10 no. ➢ 220 kV Sectionalization bay: 2 sets ➢ BC (3 nos.) & TBC (3 nos.) ➢ STATCOM (2x±300 MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr) ****Incl. spare one ICT unit (500MVA) and spare one reactor unit (80 MVAr & 110 MVAr) at Sirohi PS*** • Establishment of, 765 kV Substation at suitable location near Rishabdeo/Salumbar (Distt. Udaipur) along with 2x240 MVAr (765 kV) Bus Reactor * **<u>Future provisions at Rishabdeo/Salumbar S/s:</u>** **Space for** ➢ 765/400 kV ICT along with bays- 5 no. along with spare unit ➢ 765 kV line bays along with switchable line reactors – 4 no. ➢ 765 kV Bus Reactor along with bay: 1 no. ➢ 400 kV line bays along with switchable line reactor –4 no. ➢ 400 kV line bays –4 no. ➢ 400 kV Bus Reactor along with bay: 3 no. ➢ 400 kV Sectionalization bay: 2 sets ➢ 400/220 kV ICT along with bay - 6 no. ➢ 220 kV line bays -10 no. ➢ 220 kV Sectionalization bay: 2 sets ➢ BC (3 nos.) & TBC (3 nos.) ➢ STATCOM (2x±300 MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr)

S. No.	Items	Details
		Incl. spare one reactor unit (80 MVAr & 110 MVAr) • Fatehgarh-IV (Section-2) PS – Sirohi PS 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end (~240 km) • Barmer-I PS– Sirohi PS 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end (~200 km) • Sirohi PS-Chittorgarh (PG) 400 kV D/c line along with 80 MVAr switchable line reactor for each circuit at Sirohi PS end (Quad) (~160 km) • Sirohi PS- Rishabdeo/Salumbar 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at Sirohi end (~170 km) • Rishabdeo/Salumbar - Mandsaur PS 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at Rishabdeo/ Salumbar end (~160 km) • LILO of one circuit of 765 kV Chittorgarh-Banaskanta D/c line at Rishabdeo/Salumbar S/s (20 km) **In addition to the above, following transmission scheme is also required in Western region for further dispersal of power for above RE complexes (Fatehgarh-IV and Barmer-I).** **D. Common Transmission System for Fatehgarh-IV (4 GW) and Barmer-I (3.5 GW) in Western Region** • Establishment of 765 kV Mandsaur Pooling Station along with 2x330 MVAr (765 kV) Bus Reactors (with 1x110 MVAr & 1x80 MVAr, 765 kV spare single phase reactor unit for line/bus reactor) **Future Provisions**: **Space for** ➢ 765/400 kV ICT along with bays- 6 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 -8 nos. ➢ 400 kV Bus Reactor along with bay: 2 no. ➢ 400 kV Sectionalization bay: 1- set ➢ 220 kV line bays: 16 nos. ➢ 220 kV Sectionalization bay: 2 sets ➢ 220 kV BC and TBC: 3 nos. ➢ STATCOM (±300 MVAr) along with MSR (2x125 MVAr) &

S. No.	Items	Details
		MSC (1x125 MVAr): 1 no. ➢ Space for spare 765/400 kV, 500 MVA unit single phase spare unit • Mandsaur PS – Indore(PG) 765 kV D/c Line (200km) along with 1x330 MVAr switchable line reactor (SLR) on each ckt at Mandsaur end (with NGR Bypassing arrangement) • Establishment of 765/400 (2x1500 MVA) 400/220 (2x500 MVA) & 220/132kV (3x200 MVA) Kurawar S/s (with 1x500 MVA spare single phase transformer unit) with 2x330 MVAr 765kV bus reactor and 1x125MVAr 420kV bus reactor (with 1x110 MVAr & 1x80 MVAr, 765 kV spare single phase reactor unit for line/bus reactor) **Future Provisions**: **Space for** ➢ 765/400 kV ICT along with bays- 4 no. ➢ 765 kV line bays along with switchable line reactors – 8 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 – 10 nos. ➢ 400/220 kV ICT along with bays -6 nos. ➢ 400 kV Bus Reactor along with bay: 2 no. ➢ 400 kV Sectionalization bay: 1- set ➢ 220 kV line bays: 12 nos. ➢ 220 kV Sectionalization bay: 2 sets ➢ 220 kV BC and TBC: 2 nos. ➢ 220/132 kV ICT along with bays: 5 nos. ➢ 132 kV line bays: 16 ➢ 132 kV Sectionalization bay: 1 set ➢ STATCOM (±300 MVAr) along with MSR (2x125 MVAr) & MSC (1x125 MVAr): 1 no. • Mandsaur – Kurawar 765 kV D/c line (~235km.) with 240MVAr switchable line reactors at both ends (with NGR bypass arrangement) • LILO of Indore – Bhopal 765 kV 765kV S/c line at Kurawar (LILO route length ~15 km.) • Provision of NGR bypass arrangement and inter tripping scheme on 240 MVAr SW LR at Bhopal end of Kurawar – Bhopal 765 kV S/c line (~60 km) • Kurawar – Ashtha 400 kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line (~65km) • LILO of one circuit of Indore – Itarsi 400 kV D/c line at Astha (LILO route length ~ 30km.)

S. No.	Items	Details
		• Shujalpur – Kurawar 400 kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line (~40 km)
3.	**Depiction of the scheme on Transmission Grid Map**	**Given at para 3.5.4**
4.	**Upstream/ downstream system associated with the scheme**	At present, connectivity of about 3604 MW is received/granted at Fatehgarh-IV (Section-2) PS from various RE developers (Renew Shakti 5: 400 MW, Juniper Green : 365 MW, Cannice:320 MW Luceo : 300 MW, Serentica : 900 MW, Radiant : 200 MW, Helia:200 MW, Tepsol:300 MW, BN Hybrid: 119.2 MW, Sprng Power: 400 MW, Sprng Pavana : 100 MW. 765/400/220 kV Fatehgarh-III PS and Beawar S/s is under bidding as part of Rajasthan REZ Ph-III system and proposed to be interconnected with Ph-II/Ph-III system whereas 765/400 kV Chittorgarh S/s and 400/220 kV Bhinmal S/s are existing S/s. 765/400 kV Chittorgarh S/s is connected with Banaskantha (WR) and Ajmer (Proposed to be LILOed at Beawar) S/s through 765 kV D/c lines and 400 kV interconnection with Chittorgarh (RVPN) S/s. 400/220 kV Bhinmal S/s is connected with Zerda (WR) and Kankroli S/s (to be bypassed in future) as well as Barmer (RVPN) S/s.
5.	**Objective / Justification**	1. Transmission system for evacuation of power from Rajasthan REZ Ph-IV (Part-2 :7.5 GW) (Jaisalmer/Barmer Complex) was discussed ad agreed in 14th CMETS-NR meeting held on 23.12.22 and 61st NRPC meeting held on 26.12.22. 2. In the 12th NCT meeting held on 24.03.23, above scheme was discussed. In the meeting, various aspects like system strength (SCR), requirement of Barmer-I PS as well as high angular separation in the proposed 765 kV Jalore-Mandsaur D/C (length 320 kms) inter-regional transmission line was discussed. 3. Grid-India mentioned that in case both lines trip, the angular difference would further increase to 37 degrees. Therefore, in future, in case both lines trip and need to be revived during peak solar generation time, the system may not be stable. New intermediate substation in between may also be proposed and the transmission line length may be reduced as switching of 320 km long inter-regional transmission line may lead to issues in future. In the meeting CTUIL mentioned that 'N-1-1' is a rare contingency and this too may not occur simultaneously during peak solar generation hours. CTUIL also informed regarding possibility of LILO of the above line in future which will reduce the line length and an additional corridor is being planned from

S. No.	Items	Details
		Jalore S/s. So, in that condition, angular control will be much better in future. 4. Based on various above aspects, it was decided that CTUIL would review the transmission scheme in consultation with CEA and GRID-India and the scheme would be discussed in the next NCT meeting. Subsequently, various joint study meetings were held for review and phasing of transmission scheme among CEA, CTUIL and GRID-INDIA. List of above meetings are as under: • **Joint study meeting among CEA, CTUIL and GRID-INDIA on 17.04.23 under the Chairmanship of Member (PS), CEA** • **Joint study meeting among CEA, CTUIL and GRID-INDIA on 18.04.23 & 19.04.23** 5. Based on deliberations in NCT meeting, system studies were again carried out and discussed in above joint study meetings. **Joint study meeting among CEA, CTUIL and GRID-INDIA on 17.04.23 under the Chairmanship of Member (PS), CEA** • In the meeting, CTUIL stated that different methodologies for calculation of SCR were discussed in the meeting held on 11.04.23 convened by CEA. In the meeting, it was also decided that further deliberation is required to decide on SCR calculation methodology in Indian context. Meanwhile, CTUIL has calculated SCR based on conventional approach for SCR. Further, as discussed in the meeting, in case of hybrid RE contracted capacity i.e. power likely to be injected is being used in SCR calculation and SCR has been observed to be above 5 on Fatehgarh-IV (Section-2) and Barmer-I PS (assuming 50% capacity is evacuated at 220 kV & remaining 50% at 400 kV level pooling stations) • In the meeting, Grid-India stated that under N-1 contingency, with outage of one circuit of Jalore - Mandsaur 765 kV D/c line, the angular difference is around 25 degrees. However, in case of tripping of both circuits, the angular difference would increase to 37 degrees which may cause problems in synchronization of lines during peak solar generation hours. The issue of large voltage rise during charging of this long line (>320 km) was also raised by Grid-India. Grid- India proposed termination of this line at an intermediate sub-station so as to reduce the transmission line length which will in turn result in reduction in both angular separation as well as voltage rise during charging of line. Grid - India also suggested to increase load of Rajasthan in winter/summer solar maximized scenario. • In the reply, CTUIL stated that under N-1 contingency, the angular difference is under the stipulated planning criteria. N-1-1 or N-2 is a rare contingency and this too may not occur simultaneously during peak solar hours and deliberation is

S. No.	Items	Details
		required on N-1-1/N-2 compliance in planning studies as it may incur additional investment for strengthening of transmission system. Regarding the high voltage rise issue highlighted by Grid-India during line charging, CTUIL stated that the issue of voltage rise is generally dealt by providing adequate reactive compensation with the line/lines as well as corresponding buses. CTU also stated that there are number of 765 kV lines in NR (>320 km) on which voltage rise is within stipulated voltage limits during charging/restoration, as adequate reactive compensation (bus/line) provided on such transmission lines specially the transmission lines planned for RE evacuation. • CTUIL mentioned that as per the TSP practices, in case of split system restoration, 35-degree angle is kept in the synchroscope for line synchronization whereas in normal cases, it is 15 degrees. Grid - India mentioned that as per the recent experiences gained in Western Rajasthan complexes having low short circuit strength and problems faced during synchronization of lines, it will be prudent to plan the system such that parameters are within limits. Grid-India opined that system may be planned in such a way that split system under N-2 contingency doesn't exceed 30 degree angular difference so as to keep some operational margins. • In the meeting CEA opined that Khavda -IV generation (7 GW) along with its associated transmission system may also be considered in study files as both the schemes are required in the same timeframe. • CTUIL stated that as per the inputs provided by SECI, Sirohi and Jalore both have RE potential & are in proximity to each other. Therefore, location of Jalore PS may be shifted towards Sirohi district, so that length of the Jalore - Mandsaur 765 kV D/c line (Original length: 320 kms) is reduced by 30-40 kms. With reduction in line length (new length: 280 kms), the angular difference further reduces and may be considered in final proposal. CEA and Grid-India agreed that this would help the system and Sirohi PS should be preferred over Jalore. • After deliberations, it was decided that revised studies will be carried out considering modification suggested by Grid-India and CEA and revised file will be circulated. Based on outcome of revised file, mitigating measures for N-2 non-compliance of Jalore - Mandsaur 765 kV D/c line (Preferably 30 degree or below) shall be explored. **Joint study meeting among CEA, CTUIL and GRID-INDIA on 18.04.23 & 19.04.23** • CTUIL stated that in order to control angular difference in N-1-1/ N-2 contingency, various options were considered and it is suggested that in place of Jalore/ Sirohi - Mandsaur 765 kV D/c line, a new substation near Rishabdeo/Salumbar in Udaipur

