

A. वितरण सूची के अनुसार/ Distribution List:

1. Chief Engineer (PSP&A-II) Central Electricity Authority Sewa Bhawan, R.K.Puram New Delhi-110066	2. Member Secretary Eastern Regional Power Committee 14, Golf Club Road, Tollygunge Kolkata-700033
3. Director (SO) Power System Operation Corporation Ltd. (POSOCO) 9 th Floor, IFCI Towers, 61, Nehru Place, New Delhi-110016	4. Executive Director Eastern Regional Load Despatch Centre 14, Golf Club Road, Jubilee Park, Golf Gardens, Tollygunge, Kolkata, West Bengal - 700095
5. CMD Damodar Valley Corporation DVC Towers, VIP Road Kolkata-700054	6. CMD Odisha Power Transmission Corporation Ltd. (OPTCL) Bhoinagar Post Office, Jan path Bhubaneswar-751022
7. CMD Bihar State Power Transmission Company Ltd. (BSPTCL) Vidyut Bhavan, 4 th floor, Bailey Road Patna-800021	8. CMD Jharkhand Urja Sancharan Nigam Limited (JUSNL) Engineering Building, HEC, Dhurwa Ranchi -834004
9. Principal Chief Engineer cum Secretary Power Department Government of Sikkim Gangtok, Sikkim	10. Managing Director West Bengal State Electricity Transmission Company Ltd. (WBSETCL) Vidyut Bhavan, 8 th Floor, A-Block Salt Lake City, Kolkata-700091

B. विशेष आमंत्रित /Special invitee:

Director (Projects)
Power Grid Corporation of India Ltd.
"Saudamini", Plot No. 2, Sec-29, Gurugram
Haryana-122001

Agenda for 6th Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER)

1. Confirmation of minutes of the previous meeting

The minutes of the 5th meeting of CMETS-ER held on 30-03-2022 were issued vide letter dated 22-04-2022. As no comments have been received, the minutes may be confirmed.

2. Presentation by states on intra-state network for 2026-27 time-frame

As agreed in the previous meeting, BSPTCL and OPTCL may give presentation on load-generation balance and upcoming intra-state schemes of Bihar and Odisha respectively for 2026-27 time-frame.

A. Application related matters in Eastern Region (ER)

No New Open Access Application in Eastern Region has been received in the month of Mar'2022

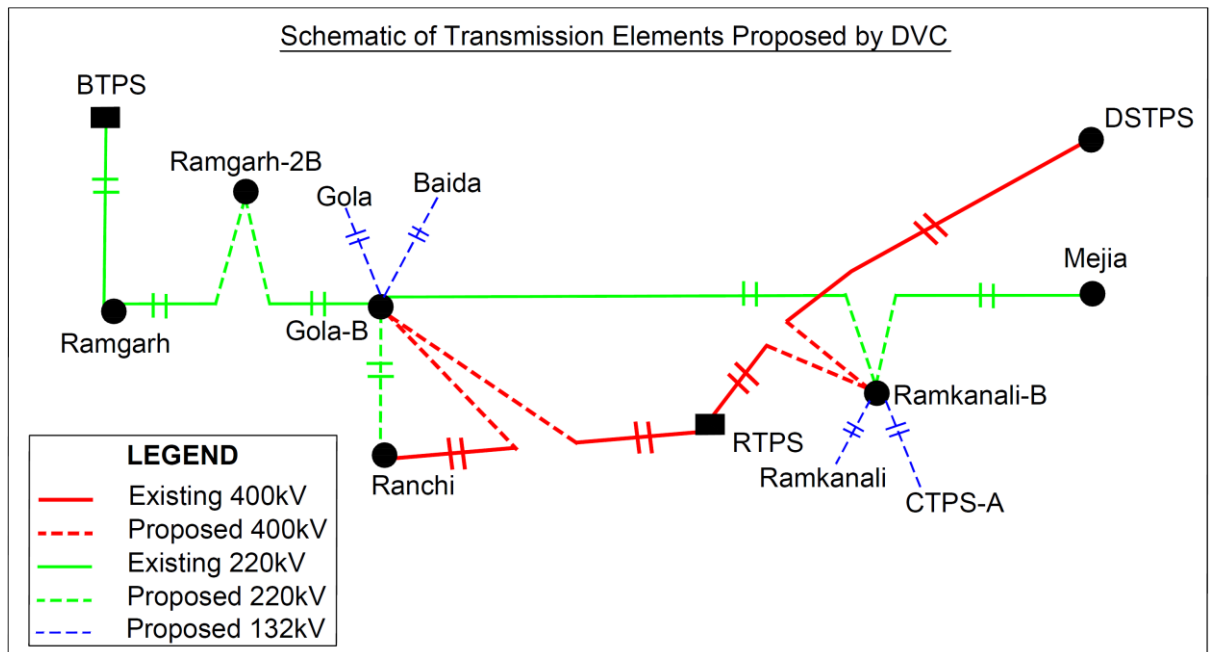
B. ISTS expansion schemes in Eastern Region