S. No.	Items	Details
		district may be also planned with Sirohi – Rishabdeo/Salumbar 765 kV D/c line (170 km) and Rishabdeo/Salumbar S/s – Mandsaur 765 kV D/c line (160 km) along with LILO of one circuit of 765 kV Chittorgarh - Banaskanta D/c line at Rishabdeo/ Salumbar S/s (20 km) for additional anchoring. • CEA opined that initially, Jalore/Sirohi – Mandsaur 765 kV D/c line may be planned for evacuation of power, which may be LILOed at Rishabdeo/Salumbar S/s at later stage as and when N-1-1 non-compliance issue on 765 kV Sirohi- Mandsaur D/c line arises. CTUIL stated that from the studies, it has emerged that LILO would be required if RE injection at Fatehgarh-IV PS (Section-2)/Barmer-I PS exceeds 2.4 GW capacity. CEA suggested that phasing may be explored to defer the investment on above LILO at Rishabdeo/Salumbar. • Grid-India stated that transmission scheme should be planned in such a way that it may evacuate 7.5 GW RE capacity (Fatehgarh-IV: 4 GW, Barmer-I: 3.5 GW) in all possible scenario (winter/summer solar maximized) irrespective of RE type (Wind/ Solar) and BESS capacity as the break up RE capacity (solar/wind) is not yet final and it is possible that whole 7.5 GW capacity may comprise of only solar or solar + BESS. This will result in almost 90-100% dispatch in all scenarios. • CTUIL stated that RE potential and dispatches are considered based on report of "Transmission system for integration of over 500GW RE capacity by 2030" as well as SECI/MNRE inputs. As per the above report,100% solar dispatch and 50% wind dispatch considered in summer solar max scenario, whereas in winter solar max scenario 100% solar dispatch and 10% wind dispatch considered. Details are as under:

S. No.	Items	Details

Pooling Station	Total RE Potential (by 2030)		RE Potential (by 2027) for which system is planned	Net (Max) Dispatch Considered by 2027(GW) in summer	Net (Max) Dispatch Considered by 2027(GW) in Winter
	Source	Capacity (GW)	Capacity (GW)		
Fatehgarh-IV	Wind	6	4	4	2.4
	Solar	6	4		
	BESS	4	2		
Barmer-I	Wind	3	3	3.5	2.3
	Solar	4	3		
	BESS	1.5	1		
	Total (GW)			**7.5**	**4.7**

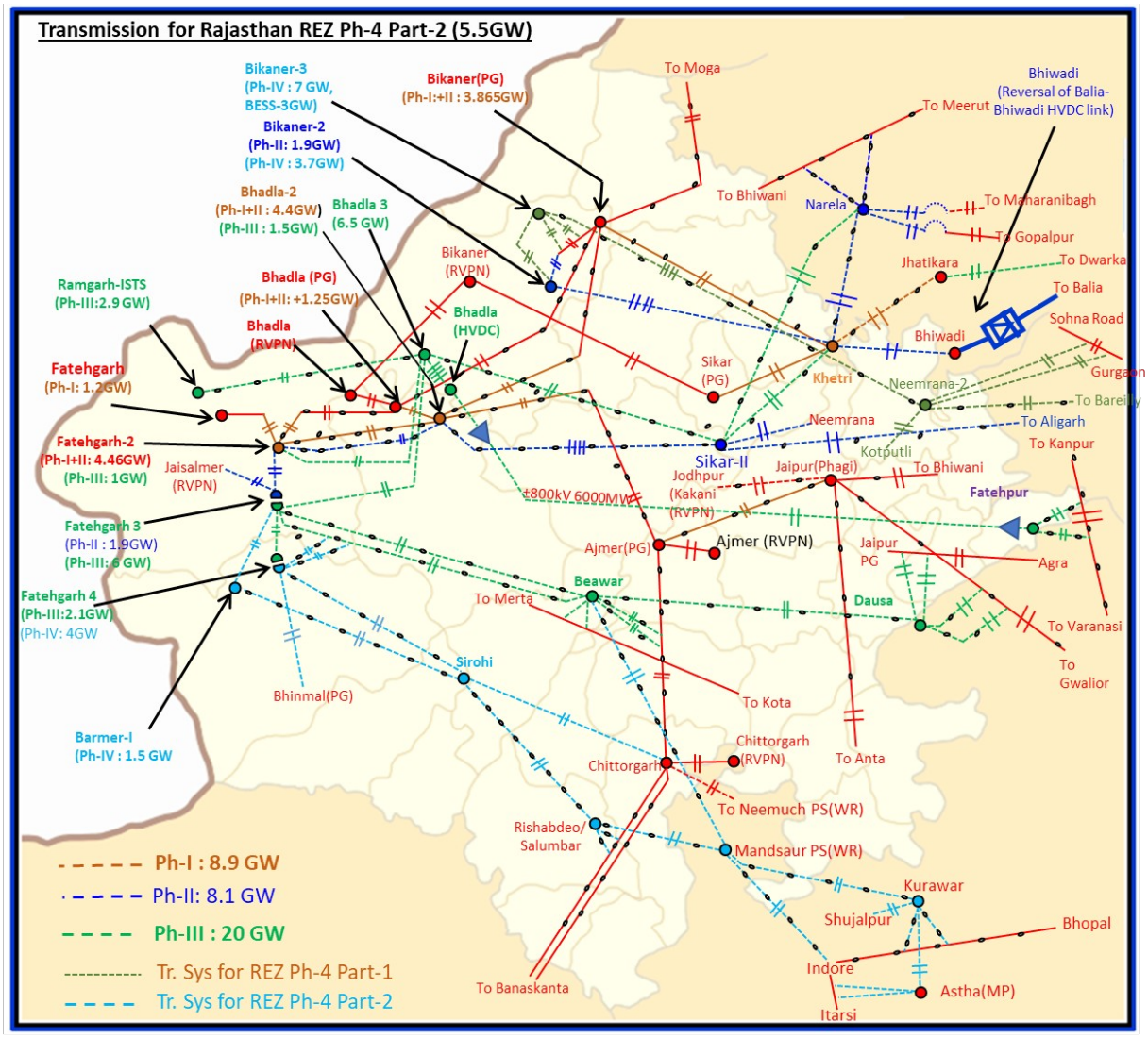
- At present, a comprehensive scheme is planned for Hybrid RE potential (7.5 GW) with 7.5 GW RE dispatch in summer season and 4.7 GW RE dispatch in winter season as Wind contribution reduces significantly in winters. In case the scheme needs to be planned for 7.5 GW RE dispatch in winter scenario also, additional transmissions system is required due to critical loading beyond Jalore/Sirohi.
- CEA stated that as the system is being planned for 4 GW injection at Fatehgarh-IV (Section-2), it should cater to 4 GW injection at any instant. CTUIL stated that with change in above approach on RE dispatch levels and considering all solar injection instead of wind/BESS, transmission requirement in RE Planning studies would increase.
- CEA stated that with above change in approach, identified transmission scheme shall be able to cater lower quantum of RE potential. Therefore, RE quantum which can be evacuated through revised transmission scheme may be studied. With development of wind or BESS capacity also in the above

S. No.	Items	Details
		complex, evacuation capacity may increase from same transmission system. • After conducting studies with incorporation of increased load of Rajasthan as suggested by Grid- India, CTUIL stated that transmission system is adequate for evacuation of about 5.5 GW RE power (solar) in summer & winter scenario. However, with development of wind or BESS capacity in above complex, evacuation capacity shall increase from 5.5 GW. Accordingly, studies were found to be in order for the transmission system. • GRID-India vide mail 20.04.23 informed that the proposed scheme is agreed and the proposal as decided in Joint study meeting meeting on 19.04.23 & may be put up to NRPC for further approval. Meanwhile, studies for off-peak scenario may also be carried out and suitable compensation (if voltage related issues are observed) may be planned later on such that same also gets commissioned in matching time frame of the proposed scheme. Further the scheme was also deliberated & approved in the 65th NRPC meeting held on 21.04.23 subject to deliberations in CMETS-NR meeting. 6. Further, the scheme was deliberated in 18th CMETS-NR meeting held on 28.04.23. In the meeting, it was stated that, in Feb solar maximized scenario (revised case) loading of 400 kV RAPS-Shujalpur D/c line is marginally higher (about 925 MW) in N-1 contingency. The loading of above line will be reviewed with progress of RE generation projects at Rajasthan and strengthening requirement will be identified later, if required. CTU also carried out the studies for off-peak scenario and same was sent vide mail 27.04.23. From the off-peak studies it was observed that voltages are within limits with proposed reactive compensation requirement. 7. Subsequently, NRLDC vide mail 03.05.23 sent their observations stating that the bus voltages are observed to be within the limit in the off peak case study based on the compensation given and no major line opening has been considered in order to mitigate high voltage scenario in the off peak case. 8. Further as advised by Grid-India, Thermal machines (1325 MW) have been switched off in off peak case as these machines are out of service in peak solar case too. NRLDC also stated to correct Qmin limits and machine control mode of few machines in Rajasthan. Based on above, Qmin limit of Ramgarh & Rajwest machines were modified in off peak file by CTU, however, some of machines i.e. Bhadla-3, Bikaner-NW, Mada, Amarsagar etc. are not in service in all scenarios, therefore any change in Qmin limit/machine control mode of these machines will not impact the bus voltages. 9. With above modifications, studies for off peak were reviewed by CTU. It is observed that there is no significant impact on Grid voltages in revised off peak file and bus voltage are within limits in Rajasthan RE complex with proposed reactive compensation

S. No.	Items	Details
		in subject scheme (Rajasthan REZ Ph-IV (Part-2) (Jaisalmer/Barmer Complex). In view of deliberation held in Joint study meetings as well as in 18th CMETS-NR meeting, ISTS Transmission scheme was agreed (as per S.No 2), which is as under 10. The transmission system for WR portion was discussed in a meeting amongst CEA, CTUIL, MPPTCL and GRID-INDIA on 01.12.2022, wherein the above system was in-principally agreed. The scheme was further agreed in 13th CMETS-WR meeting held on 08.12.2022 & 18th CMETS-WR meeting held on 26.04.23.
6.	**Estimated Cost**	**Total: Rs. 19,483 Cr.** • **Rs. 13,856 Cr. (NR Portion)** • **Rs. 5,627 Cr. (WR Portion)**
7.	**Impact on the total Annual Transmission charges in % along with the existing ATC**	A. ATC (considering Levelized Tariff @15% of estimated cost): Rs 2922.45 Cr. B. Present ATC: Rs. ₹44312.66 Cr.* C. A/B (%): 6.595 %
8.	**Need of phasing, if any**	Not Applicable
9.	**Implementation timeframe**	24 months from allocation of project /SPV transfer
10.	**Inclusion of any wild life/protected area along the transmission line route**	**Northern Region** Fathegarh-IV, Barmer-I & Fatehgarh-III S/s are located in the potential GIB area of Rajasthan. Therefore, the lines emanating from these stations also pass through the potential GIB area. However, following lines may pass through WLS or its buffer zone in the state of Rajasthan. However, for details of forest/protected areas survey is required to be done. • Beawer-Mandsaur - Bassi WLS, Kumbhalgarh WLS & Tadgarh Raoli WLS • Sirohi PS- Rishabdeo/Salumbar - Phulwari ki nal WLS • Rishabdeo/Salumbar - Mandsaur PS - Sitamata WLS • Jalore Chittorgarh - kumbhalgarh WLS **Western Region** 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**	The transmission scheme was discussed and agreed in the 61st NRPC meeting held on 26.12.22. Modified transmission scheme was discussed and agreed in 65th NRPC meeting held on 21.04.23 subject to decision in CMETS-NR meeting. The scheme was further agreed in 46th WRPC meeting held on 03.02.23

S. No.	Items	Details
12.	**System Study for evolution of the proposal**	Studies discussed and agreed in following meetings • 12th NCT meeting held on 24.03.23 • NR Joint study meeting held on 17-19th Apr'23 • 18th CMETS-NR meeting held on 28.04.23 • 65st NRPC meeting held on 21.04.23 • 18th CMETS-WR meeting held on 26.04.23 • Load flow results is attached in NR Joint study meeting held on 17-19th Apr'23

3.5.4 Schematic of the scheme is given below:



3.5.5 Detailed scope of the scheme is given:

Part-A: (Rs 2206 Cr.)

Sl. No.	Description	Capacity/ckm
1	Establishment of 4x1500 MVA, 765/400 kV & 5x500 MVA, 400/220 kV Fatehgarh-IV (Section-2) Pooling Station	• 765/400 kV 1500 MVA ICT- 4 nos. (13x500 MVA including one spare unit) • 765 kV ICT bays-4 no.

	along with 2x240 MVAr (765 kV) Bus Reactor & 2x125 MVAr (400 kV) Bus Reactor **[Future space provisions already approved at Fatehgarh-IV in 8th NCT meeting dated 25.03.22 would be utilized for the present scheme]**	• 240 MVAr Bus Reactor- 2 nos. (7x80 MVAr, including one spare unit) • 765 kV Bus reactor bays-2 no • 765 kV line bays - 4 nos [for LILO of Fatehgarh-III - Beawer 765 kV D/c (2nd) line at Fatehgarh-IV (Section-2) PS] • 400/220 kV 500 MVA ICT -5 nos. • 400 kV ICT bays- 9 no. • 400 kV line bays - 2 nos [For Fatehgarh-IV (Sec-2) - Bhinmal (PG) D/c line] • 125 MVAr Bus Reactor-2 nos. • 400 kV Bus reactor bays- 2 nos. • 400 kV Sectionalisation bay: 1 set • 220 kV ICT bays- 5 no. • 220 kV line bays: 6 nos. (for RE connectivity) • 220 kV BC (2 nos.) and 220 kV TBC (2 nos.) • 220 kV Sectionalisation bay: 1 set
2	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	Route Length: 200 km • 400 kV, 50 MVAr switchable line reactors at Fatehgarh-IV (Section-2) PS – 2 Nos. • 400 kV, 50 MVAr switchable line reactors at Bhinmal (PG) – 2 Nos. • Switching equipment for 400 kV 50 MVAr switchable line reactors at Fatehgarh-IV (Section-2) PS – 2 Nos. • Switching equipment for 400 kV 50 MVAr switchable line reactors at Bhinmal (PG) – 2 Nos.
3	LILO of both ckts of 765 kV Fatehgarh-III- Beawar D/c line (2nd) 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)	LILO length: 15 km • 330 MVAr switchable line reactors at Fatehgarh-IV (Section-2) PS – 2 nos. • Switching equipment for 330 MVAr switchable line reactors at Fatehgarh-IV (Section-2) PS – 2 nos. • 110 MVAr (765 kV) spare reactor single phase unit at Fatehgarh-IV (Section-2) PS end – 1 no.
4	2 nos. of 400 kV line bays at Bhinmal (PG)	400 kV line bays - 2 nos.

Note:

i. Transmission system for evacuation of about 2 GW RE power from REZ in Rajasthan (20 GW) under Phase-III Part A1 at Fatehgarh-IV (Section-1) is under bidding.

ii. Transmission system under Phase-IV (Part 2) is for evacuating 4-5 GW potential at Fatehgarh-IV (Section 2), which is utilising the future provision (approved in 8th NCT meeting dated 25.03.22) at Fatehgarh-IV approved under Phase-III scheme.

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

iv. POWERGRID to provide space for 2 nos. of 400 kV line bays at Bhinmal (PG) along with the space for switchable line reactors.
v. Implementation of A,B,C,D, E ,F1 & H1 packages shall be aligned
vi. Switchable line reactors to be implemented with NGR bypass arrangement

Implementation Timeframe: 24 months

Part-B : (Rs 3279 Cr.)

S. No.	Description	Capacity/ckm
1	Establishment of 2x1500 MVA, 765/400 kV Substation at suitable location near Sirohi along with 2x240 MVAr (765 kV) & 2x125 MVAr (400 kV) Bus Reactor Future provisions: Space for • *765/400 kV ICT along with bays- 4 nos.* • *765 kV line bays along with switchable line reactors – 8 nos.* • *765 kV Bus Reactor along with bay: 1 nos.* • *400 kV line bays along with switchable line reactor –4 nos.* • *400 kV line bays –4 nos.* • *400 kV Bus Reactor along with bay: 1 no.* • *400 kV Sectionalization bay: 2 sets* • *400/220 kV ICT along with bay - 6 nos.* • *220 kV line bays -10 nos.* • *220 kV Sectionalization bay: 2 sets* • *220 kV BC (3 nos.) & TBC (3 nos.)* • *STATCOM (2x±300 MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr)*	• 765/400 kV 1500 MVA ICT- 2 nos. (7x500 MVA including one spare unit) • 765 kV ICT bays-2 no. • 240 MVAr Bus Reactor-2 nos. (7x80 MVAr including one spare unit) • 765 kV Bus reactor bays-2 nos. • 765 kV line bays- 2 nos. [for D/c line to Fatehgarh-IV (Section-2) PS] • 400 kV ICT bays- 2 no. • 400 kV line bays - 2 nos. [for D/c line to Chittorgarh (PG) S/s] • 125 MVAr Bus Reactor-2 nos. • 400 kV Bus reactor bays- 2 nos.
2	Fatehgarh-IV (Section-2) PS – Sirohi PS 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end	Route Length – 240 km • 765 kV, 240 MVAr switchable line reactors at Fatehgarh-IV (Section-2) PS – 2 nos. • 765 kV, 240 MVAr switchable line reactors at Sirohi PS– 2 nos. • Switching equipment for 765 kV 240 MVAr switchable line reactors at Fatehgarh-IV (Section-2) PS – 2 nos. • Switching equipment for 765 kV 240 MVAr switchable line reactors at Sirohi PS – 2 nos.
3	Sirohi PS-Chittorgarh (PG) 400 kV D/c line	Route Length ~160 km (Quad)

S. No.	Description	Capacity/ckm
	along with 80 MVAr switchable line reactor for each circuit at Sirohi PS end (Quad)	• 400 kV, 80 MVAr switchable line reactors at Sirohi PS – 2 nos. • Switching equipment for 400 kV 80 MVAr switchable line reactors at Sirohi PS – 2 nos.
4	2 no. of 400 kV line bays at Chittorgarh (PG) S/s	400 kV line bays at Chittorgarh (PG) S/s - 2 nos.
3	2 no. of 765 kV line bays at Fatehgarh-IV (Section-2) PS	765 kV line bays at Fatehgarh-IV (Section-2) PS – 2 nos

Note:

i. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.
ii. POWERGRID to provide space for 2 nos. of 400 kV line bays at Chittorgarh (PG)
iii. Developer of Fatehgarh-IV S/s (Section-2) to provide space for 2 nos. of 765 kV line bays at Fatehgarh-IV(Section-2) PS along with the space for switchable line reactor
iv. Implementation of A,B,C,D, E ,F1 & H1 packages shall be aligned
v. Switchable line reactors to be implemented with NGR bypass arrangement

Implementation Timeframe: 24 months.

Part-C (Rs 1953 Cr.)

Sl. No.	Description	Capacity / line length km
1.	Establishment of 765 kV Mandsaur Pooling Station along with 2x330 MVAr (765 kV) Bus Reactors (with 1x110 MVAr & 1x80 MVAr, 765 kV spare single phase reactor unit for line/ bus reactor) **Future Scope**: Space for: • 765/400 kV ICT along with bays- 6 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 -8 nos. • 400 kV Bus Reactor along with bay: 2 no. • 400 kV Sectionalization bay: 1- set • 220 kV line bays: 16 nos.	• 330 MVAR 765 kV bus reactor-2 • 765 kV bus reactor bay- 2 • 765 kV line bay- 2 (for Indore line) • 110 MVAR, 765 kV, 1-ph reactor (spare unit)-1 • 80 MVAR, 765 kV, 1-ph reactor (spare unit)-1

Sl. No.	Description	Capacity / line length km
	• 220 kV Sectionalization bay: 2 sets • 220 kV BC and TBC: 3 nos. • STATCOM (± 300 MVAr) along with MSR (2x125 MVAr) & MSC (1x125 MVAr) along with 400 kV bay: 1 no. • Space for spare 765/400 kV 500 MVA unit single phase spare unit	
2.	Mandsaur PS – Indore(PG) 765 kV D/c Line	Route Length – 200 km
3.	1x330 MVAr switchable line reactor (SLR) on each ckt at Mandsaur end of Mandsaur PS – Indore(PG) 765 kV D/c Line	• 330 MVAr, 765 kV switchable line reactor- 2. • Switching equipments for 765 kV line reactor- 2
4.	2 nos. of 765 kV line bays at Indore(PG) for termination of Mandsaur PS – Indore(PG) 765 kV D/c Line	• 765 kV line bays – 2 Nos. (for Indore(PG) end)

Note:

i. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
ii. POWERGRID to provide space for 2 nos. of 765 kV line bays at Indore S/s
iii. Implementation of A,B,C,D, E ,F1 & H1 packages shall be aligned
iv. Switchable line reactors to be implemented with NGR bypass arrangement

Implementation Timeframe: 24 months

Part-D: (Rs 2227 Cr.)

S. No.	Description	Capacity/ckm
1	Beawar- Mandsaur PS 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end	Route Length – 260 km • 765 kV, 240 MVAr switchable line reactors at Beawar – 2 nos. • 765 kV, 240 MVAr switchable line reactors at Mandsaur PS – 2 nos. • Switching equipment for 765 kV, 240 MVAr switchable line reactors at Beawar – 2 nos. • Switching equipment for 765 kV, 240 MVAr switchable line reactors at Mandsaur PS – 2 nos.
2	2 no. of 765 kV line bays each at Beawar S/s & Mandsaur S/s	765 kV line bays - 4 nos (2 nos. each at Beawer S/s & Mandsaur PS)

Note:

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

ii. Developer of Mandsaur PS to provide space for 2 nos. of 765 kV line bays at Mandsaur S/s along with the space for switchable line reactor
iii. Developer of Beawar S/s to provide space for 2 nos. of 765 kV line bays at Beawar S/s along with the space for switchable line reactor
iv. Implementation of A,B,C,D, E ,F1 & H1 packages shall be aligned
v. Switchable line reactors to be implemented with NGR bypass arrangement

Implementation Timeframe: 24 months

Part-E: (Rs 3277 Cr.)

Sl. No.	Description	Capacity/ckm
1	Establishment of, 765 kV Substation at suitable location near Rishabdeo/Salumbar (Distt. Udaipur) along with 2x240 MVAr (765 kV) Bus Reactor **Future Scope** **Space for** ➢ 765/400kV ICT along with bays- 5 no. along with spare unit ➢ 765 kV line bays along with switchable line reactors – 4 no. ➢ 765kV Bus Reactor along with bay: 1 no. ➢ 400 kV line bays along with switchable line reactor –4 no. ➢ 400 kV line bays –4 no. ➢ 400 kV Bus Reactor along with bay: 3 no. ➢ 400kV Sectionalization bay: 2 sets ➢ 400/220kV ICT along with bay - 6 no. ➢ 220kV line bays -10 no. ➢ 220kV Sectionalization bay: 2 sets ➢ BC (3 nos.) & TBC (3 nos.) ➢ STATCOM (2x±300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr)	• 240 MVAr Bus Reactor- 2 nos. (7x80 MVAr, including one spare unit) • 765 kV Bus reactor bays-2 no • 765 kV line bays - 6 nos [for 765kV Sirohi PS- Rishabdeo/Salumbar – Mandsaur D/c & LILO of one circuit of 765 kV Chittorgarh-Banaskanta D/c line at Rishabdeo/Salumbar S/s]
2	Sirohi PS- Rishabdeo/Salumbar 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at Sirohi end	Route Length – 170 km • 765 kV, 330 MVAr switchable line reactors at Sirohi PS– 2 nos. • Switching equipment for 765 kV, 330 MVAr switchable line reactors at Sirohi PS– 2 nos. • 110 MVAr (765 kV) spare reactor single phase unit at Sirohi PS – 1 no.
3	Rishabdeo/Salumbar - Mandsaur PS 765 kV D/c line along with 330 MVAr switchable line reactor for each circuit at	Route Length – 160 km • 765 kV, 330 MVAr switchable line reactors at Rishabdeo/Salumbar – 2 nos.