3. Establishment of 400kV substations in DVC area – Agenda by DVC

- 3.1. DVC vide email dated 24-02-2022 informed that they have proposed scheme for the "Augmentation of DVC T&D System to meet the Load Growth as forecasted in the 19th EPS and the Mandate given by MoP on 27-09-2021". The report submitted by DVC in this regard is at **Annexure-III**.
- 3.2. The studies have been carried out for 2026-27 timeframe. DVC has informed that the peak load is expected to increase to about 5700MW by this time-frame. Further, 4x210MW generation at Mejia and 1x210MW generation at Waria, which are connected at 220kV level are expected to be decommissioned in phased manner in next 4-5 years. To compensate for the decommissioning of these generations and to feed the increasing load, DVC is planning to augment 2x660MW generation capacity at Raghunathpur TPS. The old generation units of DVC were connected at 220kV and 132kV level, however, the new units of 500MW and more capacity are connected at 400kV level. With phased decommissioning of older generation units connected at 220kV and 132kV level, new transformation capacity needs to be created at 400kV level so as transfer power to 220kV and 132kV level from 400kV.
- 3.3. In view of the above, DVC has proposed establishment of 2 nos. of new 400kV substations viz. Gola-B and Ramkanali-B as the new generations are coming up at 400kV whereas old generations are retiring at 220kV. Further, strengthening at 220kV and 132kV at various places have also been proposed. Two new 220kV substations, one each at Ramgarh-2B and Panagarh have also been proposed to meet growing demands in these areas.
- 3.4. Comprehensive studies for transmission system strengthening have been carried out on All India file including all the ISTS and In-STS systems. The study results were discussed in the joint study meeting held on 22-04-2022 among CTU, ERPC, ERLDC, DVC and OPTCL, wherein the schemes involving

connection with existing ISTS were in principally agreed in the joint study meeting. For further detailed deliberation on other schemes at 220kV and 132kV level, it was decided that the same would be taken up by DVC at ERPC level.

- 3.5. The major transmission system for establishment of new 400kV substations at Gola-B and Ramkanali-B, and a new 220kV substation at Ramgarh-2B is shown in the figure below:



- 3.6. Major observations/highlights of the proposals agreed in the joint study meeting held on 22-04-2022 is given below:

(a) Loading on Bokaro TPS and DSTPS 400/220kV, 2x315MVA ICTs are not meeting N-1 criteria. Therefore, following proposal of augmentation of ICTs at various generating stations was agreed:

- (i) Bokaro TPS: 2x315MVA ICTs to be replaced with 2x500MW. Replaced ICTs would be shifted to Meija (2nd ICT) and RTPS/Ramkanali-B (3rd ICT).
- (ii) Durgapur STPS: 2x315MVA ICTs to be replaced with 2x500MW. Replaced ICTs would be shifted to Ramkanali-B (1st and 2nd ICT) for its establishment.

(b) As far as possible, all new 400/220kV ICTs may be 500MVA and 220/132kV ICTs may be 200MVA, keeping in view future requirement. If 220/132kV ICTs need to be replaced, the same may also be done with 200MVA.