Sl. No.	Description	Capacity/ckm
	Rishabdeo/Salumbar end	• Switching equipment for 765 kV, 330 MVAr switchable line reactors at Rishabdeo/Salumbar – 2 nos. • 110 MVAr (765 kV) spare reactor single phase unit at Rishabdeo/Salumbar end – 1 no.
4	LILO of one circuit of 765 kV Chittorgarh-Banaskanta D/c line at Rishabdeo/Salumbar S/s (20 km)	LILO length: 20 km
5	2 no. of 765 kV line bays each at Sirohi PS & Mandsaur S/s	• 765 kV line bays - 4 nos (2 nos. each at Sirohi PS & Mandsaur PS)

Note:

i. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
ii. Developer of Sirohi PS to provide space for 2 nos. of 765 kV line bays at Sirohi PS along with the space for switchable line reactors
iii. Developer of Mandsaur PS to provide space for 2 nos. of 765 kV line bays at Mandsaur PS
iv. Implementation of A,B,C,D, E ,F1 & H1 packages shall be aligned
v. Switchable line reactors to be implemented with NGR bypass arrangement

Implementation Timeframe: 24 months

Part-F1: (Rs 2480 Cr.)

S. No.	Description of Transmission Element	Capacity/ckm
1	Establishment of 2x1500 MVA, 765/400 kV Barmer-I Pooling Station along with 2x240 MVAr (765 kV) Bus Reactor & 2x125 MVAr (400 kV) Bus Reactor Future provisions: Space for ➢ 765/400kV ICT along with bays- 4 no. ➢ 765 kV line bays along with switchable line reactors – 4 nos. ➢ 765kV Bus Reactor along with bay: 1 no. ➢ 400 kV line bays –4 ➢ 400 kV line bays along with switchable line reactor –4 nos. ➢ 400/220kV ICT along with bays -10 nos. ➢ 400 kV Bus Reactor along with bay: 1 no. ➢ 400kV Sectionalization bays: 2 sets ➢ 220 kV line bays for connectivity of RE	• 765/400 kV 1500 MVA ICT- 2 nos. (7x500 MVA including one spare unit) • 765 kV ICT bays-2 no. • 240 MVAr Bus Reactor-2 no. (7x80 MVAr, including one spare unit) • 765 kV Bus reactor bays-2 no. • 765 kV line bays- 2 nos (for D/c line to Sirohi PS) • 400 kV ICT bays- 2 no. • 125 MVAr Bus Reactor-2 nos. • 400 kV Bus reactor bays- 2 nos. • 400 kV line bays - 2 nos. [for D/c line to Fatehgarh-III(Section-2) PS]

S. No.	Description of Transmission Element	Capacity/ckm
	Applications -14 nos. ➢ 220kV Sectionalization bay: 3 sets ➢ BC (4 nos.) & TBC (4 nos.) ➢ STATCOM (2x±300MVAr) along with MSC (4x125 MVAr) & MSR (2x125 MVAr)	
2	Fatehgarh-III (Section-2) PS – Barmer-I PS 400 kV D/c line (Quad)	Route Length -50 km (Quad)
3	Barmer-I PS– Sirohi PS 765 kV D/c line along with 240 MVAr switchable line reactor for each circuit at each end	Route Length – 200 km • 765 kV, 240 MVAr switchable line reactors at Barmer-I PS – 2 nos. • 765 kV, 240 MVAr switchable line reactors at Sirohi PS – 2 nos. • Switching equipment for 765 kV 240 MVAr switchable line reactors at Barmer-I PS – 2 nos • Switching equipment for 765 kV 240 MVAr switchable line reactors at Sirohi PS – 2 nos.
4	2 no. of 400 kV line bays at Fatehgarh-III (Section-2) PS	400 kV line bays at Fatehgarh-III (Section-2) PS - 2 nos.
5	2 no. of 765 kV line bays at Sirohi PS	765 kV line bays at Sirohi PS – 2 nos

Note:

i. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey
ii. Developer of Sirohi PS to provide space for 2 nos. of 765 kV line bays at Sirohi PS along with the space for switchable line reactor
iii. Developer of Fatehgarh-III PS (Section-2) to provide space for 2 nos. of 400 kV line bays at Fatehgarh-III PS (Section-2)
iv. Switchable line reactors to be implemented with NGR bypass arrangement
v. Implementation of A,B,C,D, E ,F1 & H1 packages shall be aligned

Implementation Timeframe: 24 months

Part-F2: (Rs 255 Cr.)

Sl. No.	Description	Capacity/ckm
1	Augmentation with 1x1500 MVA, 765/400 kV ICT at Barmer-I PS	• 765/400 kV 1500 MVA ICT- 1 Nos. (3x500 MVA) • 765 kV ICT bay-1 No. • 400 kV ICT bay- 1 No.
2	Creation of 220 kV level along with 2x500	• 400/220 kV 500 MVA ICT -2 Nos

	MVA, 400/220 kV Barmer-I PS	• 400 kV ICT bays- 2 No. • 220 kV ICT bays- 2 No. • 220 kV line bays: 4 Nos. (for RE connectivity) • BC (1 no • .) & TBC (1 no.)

Note:

i. To be taken upon application at 220 kV or 400 kV at Barmer-I PS as per requirement

Implementation Timeframe: 18 months

Part-G (Rs 132 Cr.)

S. No.	Description of Transmission Element	Capacity/ckm
1	Augmentation by 1x1500 MVA, 765/400 kV ICT at Fatehgarh-II PS (7th)	• 765/400 kV 1500 MVA ICT -1 no. • 765 kV ICT bay-1 no. • 400 kV ICT bay- 1 no.

Implementation Timeframe: 18 months

Part-H-1 (Rs. 3674 Cr.)

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Establishment of 765/400 (2x1500 MVA), 400/220 (2x500 MVA) & 220/132 kV (3x200 MVA) Kurawar S/s (with 1x500 MVA spare single phase transformer unit) with 2x330 MVAr 765 kV bus reactor and 1x125 MVAr 420 kV bus reactor (with 1x110 MVAr & 1x80 MVAr, 765 kV spare single phase reactor unit for line/bus reactor) **Future Scope**: Space for • 765/400 kV ICT along with bays- 4 no. • 765 kV line bays along with switchable line reactors – 8 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 – 10 nos. • 400/220 kV ICT along with bays -6 nos.	• 765/400 kV, 1500 MVA ICT – 2 • 400/220 kV, 500MVA ICT – 2 • 220/132 kV, 200MVA ICT – 3 • 765 kV ICT bays- 2 • 400 kV ICT bays- 4 • 220 kV ICT bays – 5 • 132 kV ICT bays - 3 • 330 MVAR 765 kV bus reactor-2 • 125 MVAR 420 kV bus reactor-1 • 765 kV reactor bay- 2 • 765 kV line bays- 4 • 400 kV line bays- 4 • 400 kV reactor bay- 1 • 220 kV BC – 1 • 220 kV TBC – 1 • 132 kV TBC – 1 • 500 MVA, 765/400 kV Spare ICT-1 • 110 MVAR, 765 kV, 1-ph reactor (spare unit)-1 • 80 MVAR, 765 kV, 1-ph reactor (spare unit)-1

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
	• 400 kV Bus Reactor along with bay: 2 no. • 400 kV Sectionalization bay: 1- set • 220 kV line bays: 12 nos. • 220 kV Sectionalization bay: 2 sets • 220 kV BC and TBC: 2 nos. • 220/132 kV ICT along with bays: 5 nos. • 132 kV line bays: 16 nos. • 132 kV Sectionalization bay: 1 set • 132 kV TBC– 1 no. • STATCOM (±300 MVAr) along with MSR (2x125 MVAr) & MSC (1x125 MVAr) with 400 kV bay: 1 no.	
2.	Mandsaur – Kurawar 765 kV D/c line	Route length: 235 km
3.	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 equipments for 765 kV line reactor- 4 (2 for Mandsaur end and 2 for Kurawar end)
4.	2 nos. of 765 kV line bays at Mandsaur S/s for termination of Mandsaur – Kurawar 765 kV D/c line	• 765 kV line bays – 2 Nos. (for Mandsaur end)
5.	LILO of Indore – Bhopal 765 kV S/c line at Kurawar	LILO route length: 15 km.
6.	Kurawar – Ashtha 400 kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line	Route length: 65 km
7.	2 nos. of 400 kV line bays at Ashtha (MP) S/s for termination of Kurawar – Ashtha 400 kV D/c line	400 kV line bays – 2 Nos. [for Ashtha (MP) end]
8.	LILO of one circuit of Indore – Itarsi 400 kV D/c line at Astha	LILO route length : 30 km
9.	2 nos. of 400 kV line bays at Ashtha (MP) S/s for LILO of one circuit of Indore – Itarsi 400 kV D/c line at Astha	400 kV line bays – 2 Nos. (for Ashtha (MP) end)
10.	Shujalpur – Kurawar 400 kV D/c (Quad ACSR/AAAC/AL59 moose equivalent) line	Route length: 40 km
11.	2 nos. of 400 kV line bays at Shujalpur(PG) S/s for termination of Shujalpur – Kurawar 400 kV D/c line	400 kV line bays – 2 Nos. [for Shujalpur(PG) end]

Implementation Time-frame: 24 months from date of allocation to implementing agency

Note:

i. The line lengths mentioned above are approximate as the exact length shall be obtained after the detailed survey.
ii. MPPTCL has confirmed availability of space for 2 nos. 400 kV bays at Ashta (MP) S/s and for 2 nos. additional bays, MPPTCL has informed that adjacent land is private land and may be purchased by the project developer at their cost as per requirement.
iii. Implementation of A,B,C,D, E ,F1 & H1 packages shall be aligned
iv. TSP of the subject scheme shall implement Inter-tripping scheme on Mandsaur – Kurawar 765 kV D/c line (for tripping of the switchable line reactor at Mandsaur/Kurawar end along with the main line breaker).
v. Switchable line reactors to be implemented with NGR bypass arrangement

Part-H-2 (Rs. 0.45Cr.)

Sl. No.	Scope of the Transmission Scheme	Capacity / line length km
1.	Provision of NGR bypass arrangement and inter tripping scheme on 240 MVAr SW LR at Bhopal end of Kurawar – Bhopal 765 kV S/c line (~60 km.)	NGR bypass arrangement and inter tripping scheme (Bhopal end)

Implementation Time-frame: In the matching timeframe of Part-H-1.

3.5.6 Members may deliberate.

3.6 Requirement of additional FOTE of STM-16 capacity at Bhuj PS to cater connectivity of RE Gencos.

3.6.1 To connect 6 number of RE generators (Inox, Vadava Desalpar, Narayanpar, Adani Ratadia, Renew Power, Alfanar Energy**)** directly to existing FOTE at Control Room of Bhuj PS maintaining MSP (1+1) and for making independent connectivity for upcoming generators at this station, Additional STM-16 capacity SDH equipment is required

3.6.2 The "Requirement of additional FOTE of STM-16 capacity at Bhuj PS to cater connectivity of RE Gencos", has been deliberated in 46th TCC/ WRPC meeting. WRPC concurred the proposal of "Requirement of additional FOTE of STM-16 capacity at Bhuj PS to cater connectivity of RE Gencos" at estimated cost of Rs 60 Lacs.

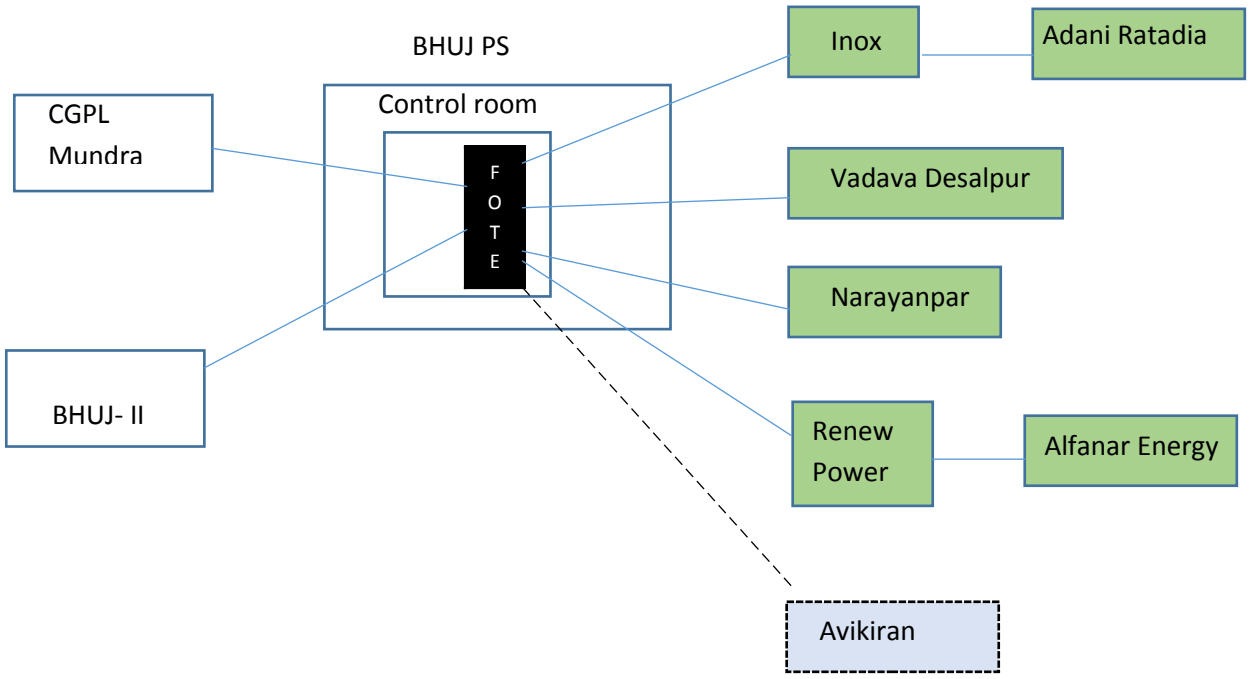
3.6.3 Details of the scheme is given below:

S. No.	Items	Details
1.	Name of Scheme	Requirement of additional FOTE of STM-16 capacity at Bhuj PS to cater connectivity of RE Gencos.
2.	Scope of the scheme	1. Supply and installation of

S. No.	Items	Details
		a) 01 number 10 MSP (1+1) FOTE or 02 No. 5MSP (1+1) FOTE (STM-16 capacity) at Bhuj PS.
3.	Depiction of the scheme on FO Map	**Para 3.6.4**
4.	Objective / Justification	• Bhuj Pooling station is owned by M/s POWERGRID. At present, 01 no 5-MSP STM-16 SDH equipment is installed catering to communication link with Banaskantha, CGPL Mundra and 06 numbers of RE generators (Inox, Vadava Desalpar, Narayanpar, Adani Ratadia, Renew Power, Alfanar Energy). • Alfanar Energy, and Adani Ratadia are connected on cascade mode, making the data of one generator dependent on others. • Another RE generator Avikiran is also granted connectivity at Bhuj PS. • To connect all these generators directly to existing FOTE at Control Room of Bhuj PS maintaining MSP (1+1) and for making independent connectivity for upcoming generators at this station, Additional STM-16 capacity SDH equipment is required. The schematic diagram is attached at **Para 3.6.4**
5.	Estimated Cost &Funding	**Rs. 60 Lakhs** (approx.) excluding GST.
6.	Implementation timeframe	12 months from the date of allocation
7.	Implementation Mode	Through POWERGRID on RTM mode.
8.	Deliberations with WRPC along with their comments	The "Requirement of additional FOTE of STM-16 capacity at Bhuj PS to cater connectivity of RE Gencos", has been deliberated in 46th TCC/ WRPC meeting held on 02-03 Feb 2023. WRPC concurred the proposal of "Requirement of additional FOTE of STM-16 capacity at Bhuj PS to cater connectivity of RE Gencos" at estimated cost of Rs 60 Lacs.

3.6.4 Schematic of the scheme:

Present connectivity at Bhuj PS-



BHUJ PS

3.6.5 Detailed Scope of the Scheme is given below:

Scope of the Scheme	Cost
1. Supply and installation of 01 number 10 MSP (1+1) FOTE or 02 No. 5MSP (1+1) FOTE (STM-16 capacity) at Bhuj PS.	**Rs. 60 Lakhs** (approx.) excluding GST.

3.6.6 Members may deliberate.

3.7 **Requirement of additional FOTE of STM-16 capacity at Bhuj-II substation to cater connectivity of RE Gencos.**

3.7.1 To connect 6 number of RE generators (Inox, Vadava Desalpar, Narayanpar, Adani Ratadia, Renew Power, Alfanar Energy**)** directly to existing FOTE at Control Room of Bhuj PS maintaining MSP (1+1) and for making independent connectivity for upcoming generators at this station, Additional STM-16 capacity SDH equipment is required

3.7.2 The "Requirement of additional FOTE of STM-16 capacity at Bhuj II to cater connectivity of RE Gencos", has been deliberated in 46th TCC/ WRPC meeting. WRPC concurred the proposal of "Requirement of additional FOTE of STM-16 capacity at Bhuj II to cater connectivity of RE Gencos" at estimated cost of Rs 30 Lacs.

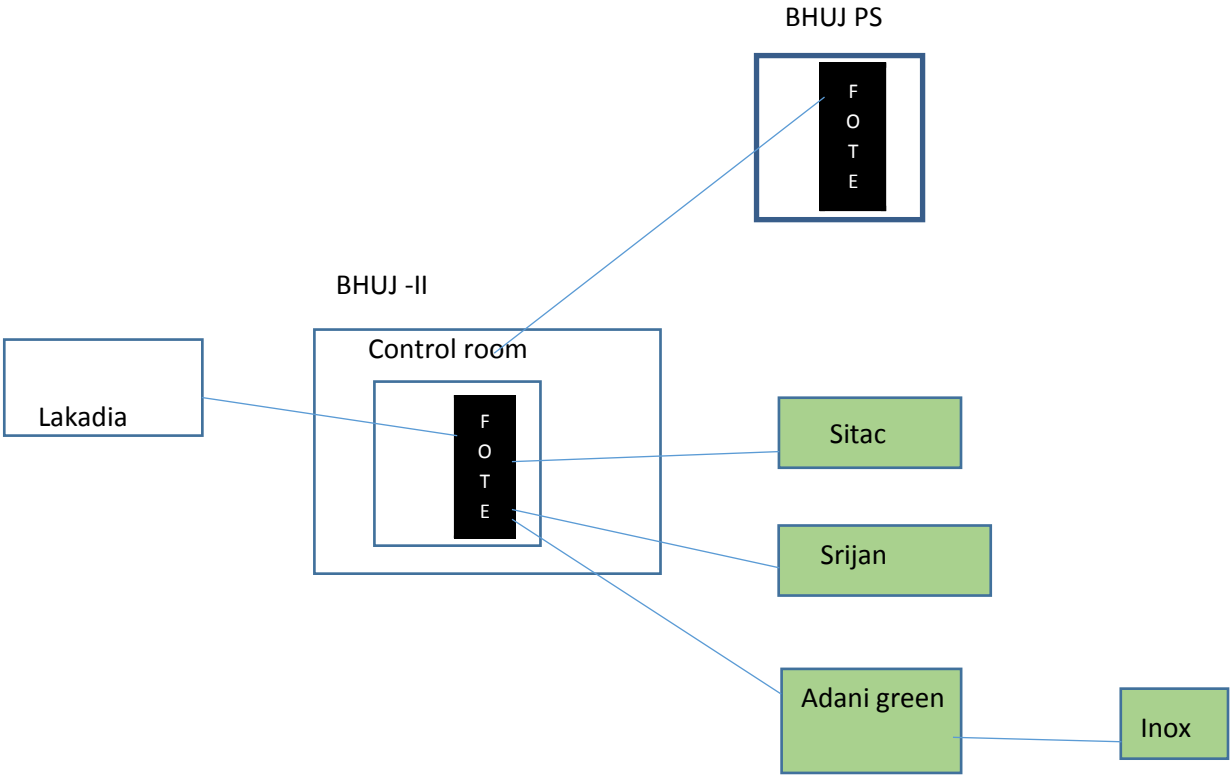
3.7.3 Details of the scheme is given below:

S. No.	Items	Details
1.	Name of Scheme	Requirement of additional FOTE of STM-16 capacity at Bhuj-II substation to cater connectivity of RE Gencos.
2.	Scope of the scheme	1. Supply and installation of a) 01 number 5 MSP (1+1) FOTE (STM-16 capacity) at Bhuj-II station.
3.	Depiction of the scheme on FO Map	**para 3.7.4**
4.	Objective / Justification	• Bhuj-II substation is owned by M/s PBTL. 1 no 5-MSP, STM-16 SDH equipment with (Multiplex Section Protection) is installed catering to communication link with Bhuj PS, Lakadia S/s and 04 nos RE generators (SITAC, Adani, Srijan, Inox). • Many more RE generators are to come in near future at Bhuj-II. • To connect all these generators directly to existing FOTE at Control Room of Bhuj-II maintaining MSP (1+1) and for making independent connectivity for upcoming generators at this station, Additional STM-16 capacity SDH equipment is required. The schematic diagram is attached at **para 3.7.4**
5.	Estimated Cost &Funding	**Rs. 30 Lakhs** excluding GST.
6.	Implementation timeframe	12 months from the date of allocation
7.	Implementation Mode	Through M/s PBTL on RTM mode.

S. No.	Items	Details
8.	Deliberations with WRPC along with their comments	The "Requirement of additional FOTE of STM-16 capacity at Bhuj-II substation to cater connectivity of RE Gencos", has been deliberated in 46th TCC/ WRPC meeting held on 02-03 Feb 2023. WRPC concurred the proposal of "Requirement of additional FOTE of STM-16 capacity at Bhuj-II substation to cater connectivity of RE Gencos" at estimated cost of Rs 30 Lacs.

3.7.4 Schematic of the scheme:

Present connectivity at Bhuj-II



3.7.5 Detailed Scope of the Scheme is given below:

Scope of the Scheme	Cost
1. Supply and installation of 01 number 5 MSP (1+1) FOTE (STM-16 capacity) at Bhuj-II station.	**Rs. 30 Lakhs** excluding GST.

3.7.6 Members may deliberate.

3.8 **Congestion in ISTS communication link via Dehgam- Ranchhodpura- Santhalpur-Bhachau- Mundra**

3.8.1 The communication link via Dehgam-Ranchhodpura-Santhalpur-Bhachau-Mundra was at STM-4 level. Further, this link was extended through Mundra-Bhuj-Santhalpur Repeater-Banaskantha at STM-16 level.Owner of these stations is POWERGRID. This communication network is being used for routing the data Bhuj-PS, Bhuj-II, Lakadia, CGPL Mundra and various RE generators connected to these stations to WRLDC/NLDC. Communication link via Dehgam-Ranchhodpura-Santhalpur repeater-Banaskantha is also used for routing inter regional data between WR-NR.

As on date the STM-4 level bandwidth on Dehgam-Ranchhodpura-Santhalpur Rep is almost 100% utilized and on Santhalpur rep-Bhachau-Mundra is 75% utilized. Outage of these lines affects the telemetry of entire Bhuj location and CGPL Mundra.

3.8.2 The "Upgradation of STM-4 communication link of Dehgam, Ranchhodpura, Santhalpur Rep, Bhachau and CGPL Mundra to STM-16 capacity", has been deliberated in 46th TCC/ WRPC meeting held on 02-03 Feb 2023. WRPC concurred the proposal of "Upgradation of STM-4 communication link of Dehgam, Ranchhodpura, Santhalpur Rep, Bhachau and CGPL Mundra to STM-16 capacity" at estimated cost of Rs 1.5 Cr.