(c) The design fault level at each new voltage level may be as follows, keeping in view future requirement:

- (i) 400kV: 63kA
- (ii) 220kV: 50kA
- (iii) 132kV: 40kA or higher

- (d) All ACSR lines may be implemented with maximum conductor temperature of 85°C or more, considering ambient temperature of 45°C.
- (e) Establishment of Gola-B 400/220/132kV S/s
 - (i) 400/220kV, 2x500MVA + 220/132kV, 2x200MVA
 - (ii) LILO of Raghunathpur TPS – Ranchi 400kV D/c line at Gola-B
 - (iii) LILO of Ramgarh-2B (newly proposed) – Ranchi 220kV S/c line (presently Ramgarh – Ranchi line) at Gola-B
 - (iv) LILO of Ramkanali-B (newly proposed) – Ramgarh-2B 220kV S/c line (presently MTPS – Ramgarh line) at Gola-B
 - (v) LILO of Ranchi – Ramkanali-B (newly proposed) 220kV S/c line (presently Ranchi – MTPS line) at Gola-B
 - (vi) LILO of CTPS – Gola 132kV D/c line at Gola-B
 - (vii) 420kV, 2x125MVAr bus reactor
 - (viii) Adequate space for future expansion at 400kV, 220kV and 132kV levels including space for installation of new ICTs, bus reactors, and lines.
- (f) Establishment of Ramkanali-B 400/220/132kV S/s
 - (i) 400/220kV, 2x315MVA (shifted from DSTPS) + 220/132kV, 2x200MVA
 - (ii) LILO of Durgapur STPS – Raghunathpur TPS 400kV D/c line at Ramkanali-B
 - (iii) LILO of MTPS – Gola-B (newly proposed) 220kV S/c line (presently MTPS – Ranchi line) at Ramkanali-B
 - (iv) LILO of MTPS – Gola-B (newly proposed) 220kV S/c line (presently MTPS – Ramgarh line) at Ramkanali-B
 - (v) LILO of Ramkanali – CTPS 132kV D/c line at Ramkanali-B
 - (vi) 420kV, 2x125MVAr bus reactor
 - (vii) Adequate space for future expansion at 400kV, 220kV and 132kV levels including space for installation of new ICTs, bus reactors, and lines.
- (g) A new 220kV substation may be planned in Putki/Patherdih/adjoining area with 220kV D/c line from ISTS substation at Dhanbad in order to provide additional feed apart from 132kV feed from CTPS. This shall improve reliability of power supply in the area.
- (h) Depending upon load growth, reconductoring of Ramgarh-2B – Gola-B 220kV D/c line may be taken up in future.
- (i) Under N-1-1 of Raghunathpur TPS – Ramkanali-B 400kV D/c line, Raghunathpur TPS – Maithon 400kV line was found to be critically loaded. Depending upon progressive commissioning of new units at Raghunathpur

TPS and loading on lines emanating from Raghunathpur TPS, suitable protection scheme as per requirement may be planned in future.

- (j) LILO of BTPS – Ramgarh 220kV D/c line at Ramgarh-2B is presently not required. Could be taken up in future as per system requirement.

3.7. Proposal may be discussed.

4. Establishment of 400/220kV substation at Joda – Agenda by OPTCL

4.1. In the 5th meeting of CMETS-ER held on 30-03-2022, LILO of Rourkela (POWERGRID) – Talcher (NTPC) 400kV D/c line at proposed Joda New substation of OPTCL was discussed. The matter was referred to joint study considering the observations of ERLDC and DVC.

4.2. The joint study meeting was held on 22-04-2022. Major observations/highlights of the proposals agreed in the joint study meeting are given below:

- (a) CTU presented the studies for both peak and off-peak scenario, with the following cases:

- (i) Base case
- (ii) Outage of both poles of Talchar – Kolar HVDC link
- (iii) Outage of 4 units of Talcher (6x500MW)

(b) It was observed that, two circuits of Jharsuguda – Rourkela 400kV 2xD/c line are designed with maximum operating temperature of 75°C and other two are designed for 85°C. The 75°C lines can only be loaded to maximum of 850MW. Under N-1 of Jharsuguda – Rourkela line, power flow beyond 850MW was observed on the parallel line.

(c) With the integration of Joda New 400/220kV substation with the existing 220/132kV Joda (Barbil) substation, about 900MW power flows through the 400/220kV ICTs, most of the power flows from Jharsuguda – Rourkela – Joda 400kV corridor. Further, Rourkela substation also acts as a source of power to Jharkhand through Rourkela – Chaibasa and Rourkela – Ranchi 400kV D/c lines. Accordingly, it was proposed to reconductor 400kV Jharsuguda – Rourkela 2xD/c lines in matching timeframe of establishment of Joda New 400/220kV substation.