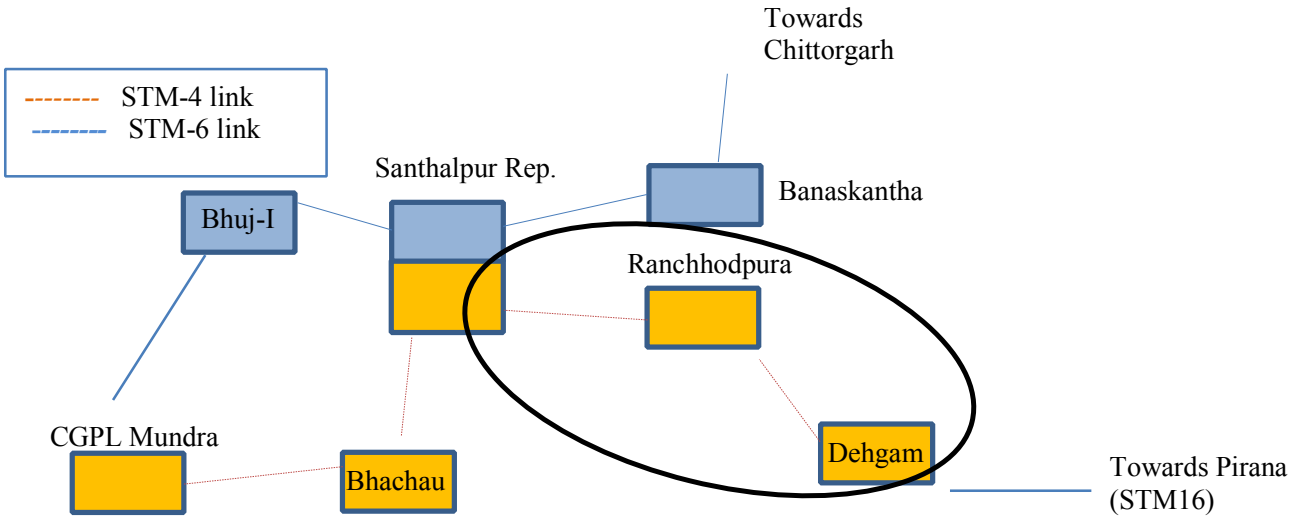
3.8.3 Details of the scheme is summarized below:

S. No.	Items	Details
1.	Name of Scheme	Upgradation of STM-4 communication link of Dehgam, Ranchhodpura, Santhalpur Rep, Bhachau and CGPL Mundra to STM-16 capacity.
2.	Scope of the scheme	1. Supply and installation of 5 no. STM-16 SDH, 5 MSP (1+1) for all the below mentioned stations- 1. Dehgam 2. Ranchhodpura 3. Santhalpur Repeater 4. Bhachau 5. CGPL Mundra
3.	Depiction of the scheme on Map	**para 3.8.4**.
4.	Objective / Justification	• The communication link via Dehgam-Ranchhodpura-Santhalpur-Bhachau-Mundra was at STM-4 level. Further, this link was extended through Mundra-Bhuj-Santhalpur Repeater-Banaskantha at STM-16 level. • Owner of these stations is POWERGRID. • This communication network is being used for routing the data Bhuj-PS, Bhuj-II, Lakadia, CGPLMundra and various RE generators connected to these stations to

S. No.	Items	Details
		WRLDC/NLDC. • Communication link via Dehgam-Ranchhodpura-Santhalpur repeater-Banaskantha is also used for routing inter regional data between WR-NR. • As on date the STM-4 level bandwidth on Dehgam-Ranchhodpura-Santhalpur Rep is almost 100% utilized and on Santhalpur rep-Bhachau-Mundra is 75% utilized. • Outage of these lines affects the telemetry of entire Bhuj location and CGPL Mundra. • It was discussed in 3rd Communication Planning Meeting held on 27.12.2022, that old equipment on these locations, after commissioning of new equipment and transfer of entire traffic, shall be used for building redundancy around Bhuj/Radhanesada/Vav area where multiple new RE generators are expected to be connected in near future. The schematic diagram is attached at **para 3.7.4**.
5.	Estimated Cost &Funding	**Rs. 1.5 Cr.** excluding GST.
6.	Implementation timeframe	12 months from the date of allocation
7.	Implementation Mode	Through POWERGRID on RTM mode.
8.	Deliberations with WRPC along with their comments	The "Upgradation of STM-4 communication link of Dehgam, Ranchhodpura, Santhalpur Rep, Bhachau and CGPL Mundra to STM-16 capacity", has been deliberated in 46th TCC/ WRPC meeting held on 02-03 Feb 2023. WRPC concurred the proposal of "Upgradation of STM-4 communication link of Dehgam, Ranchhodpura, Santhalpur Rep, Bhachau and CGPL Mundra to STM-16 capacity" at estimated cost of Rs 1.5 Cr.

3.8.4 Schematic of the scheme:

Connectivity diagram of Dehgam-Ranchhodpura-Santhalpur-Bhachau-Mundra link



3.8.5 Detailed Scope of the Scheme is given below:

Scope of the Scheme	Cost
1. Supply and installation of 5 no. STM-16 SDH, 5 MSP (1+1) for all the below mentioned stations- a) Dehgam b) Ranchhodpura c) Santhalpur Repeater d) Bhachau e) CGPL Mundra	**Rs. 1.5 Cr.** excluding GST.

3.8.6 Members may deliberate.

4 Modification in the earlier approved/notified transmission schemes:

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

4.1.1 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 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 preponement in the commissioning timeline of STKHEP.

4.1.2 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 interim part to ensure that no generation loss happen. MS (NRPC) stated that implementation of the interim arrangement with the time frame of July'25 matching with the generation project in such hilly terrain though difficult but not impossible. Therefore, NRPC Forum may recommend NCT to give consideration to generation project schedule and accordingly line may be developed suitably.

4.1.3 Details of the scheme is summarized below:

S. No.	Items	Details
1.	**Name of Scheme**	Transmission system for evacuation of power from Shongtong Karcham HEP (450MW) and Tidong HEP (150 MW)
2.	**Scope of the scheme**	**I. Interim System [For Shongtong HEP: with time frame of 24 months]** • Generation switchyard of Shongtong HEP** to Wangtoo (HPPTCL) 400 kV D/c [Quad$^{\$}$] line (about 18 kms) • 2 nos. of 400 kV bays (GIS) at Wangtoo S/s (HPPTCL) **II. Final System (To be matching with Tidong generator requirement ie.1st July 2026)** • Establishment of 2x315 MVA (7x105 MVA 1-ph units including one spare unit), 400/220 kV GIS

S. No.	Items	Details
		Pooling Station at Jhangi ^ **Future provisions (Space for):** ➢ 4 Nos. of 400 kV line bays ➢ 6 Nos. of 220 kV line bays for future projects (Out of above 6 bays, space for 2 bays to be utilized for connectivity to Tidong generation) ➢ 2 Nos. of 400/220 kV Transformer ➢ 1 Nos. 420 kV Bus Reactor along with associated bay ➢ 220 kV Sectionalization bay: 1 set ➢ Bus Coupler: 1 No. • Extension of Wangtoo (HPPTCL) - Shongtong HEP 400 kV (Quad[$]) D/c line upto Jhangi PS with one circuit through Shongtong HEP generation switchyard (37kms) • Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c line (Twin HTLS)* (210kms) • 80 MVAR switchable line reactor at Panchkula end on each circuit of 400 kV Wangtoo (HPPTCL) - Panchkula (PG) D/c line • 125 MVAR, 420kV Bus reactor at Jhangi PS (1-ph units along with one spare unit) ***^ 1 no. additional 400kV bay is considered in present scope for GIS Diameter completion along with one no. bus coupler (220kV)*** ***$ Line capacity shall be 2500 MVA per circuit at Nominal voltage*** **** with minimum capacity of 2100 MVA on each circuit at Nominal voltage*** ***** Associated 400 kV bays at Shongtong Generation switchyard shall be under the scope of applicant/generation developer as of now*** [##]***Tidong HEP- Jhangi PS 220 kV D/C line (along with associated bays at both ends) - under the scope of applicant/generation developer.***
3.	**Depiction of the scheme on Transmission Grid Map**	**Given at Para 4.1.4**
4.	**Upstream/downstream system**	M/s Tidong (150 MW) HEP is proposed to be

S. No.	Items	Details
	associated with the scheme	interconnected at 400/220 kV Jhangi PS through 220 kV D/c line. M/s Shongtong HEP (450 MW) is proposed to be interconnected at 400/220 kV Wangtoo (HPPTCL) S/s through 400 kV D/c line. Both the above HEPs already granted Connectivity and LTA. Connectivity of existing 400/220 kV Wangtoo (HPPTCL) S/s includes 400 kV D/c interconnection with Kala Amb (PG) (one ckt LILOed at Sorang HEP). 400 kV Wangtoo S/s is also interconnected to Karcham Wangtoo S/s through 400 kV D/c line.
5.	**Objective / Justification**	A comprehensive transmission system (400 kV Jhangi-Wangtoo-Panchkula D/c Corridor) for evacuation of power from two Hydro Electric Projects (HEPs) viz Tidong (150 MW) and Shongtong Karcham HEP (450 MW) in Himachal Pradesh was agreed in the 10th Consultation Meeting for Evolving Transmission Schemes in Northern Region meeting held on 30/08/2022. Above transmission system was also agreed in 57th Northern Region Power Committee (NRPC) meeting held on 31/08/2022 & 11th National Committee on Transmission (NCT) held on 28/12/2022 & 17/01/2023 with following broad scope of works to be implemented in 2 phases with Tidong HEP system in Ph-1 & Shongtong HEP system in Ph-2: Phase-I (with Tidong HEP and with schedule: 01st July 2026) • Establishment of 2x315 MVA (7x105 MVA), 400/220 kV GIS Pooling Station at Jhangi • Jhangi PS – Wangtoo (Quad) 400 kV D/c line • 2 nos. of 400 kV bays at Wangtoo (HPPTCL) for termination of 400 kV Jhangi PS – Wangtoo D/c line Phase-II (with Shongtong HEP and with schedule: 31st July 2026] • LILO of one circuit of Jhangi PS – Wangtoo (HPPTCL) 400 kV D/c (Quad) line at generation switchyard of Shongtong HEP • Wangtoo (HPPTCL) - Panchkula (PG) 400 kV

S. No.	Items	Details
		D/c line (Twin HTLS) • 400 kV bays at Wangtoo S/s (2 nos.) and Panchkula S/s (2 nos.) for termination of Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c line The transmission scheme was also approved by MOP based on recommendation by the NCT for implementation through TBCB route. Recently, HPPCL vide their letter dated 05.04.2023 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 transmission system for evacuation of power from Shongtong Karcham HEP (STKHEP) in Himachal Pradesh due to the preponement in the commissioning timeline of STKHEP. Subsequently, in 12th NCT meeting held on 24.03.23, above matter was also deliberated and it was decided that proposal pertains to change in implementation timeframe as well as re-configuration of scheme, therefore proposals need to be studied and put up in the next NCT meeting. Accordingly, a meeting was convened by CEA on 12.04.2023 regarding the above development in the generation schedule of Shongtong HEP. During the meeting, HPPCL informed that the progress of the STKHEP was reviewed and the various issues/disputes that were delaying the project were resolved and therefore their revised commissioning schedule shall be now July'25. M/s Statkraft (for Tidong HEP) stated that for Tidong HEP, the requirement of Jhangi PS would be from July'26. M/s Statkraft added that since the location of Jhangi Pooling station has not yet been finalized and considering the issue of tough terrain and local RoW issues, constructing dedicated line from Tidong HEP to Jhangi Pooling station would take considerable time and hence, the requirement of ISTS transmission system for Tidong HEP would be from July'26. CTUIL during the meeting informed that these are

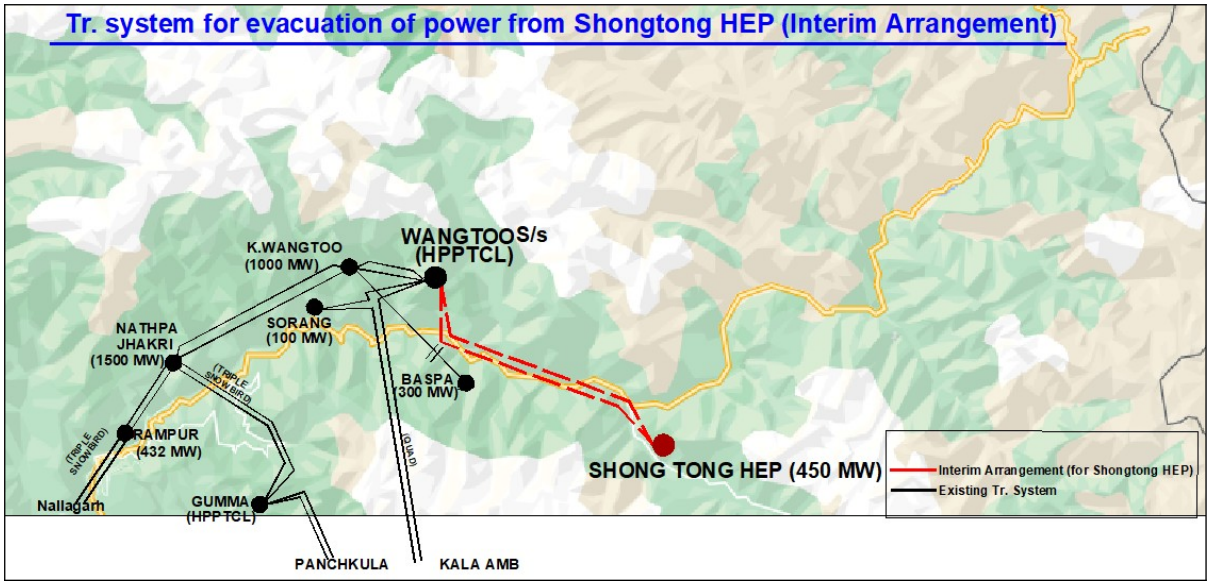
S. No.	Items	Details
		very high altitude areas with long periods of no activity in winter and monsoon season and considering the various difficulties in construction of transmission line in that area, the completion of the transmission system in July 2025 timeframe does not seem to be practical. Further, the implementation schedule of the transmission system to be implemented in challenging areas like hilly terrain may be taken as 30/36 months. CEA agreed and stated that the minimum timeframe for hilly terrain is to be considered as 30-36 months. HPPCL stated that from the total length of 54 kms of the 400 kV transmission line from Jhangi PS to Wangtoo (HPPTCL), the 18 km portion from Wangtoo (HPPTCL) to Shongtong HEP could be implemented by July 2025, which would be sufficient for evacuation of power from STKHEP till the completion of complete final transmission system. In view of above, it was decided that in the case of different timelines for the requirement of transmission system for Tidong HEP and STKHEP, the transmission system could be phased accordingly. Further schedule for interim part was decided to be 24 months. After further deliberation, in above meeting, it was agreed that transmission system to be bifurcated in two parts as mentioned below: (i) Interim Part (with time frame of 24 months) 1) Generation switchyard of Shongtong HEP to Wangtoo (HPPTCL) 400 kV D/c line (about 18 kms) 2) 2 nos. of 400 kV bays at Wangtoo (HPPTCL) (ii) Final System (with time frame of 1st July 2026) 1) Establishment of 2x315 MVA (7x105 MVA 1-ph units including one spare unit), 400/220 kV GIS Pooling Station at Jhangi 2) Completion of remaining portion of 400 kV line i.e. from Shongtong HEP to Jhangi PS so as to form Jhangi PS – Wangtoo (Quad) D/c line with LILO of one circuit of Jhangi PS – Wangtoo (HPPTCL) 400 kV D/c (Quad) line at

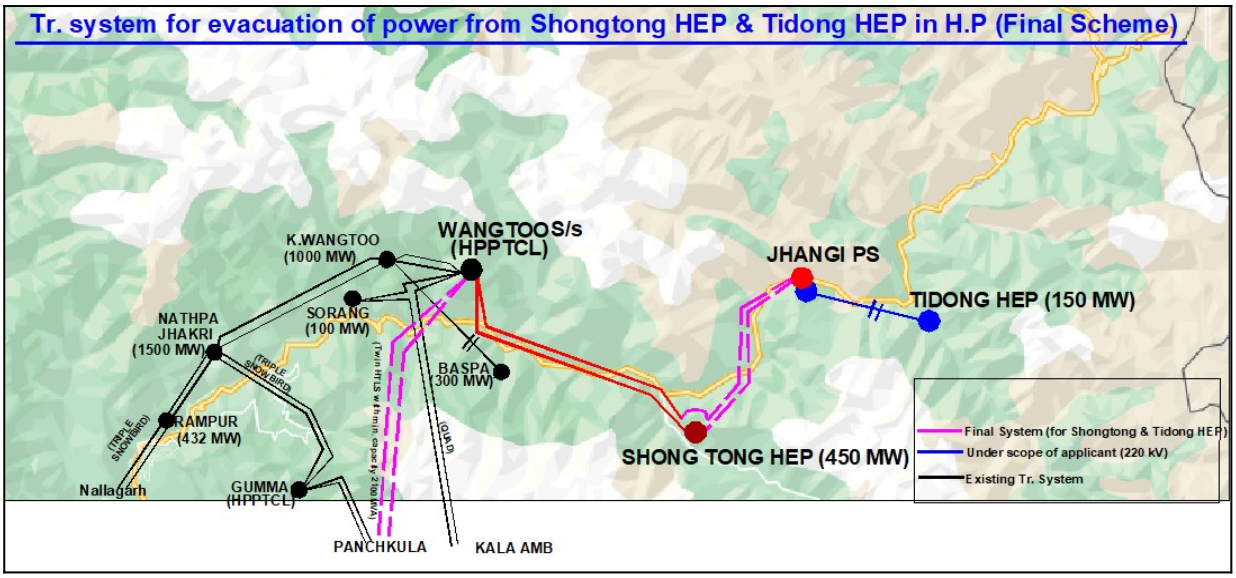
S. No.	Items	Details
		generation switchyard of Shongtong HEP 3) Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c line 4) 400 kV bays at Wangtoo S/s (2 nos.) and Panchkula S/s (2 nos.) for termination of 400 kV Wangtoo (HPPTCL) - Panchkula (PG) D/c line The above scheme was also discussed in the recent 65th NRPC meeting held on 21/04/2023 and also in 18th CMETS-NR meeting held on 28.04.23 in which HPPCL reiterated that they shall commission their Shongtong generation by July'25 and the decision should be taken in line with the deliberations held in the NRPC meeting held on 21/04/2023. M/s Statkraft during the meeting requested that implementation of 220 kV bays at Jhangi PS end for Tidong HEP DTL may be taken up under ISTS under GNA regime. CTU informed that they will look into the requirement in light of the effectiveness of GNA regulation. Accordingly, revised scheme was deliberated and agreed in the 18th CMETS-NR meeting (as per S.No. 2) However, matter regarding implementation of 220kV bays at Jhangi PS under ISTS for Tidong HEP shall be referred to NCT as GNA Transition process is yet to be completed include BG requirement to be fulfilled by M/s STATKRAFT in this regard.
6.	**Estimated Cost**	Interim System: Rs 224.16 Cr Final System: Rs 2,399.40 Cr. Total (Interim + Final): Rs 2623.56 Cr
7.	**Impact on the total Annual Transmission charges in % along with the existing ATC**	A. ATC (considering Levelized Tariff @15% of estimated cost): Rs 393.534 Crore B. Present ATC: ₹44312.66 Cr.* C. A/B (%): 0.888 %
8.	**Need of phasing, if any**	The scheme is proposed to be implemented in two phases: • **Interim System**: 24 months from allocation (associated with Shongtong Karcham HEP (450 MW) • **Final System**: 01st Jul'26 (To be matching with Tidong generator requirement)

S. No.	Items	Details
9.	**Implementation timeframe**	• **Interim System**: 24 months from allocation (associated with Shongtong Karcham HEP (450 MW) • **Final System**: 01st Jul'26 (To be matching with Tidong generator requirement)
10.	**Inclusion of any wild life/protected area along the transmission line route**	For 400 kV Shongtong HEP to Wangtoo (HPPTCL) & Extension of Wangtoo (HPPTCL) - Shongtong HEP 400 kV (Quad) D/c line uptown Jhangi PS with one circuit through Shongtong HEP generation switchyard, no major NP, WLS, other protected areas observed, however, for details of other forest/protected areas survey is required to be done. For 400 kV Wangtoo – Panchkula D/c line, The line may pass through Rupi Bhaba WLS, Daranghati WLS, Chail WLS & Churdhar WLS or its buffer zone in HP state & Morni Hills WLS or its buffer zone in Haryana state. However, for details of forest/protected areas survey is required to be done.
11.	**Deliberations with RPC along with their comments**	The Scheme was deliberated and agreed in 57th NRPC meeting held on 31.08.2022. NRPC stated that CTU proposal of phasing of Kaza Transmission Scheme is agreeable. However, it was also opined that CTU shall closely monitor progress of Kaza RE project and ensure that transmission system for Kaza Solar Park is planned & implemented matching with SJVN Kaza generation project to meet its evacuation requirement so that there is no loss of RE generation. Subsequently MNRE vide letter dated 28.04.23 cancelled Kaza solar park (880MW) and Kinnaur (400 MW) under the solar park scheme. The revised scheme was also discussed in the recent 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 interim part to ensure that no generation loss happen. MS (NRPC) stated that implementation of the interim arrangement with the time frame of July'25 matching with the generation project in such hilly terrain though difficult but not impossible. Therefore, NRPC Forum may

S. No.	Items	Details
		recommend NCT to give consideration to generation project schedule and accordingly line may be developed suitably. NRPC Forum accorded technical concurrence to the revised scheme as above subject to decision of CMETS-NR. The scheme was deliberated and agreed in the 18th CMETS-NR meeting held on 28.04.23
12.	**System Study for evolution of the proposal**	Studies discussed and agreed in the following meetings: • 10th CMETS-NR meeting held on 30.08.2022 • 57th NRPC meeting held on 31.08.2022 • Meeting convened by CEA on 12.04.23 regarding the transmission system for evacuation of power from STKHEP • 65th NRPC meeting held on 21.04.23 18th CMETS-NR meeting held on 28.04.23

4.1.4 Schematic of the scheme is given below:





4.1.5 Detailed scope of the scheme is given below:

Sl. No.	Scope of the Transmission Scheme
1.	**Interim Part (For Shongtong HEP: with time frame of 24 months)** 1) Generation switchyard of Shongtong HEP** to Wangtoo (HPPTCL) 400 kV D/c line (Quad[$)] • Route length- 18 km 2) 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*

Sl. No.	Scope of the Transmission Scheme
	Note: HPPTCL shall provide space for two number of 400kV line bays (GIS) at Wangtoo (HPPTCL) substation for termination of the 400kV line
2.	**Final System (To be matching with Tidong generator requirement ie. with time frame of 1st July 2026)** 1) Establishment of 2x315 MVA (7x105 MVA 1-ph units including one spare unit), 400/220 kV GIS Pooling Station at Jhangi^ **5** 400/220kV ICTs – 2x315 MVA (7x105 MVA 1-ph units including one spare unit) **6** 400kV ICT bays – 2nos. **7** 220kV ICT bay -2nos. **8** 220kV Bus coupler- 1 No. • 400kV line bays (GIS) – 3 nos (2 nos. for **e**xtension of Wangtoo (HPPTCL) – Shongtong HEP 400 kV (Quad$) D/c line upto Jhangi PS with one circuit through Shongtong HEP generation switchyard) & 1 nos. for GIS Diameter completion at Jhangi **9** 420kV Bus reactor- 1 nos (4x41.66 single phase units including one spare unit) **10** 420kV reactor bay – 1no. **Future provisions (Space for):** **11** 4 Nos. of 400 kV line bays **12** 6 Nos. of 220 kV line bays for future projects (Out of above 6 bays, space for 2 bays to be utilized for connectivity to Tidong generation) • 2 Nos. of 400/220 kV Transformer • 1 Nos. 420 kV Bus Reactor along with associated bay • 220 kV Sectionalization bay: 1 set • Bus Coupler: 1 No. 2) Extension of Wangtoo (HPPTCL) - Shongtong HEP 400 kV (Quad$) D/c line upto Jhangi PS with one circuit through Shongtong HEP generation switchyard • Route length- 37 km 3) Wangtoo (HPPTCL) - Panchkula (PG) 400 kV D/c line* (twin HTLS) • Route length- 210 km 4) 80 MVAR switchable line reactor at Panchkula end on each circuit of 400 kV Wangtoo (HPPTCL) - Panchkula (PG) D/c line 5) 400 kV bays at Wangtoo S/s (2 nos.-GIS) and Panchkula S/s (2 nos.-AIS) for termination of 400 kV Wangtoo (HPPTCL) - Panchkula (PG)