4.3. In view of the above, following scope is proposed for establishment of Joda New substation:

- (i) Under Intra-state by OPTCL

- a) Establishment of 400/220kV, 3x500MVA Joda New S/s: ICTs to be installed progressively with demand growth
- b) LILO of Rourkela (POWERGRID) – Talcher (NTPC) 400kV D/c line at Joda New
- c) 400kV, 2x125MVAr bus reactor at Joda New

(ii) Under ISTS

- a) Reconductoring of Jharsuguda – Rourkela 400kV 2xD/c Twin Moose line with Twin HTLS conductor (with ampacity Single HTLS as 1600A at nominal voltage)
- b) Necessary bay upgradation at Jharsuguda and Rourkela end for all the above 4 lines matching with the rating of reconducted line.

4.4. Proposal may be discussed.

5. Requirement of 420kV, 2x50MVAR (two banks of 3x16.67MVAR 1-Ph units) switchable line reactor installed at Biharsharif end in Biharsharif – Lakhisarai 400kV ckt-2 and Biharsharif – Sasaram ckt-1 – Agenda by POWERGRID

- 5.1. In the 4th meeting of ERPC-TP held on 23-07-2021, the requirement of 420kV, 50MVAR switchable line reactor at Biharsharif end for Biharsharif – Lakhisarai 400kV ckt-2 and Biharsharif – Sasaram ckt-1 was discussed and the matter was referred for joint study.
- 5.2. POWERGRID vide in its letter dated 31-03-2021 has informed that after serving the transmission system for about 32 years, the line reactors are giving frequent trouble in O&M and the service support is also not easily available since the design has now become obsolete. Accordingly, it is proposed by POWERGRID to decommission the said 50MVAR single phase switchable line reactors installed in Biharsharif – Sasaram ckt-1 and other 50MVAR installed in Biharsharif – Lakhisarai ckt-2.
- 5.3. Biharsharif – Lakhisarai 400kV line is 89km with 50MVAR line reactor at Biharsharif end. Biharsharif – Sasaram 400kV line is 210km with 63MVAR line reactor at Sasaram end and 50MVAR line reactor at Biharsharif end. Charging studies have been carried out without 50MVAR line reactors at Biharsharif end in both of the lines. The study results are given in the table below.

400kV line section	Voltage rise on charging from Biharsharif end			Voltage rise on charging from other end		
	Source Rise	Line Rise	Total Rise	Source Rise	Line Rise	Total Rise
Biharsharif – Sasaram (with 63MVAR LR at Sasaram end)	1-2kV	1-2kV	2-3kV	2-3kV	10-11kV	12-13kV
Biharsharif – Lakhisarai (no LR)	1-2kV	1-2kV	2-3kV	2-3kV	1-2kV	4-5kV

It may be observed that even without the 50MVAR line reactors at Biharsharif end, both the lines can be charged and operated. Accordingly, it is proposed that as long as the two 50MVAR reactors are serviceable, the same may be operated and thereafter new line reactors are not required at Biharsharif end in the Biharsharif – Sasaram ckt-1 and Biharsharif – Lakhisarai ckt-2.

- 5.4. It has been observed that during winter, the voltage at Biharsharif reached upto 422kV. Biharsharif substation is being operated in split mode from Mar 2021 onwards. Section-A comprises of 80MVA_r bus reactor and Section-B comprises of 50MVA_r+2x125MVA_r bus reactors. POWERGRID has informed that space is available for installation of new 125MVA_r bus reactor at Section-A side.
- 5.5. It has been observed that with switching of 125MVA_r bus reactor at Biharsharif Section-A, the bus voltage changes by about 2kV. Accordingly, 420kV, 125MVA_r bus reactor along with associated bay is proposed to be installed in the Section-A of Biharsharif substation in order to limit voltage rise and also be able to meet contingency of only one 80MVA_r bus reactor in that section.
- 5.6. Proposal may be discussed.
- 6. Status of downstream 220kV or 132kV network by STUs from the various commissioned and under-construction ISTS substations in ER**
 - 6.1. Numbers of ISTS sub-stations have been commissioned and some are under construction for which the downstream system is being implemented by the STUs. Based on the information provided by the states, updated information on planned/under-construction downstream system is given at **Annexure-I**.
 - 6.2. STUs may update the status of downstream system given at **Annexure-I** prior to the meeting for further deliberations in the meeting, if any.
- 7. Status of 400kV substations being implemented by STUs in ER under intra-state schemes to be connected through ISTS**
 - 7.1. Various 400kV substations have been approved in the intra-state strengthening schemes in ER having interconnection with ISTS grid involving LILO of ISTS lines or direct connection to ISTS substations. Status of such intra-state substations as per available information is given at **Annexure-II**.
 - 7.2. STUs may update the status of the transmission system given at **Annexure-II** prior to the meeting for further deliberations in the meeting, if any.

Annexure-I

Status of Downstream Transmission Network in ER

Sl. No.	ISTS S/s	State	Voltage ratio, Trans. Cap	Downstream Voltage level (kV)	Unutilised bays	Status of ISTS bay	STU lines for unutilised bays	Status of Lines	
								Date of Award	Completion schedule
1.	Chaibasa	Jharkhand	400/220kV, 2x315MVA	220	2	Existing bay	Chaibasa (POWERGRID) – Jadugoda (JUSNL) 220kV D/c		Will be taken up in future. No firm plan as of now.
2.	Daltonganj	Jharkhand	400/220/132kV, 2x315MVA+ 2x160MVA	132	2	Existing bay	Daltonganj (POWERGRID) – Chatarpur 132kV D/c	22-10-2019	Expected by 21-10-2022.
3.	Dhanbad	Jharkhand	400/220kV	220	4	Existing bay	LILO of 1 st circuit of 220kV Dumka – Govindpur D/c line at Dhanbad (23km)	Tender has been floated	Dec 2023
							LILO of 2 nd circuit of 220kV Dumka – Govindpur D/c line at Dhanbad	Survey and estimation are being taken up. Thereafter, funding will be tied up.	
4.	Keonjhar	Odisha	400/220kV, 2x315MVA	220	2	Existing bay	Keonjhar (POWERGRID) – Turumunga (OPTCL) 220kV D/c		Expected by Jun'22
5.	Pandiabil	Odisha	400/220kV, 2x500MVA	220	2	Existing bay	Pratapsasan (OPTCL) – Pandiabil (POWERGRID) 220kV D/c		Expected by Apr'22
6.	Subashgram	West Bengal	400/220kV, 3x315MVA	220	2	Existing bay	Subashgram (POWERGRID) – Baraipur 220kV D/c line		Testing is going on. Expected by Apr'22.
7.	Rajarhat	West Bengal	400/220kV, 2x500MVA	220	4	Existing bay	Rajarhat (POWERGRID) – New Town AA2C 220kV D/c		Severe ROW (12km) in cable laying. Expected by Oct 2022
							Rajarhat (POWERGRID) – Barasat/Jeerat 220kV D/c		Expected by June'22
8.	Sitamarhi (New)	Bihar	400/220/132kV, 2x500MVA + 2x200MVA	132	2	Existing bay	LILO of Benipatti - Pupri 132kV S/c at Sitamarhi (New)		Expected by May'22
9.	Saharsa (New)	Bihar	400/220/132kV, 2x500MVA + 2x200MVA	220	4	Existing bay	Saharsa (New) - Khagaria 220kV D/c line		Charging process going on. Expected to be charged by April'22.

Sl. No.	ISTS S/s	State	Voltage ratio, Trans. Cap	Downstream Voltage level (kV)	Unutilised bays	Status of ISTS bay	STU lines for unutilised bays	Status of Lines	
								Date of Award	Completion schedule
							Saharsa (New) - Begusarai 220kV D/c line		Expected by April'22.
				132	2-ISTS (addln 4 by state)		Saharsa (New) - Saharsa 132kV D/c line formed by LILO of Saharsa - Banmankhi and Saharsa - Uda Kishanganj 132kV S/c line		04 nos. of bays are under construction by BSPTCL at Saharsa (New). Expected by Aug'22.
10.	Banka	Bihar	400/220/132kV, 2x500MVA + 2x200 & 1x315MVA	220	2	Under Bidding	Banka (POWERGRID) – Goradih (Sabour New) 220kV D/c line	Funds tied up. Tendering is expected shortly.	18 months from award.