Sl. No.	Scope of the Transmission Scheme
	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* *(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* *(v) The line lengths indicated above are approximate as the actual line length would be obtained after detailed survey.*

12.1.1 Members may deliberate.

12.2 **Revised timeframe of the transmission scheme "Transmission system for evacuation of power from Luhri Stage-I HEP"**

12.2.1 The transmission system for evacuation of power from Luhri Stage-I HEP was agreed in the 8th meeting of NCT held on 25.03.2022 with the following scope of works:

Sl. No.	***Scope of the Transmission Scheme***	***Capacity /km***
1.	Establishment of 7x105 MVA, 400/220 kV Nange GIS Pooling Station along with125 MVAR (420kV) Bus Reactor at Nange (GIS) PS(1-Ph units along with one spare unit) Future provisions: Space for • 400/220kV ICTs (315 MVA with single phase units) along with associated bays: 3 nos. • 400 kV line bays along with switchable line reactor: 3 nos. • 220 kV line bays: 10 nos	315MVA, 400/220kV ICT: 2 nos. (7x105 MVA including 1 spare ICT) 400kV ICT bays: 2 nos. 220kV ICT bays: 2 nos. 400 kV, 125 MVAr Bus Reactor-1 400 kV Bus Reactor bay- 1 no. 400 kV Line Bays- 2 nos.
2.	Nange (GIS) Pooling Station – Koldam 400 kV D/c line (Triple snowbird) (*only one circuit is to be terminated at Koldam while second circuit would be connected to*	40 km

Sl. No.	*Scope of the Transmission Scheme*	*Capacity /km*
	bypassed circuit of Koldam – Ropar/Ludhiana 400kV D/c line)	
3.	1 no. of 400kV line bay at Koldam S/s for termination of Nange (GIS) Pooling Station – Koldam 400 kV linealongwith125 MVAR (420kV) Bus Reactor at Koldam S/s (1-Ph units along with one spare unit)	400 kV Line Bays- 2 nos. 400 kV, 125 MVAr Bus Reactor- 1 No. 400 kV Bus Reactor bay- 1 No.
4.	Bypassing one ckt of Koldam – Ropar/Ludhiana 400kV D/c line (Triple snowbird) at Koldam and connecting it with one of the circuit of Nange- Koldam 400kV D/c line(Triple snowbird), thus forming Nange- Ropar/ Ludhiana one line (Triple snowbird)	
5.	1x50 MVAR switchable line reactor at Ropar end of Nange- Ropar/ Ludhiana 400kV line	400 kV, 50 MVAr Line Reactor- 1 400 kV Reactor Bay- 1 no.

12.2.2 The above mentioned transmission scheme was notified through the Gazette Notification dated 2.06.2022 and RECPDCL was appointed as the BPC of the transmission scheme. The transmission scheme is currently under bidding with the implementation timeframe of 24.04.2025 (in matching timeframe of Luhri Stage-I HEP).

12.2.3 SJVNL vide their letter dated 17.02.2023 informed that Luhri Stage-I HEP is likely to be commissioned by August, 2026. The same was acknowledged in a meeting convened by CEA on 07.03.2023. Accordingly, it was decided that the timeframe of the transmission scheme "Transmission system for evacuation of power from Luhri Stage-I HEP", would be revised to August, 2026, in the matching timeframe of Luhri Stage-I HEP.

12.2.4 Members may note the same.

12.3 **Delinking of 400 kV Fatehgarh-II- Bhadla-III D/c line from transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part B1"**

12.3.1 The transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B1" was agreed in the 5th meeting of the NCT held on 25.08.2021 and 02.09.2021, with the following scope of works:

- Establishment of 2x1500 MVA 765/400 kV & 3x500 MVA 400/220 kV pooling station at Bhadla-3
- Fatehgarh-2 PS – Bhadla-3 PS 400 kV D/c line
- Bhadla-3 PS – Sikar-II S/s 765 kV D/c line

12.3.2 The above mentioned transmission scheme was notified through the Gazette Notification dated 6.12.2022 and PFCCL was appointed as the BPC of the transmission scheme. As the transmission scheme is falling under core GIB area, PFCCL approached the Committee formed by Hon'ble Supreme Court for obtaining the necessary GIB clearance.

12.3.3 Subsequently, a meeting held on 01.05.2023 under the chairmanship of Secretary, MoP, to review the progress of under construction/ under bidding/ planned Transmission Projects for evacuation of Renewable Energy (RE) projects, wherein it was highlighted that the GIB clearance for Fatehgarh-2 PS – Bhadla-3 PS 400 kV D/c line has not been received due to which the bidding process for the transmission scheme is getting delayed. Considering that, Secretary, MoP, directed that the process of delinking of 400 kV Fatehgarh-II- Bhadla-III D/c line from Phase-III Part-B1 may be carried out at the earliest and a separate package may be formed comprising 400 kV Fatehgarh-II- Bhadla III D/c line.

12.3.4 The same was deliberated in a meeting convened by CEA on 10.05.2023, wherein PFCCL (BPC) was requested to delink the 400 kV Fatehgarh-II- Bhadla-III D/c line as directed by Secretary, MoP. Further, it was recommended that for timely completion of the bidding process, bidders may be given 4 weeks of time for bid submission by the BPC, since the transmission scheme (Transmission system for evacuation of power from REZ in Rajasthan (20GW) under Phase-III Part B1) is already under the bidding process for the past few months and also linked with other transmission schemes under Phase-III.

12.3.5 In view of above, the modification in the scope of the transmission scheme "Transmission system for evacuation of power from REZ in Rajasthan (20 GW) under Phase-III Part B1" is as follows:

Sl. No.	Existing Scope	Revised Scope
1.	Establishment of 2x1500 MVA 765/400kV & 3x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor • 765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA including one spare unit) • 765kV ICT bays - 2 nos. • 400/220 kV, 500 MVA ICT – 3 nos. • 765kV line bays -2 nos.	Establishment of 2x1500 MVA 765/400kV & 3x500 MVA 400/220 kV pooling station at Bhadla-3 along with 2x330 MVAr (765kV) Bus Reactor & 2x125 MVAr (420kV) Bus Reactor • 765/400kV 1500 MVA ICTs: 2 nos. (7x500 MVA including one spare unit) • 765kV ICT bays - 2 nos. • 400/220 kV, 500 MVA ICT – 3 nos. • 765kV line bays -2 nos. • 400 kV ICT bays – 5 nos. • 220 kV ICT bays - 3 nos.

Sl. No.	Existing Scope	Revised Scope
	• 400 kV ICT bays – 5 nos. • 220 kV ICT bays - 3 nos. • **400 kV line bays - 2 nos**. • 220 kV line bays: 5 nos. • 330 MVAr Bus Reactor-2 nos. (7x110 MVAr, including one spare unit) • 765kV reactor bay- 2 nos. • 125 MVAr, 420kV bus reactor - 2 nos. • 420 kV reactor bay - 2 nos. <u>Future provisions:</u> Space for • 765/400kV ICTs along with bays: 2 nos. • 765kV line bay along with switchable line reactor: 6 nos. • 765kV line bay: 4 nos. • 765kV Bus Reactor along with bays: 2 nos. • 400/220 kV ICTs along with bays: 10 nos. • 400 kV line bays: 8 nos. • **400 kV line bays along with switchable line reactor: 6 Nos.** • 400kV Bus Reactor along with bays: 2 nos. • 400kV Sectionalization bay: 2 sets • 220 kV line bays: 12 nos. • 220kV sectionalization bay: 2 sets	• 220 kV line bays: 5 nos. • 330 MVAr Bus Reactor-2 nos. (7x110 MVAr, including one spare unit) • 765 kV reactor bay- 2 nos. • 125 MVAr, 420kV bus reactor - 2 nos. • 420 kV reactor bay - 2 nos. <u>Future provisions:</u> Space for • 765/400 kV ICTs along with bays: 2 nos. • 765 kV line bay along with switchable line reactor: 6 nos. • 765 kV line bay: 4 nos. • 765 kV Bus Reactor along with bays: 2 nos. • 400/220 kV ICTs along with bays: 10 nos. • 400 kV line bays: 8 nos. • **400 kV line bays along with switchable line reactor: 8 Nos.** • 400 kV Bus Reactor along with bays: 2 nos. • 400 kV Sectionalization bay: 2 sets • 220 kV line bays: 12 nos. • 220 kV sectionalization bay: 2 sets
2.	Fatehgarh-2 PS – Bhadla-3 PS 400kV D/c line (Quad moose) along with 63 MVAr Switchable line reactor for each circuit at both ends of Fatehgarh 2- Bhadla-3 400kV D/c line • 400kV 63 MVAR switchable line reactor – 4 nos. • Switching equipment for 400kV 63 MVAR switchable line reactor – 4 nos.	**Deleted**
3.	400 kV line bays at Fatehgarh-2 PS for	**Deleted**

Sl. No.	Existing Scope	Revised Scope
	Fatehgarh-2 PS – Bhadla-3 PS 400kV D/c line • 400 kV line bays - 2 nos.	
4.	Bhadla-3 PS – Sikar-II S/s 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 PS – Sikar-II S/s 765 kV D/c line • Switching equipment for 765 kV 330 MVAR switchable line reactor – 4 nos. • 765 kV, 330 MVAr Switchable line reactor- 4 nos.	Bhadla-3 PS – Sikar-II S/s 765 kV D/c line along with 330 MVAr Switchable line reactor for each circuit at each end of Bhadla-3 PS – Sikar-II S/s 765 kV D/c line • Switching equipment for 765 kV 330 MVAR switchable line reactor – 4 nos. • 765 kV, 330 MVAr Switchable line reactor- 4 nos.
5.	765 kV line bays at Sikar-II • 765 kV line bays – 2 nos.	765 kV line bays at Sikar-II • 765 kV line bays – 2 nos.
	Note: *i. Provision of suitable sectionalization shall be kept at Bhadla-3 at 400 kV & 220 kV level to limit short circuit level.* *ii. POWERGRID to provide space for 2 nos. of 400 kV line bays along with space for switchable line reactors at Fatehgarh-2 S/s.* *iii. Developer of Sikar-II S/s to provide space for 2 nos. of 765 kV line bays at Sikar-II S/s along with space for switchable line reactors.* *iv. Space provision for future 2 nos. 220kV Bus Coupler bay and 2 nos. Transfer Bus Coupler Bay shall be kept for bus switching scheme requirement.*	**Note:** *i. Provision of suitable sectionalization shall be kept at Bhadla-3 at 400 kV & 220 kV level to limit short circuit level.* ***ii. Deleted*** *iii. Developer of Sikar-II S/s to provide space for 2 nos. of 765 kV line bays at Sikar-II S/s along with space for switchable line reactors.* *iv. Space provision for future 2 nos. 220kV Bus Coupler bay and 2 nos. Transfer Bus Coupler Bay shall be kept for bus switching scheme requirement.*

12.3.6 Members may deliberate.

13 Comprehensive presentation by CTU apprising NCT of measures taken for ensuring development of an efficient, co-ordinated and economical ISTS for smooth flow of electricity.

CTU may present

14 Five-year rolling plan for ISTS capacity addition.

CTU may present
Members may please deliberate

15 Any other issues, with permission of chair