Annexure-II

**Status of 400kV substations being implemented by STUs in ER under
intra-state schemes to be connected to ISTS**

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
A Bihar (to be implemented by BSPTCL/BGCL)				
I	Naubatpur GIS	400/220/132/33kV, 2x500MVA + 2x160MVA + 2x80MVA	26.04.2018	Charged on 17 th Mar 2022.
a)	LILO of circuits 3 & 4 of Patna (PG)-Balua 400 kV D/c (Quad) line at Naubatpur 400 kV 2x D/C	400kV 2x D/C	26.04.2018	Charged on 17 th Mar 2022.
b)	LILO of both circuits of Ara (PG) – Khagaul (BSPTCL) line at Naubatpur (New) 220 kV 2xD/C	220kV 2xD/C	26.04.2018	Expected in Apr'22.
II	Bakhtiyarpur GIS	400/220/132kV, 2x500MVA + 2x160MVA	26.11.2019	Progressively from Aug'22 to Dec'22.
a)	LILO of both circuits of Barh – Patna (PG) 400kV D/c (Quad) line-1 at Bakhtiyarpur 400 kV 2xD/C	400kV 2xD/c	26.11.2019	Line ready to be charged matching with Bakhtiyarpur S/s.
III	Jakkanpur GIS	400/220/132/33kV, 2x500MVA + 3x160MVA + 4x80MVA	26.04.2018	Expected in Apr'22.
a)	LILO of both circuits of Nabinagar-II – Patna (PG) 400kV D/c at Jakkanpur	400kV 2xD/c	26.04.2018	Expected in Apr'22
IV	Chappra (New)	400/220/132kV, 2x500MVA + 2x200MVA	Funds not yet tied up	State Govt approval under process.
a)	LILO of 400 kV Barh (NTPC) - Motihari (DMTCL) D/C (Quad) transmission line at Chappra	400kV 2xD/c	Funds not yet tied up	State Govt approval under process.
B Odisha (to be implemented by OPTCL)				
I	Meramundali-B	400/220kV, 2x500MVA	-	ICT-1 charged & ICT-2 on 23 rd Mar'22.
II	Digapahandi	400/220kV, 2x500MVA	Survey in progress	2025-26
a)	Digapahandi – Therubali – Jeypore 400kV D/c line	400kV D/c	Survey in progress	2025-26
III	Therubali	400kV switching station along with 420kV, 1x125MVA bus reactor	Survey in progress	2025-26
IV	Bhadrak	400/220kV, 2x500MVA	Tendering in progress	2024-25
a)	LILO of Baripada – Duburi and Baripada – Pandiabili 400kV line sections at Bhadrak	400kV D/c	Tendering in progress	2024-25

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
V	Paradeep*			
a)	Paradeep	400kV	Line package awarded and substation awarded in May'22	24 months
b)	Paradeep	765kV		2025-26
c)	Angul (POWERGRID) – Paradeep (OPTCL) 765kV D/c line	765kV D/c	Survey in progress	2025-26
VI	Begunia	765/400kV, 2x1500MVA	Kept in abeyance	Kept in abeyance
a)	Angul – Begunia 765kV D/c line	765kV D/c	Kept in abeyance	Kept in abeyance
b)	LILO of Pandiabil – Digapahandi 400kV D/c line at Begunia	400kV D/c	Kept in abeyance	Kept in abeyance
C	Jharkhand (to be implemented by JUSNL)			
I	Jasidih	400/220kV, 2x500MVA	-	No firm plan now. To be taken up in future.
II	Chandil (New)	400/220kV, 2x500MVA	NIT has been floated on 05-03-2022. Bid opening in Apr'22.	24 months
a)	Chandil – Chaibasa (POWERGRID) 400kV D/c line	400kV D/c		
III	Koderma	400/220/132/33kV, 2x500MVA + 2x200MVA + 2x80MVA		
IV	Mander	400/220kV, 2x500MVA	-	No firm plan now. To be taken up in future.
a)	LILO of Patratu – Ranchi (New) 400kV D/c line at Mander	400kV 2xD/c	-	No firm plan now. To be taken up in future.
V	Dumka (New)	400/220kV, 2x500MVA	-	No firm plan now. To be taken up in future.
a)	Dumka (New) – Dhanbad (ISTS) 400kV D/c line	400kV D/c	-	No firm plan now. To be taken up in future.
D	West Bengal (to be implemented by WBSETCL)			
I	Laxmikantpur GIS	400/132kV, 2x315MVA	Land identified. In process of acquisition. Expected by Dec 2024	
a)	LILO of Haldia – Subhasgram 400kV D/c line at Laxmikantpur	400kV D/c	-	Expected by Dec 2024

* OPTCL informed that Paradeep 765/400kV is different that of already under-construction Paradeep 400/220kV S/s, accordingly, they are planning 400kV 2xD/c line between two substations.