

# सेंट्रल ट्रांसमिशन यूटिलिटी ऑफ इंडिया लिमिटेड

(पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड के स्वामित्व में)

(भारत सरकार का उदयम)

## CENTRAL TRANSMISSION UTILITY OF INDIA LTD.

(A wholly owned subsidiary of Power Grid Corporation of India Limited)

(A Government of India Enterprise)

संदर्भ/Ref: CTU/E/00/14<sup>th</sup> CMETS-ER

दिनांक/Date: 18-01-2023

वितरण सूची के अनुसार/ As per Distribution List

विषय/ Subject: पूर्वी क्षेत्र में पारेषण योजनाओं के विकास के लिए 14<sup>वीं</sup> परामर्श बैठक के कार्यवृत्त (सीएमईटीएस-ईआर) / Minutes of 14<sup>th</sup> Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER)


महोदय/महोदया/ Sir/ Ma'am,

पूर्वी क्षेत्र में पारेषण योजनाओं के विकास के लिए 14<sup>वीं</sup> परामर्श बैठक 29 दिसंबर, 2022 को वीडियो कॉन्फ्रेंस के माध्यम से आयोजित की गई थी। इस संबंध में बैठक के कार्यवृत्त संलग्न है। यही CTUIL की वेबसाइट ([www.ctuil.in](http://www.ctuil.in) >> [ISTS Planning and Coordination](#) >> [Consultation Meeting for ISTS](#) >> [Eastern Region](#)) पर भी उपलब्ध है।

The 14<sup>th</sup> Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER) was held on 29<sup>th</sup> December, 2022 through video conferencing. In this regard, please find enclosed minutes of the meeting. The same is available on CTUIL website ([www.ctuil.in](http://www.ctuil.in) >> [ISTS Planning and Coordination](#) >> [Consultation Meeting for ISTS](#) >> [Eastern Region](#))

धन्यवाद/ Thanking you,

भवदीय / Yours faithfully,

  
18/01/2023

(राजेश कुमार) / (Rajesh Kumar)

महाप्रबंधक/ General Manager

**A. वितरण सूची / Distribution List:**

1.	<b>Chief Engineer (PSP&amp;A-II)</b> Central Electricity Authority Sewa Bhawan, R.K.Puram New Delhi-110066	2.	<b>Member Secretary</b> Eastern Regional Power Committee 14, Golf Club Road, Tollygunge Kolkata-700033
3.	<b>Director (SO)</b> Power System Operation Corporation Ltd. (POSOCO) 9 <sup>th</sup> Floor, IFCI Towers, 61, Nehru Place, New Delhi-110016	4.	<b>Executive Director</b> Eastern Regional Load Despatch Centre 14, Golf Club Road, Jubilee Park, Golf Gardens, Tollygunge, Kolkata, West Bengal - 700095
5.	<b>CMD</b> Damodar Valley Corporation DVC Towers, VIP Road Kolkata-700054	6.	<b>CMD</b> Odisha Power Transmission Corporation Ltd. (OPTCL) Bhoingar Post Office, Jan path Bhubaneshwar-751022
7.	<b>CMD</b> Bihar State Power Transmission Company Ltd. (BSPTCL) Vidyut Bhavan, 4 <sup>th</sup> floor, Bailey Road Patna-800021	8.	<b>CMD</b> Jharkhand Urja Sancharan Nigam Limited (JUSNL) Engineering Building, HEC, Dhurwa Ranchi -834004
9.	<b>Principal Chief Engineer cum Secretary</b> Power Department Government of Sikkim Gangtok, Sikkim	10.	<b>Managing Director</b> West Bengal State Electricity Transmission Company Ltd. (WBSETCL) Vidyut Bhavan, 8 <sup>th</sup> Floor, A-Block Salt Lake City, Kolkata-700091
11.	<b>Director (Projects)</b> Power Grid Corporation of India Ltd. "Saudamini", Plot No. 2, Sec-29, Gurugram Haryana-122001	12.	<b>Managing Director</b> Haldia Energy Limited (HEL) 2A, Lord Sinha Road, First Floor, Kolkata, West Bengal - 700 071, Email: <a href="mailto:rabi.chowdhury@rpsq.in">rabi.chowdhury@rpsq.in</a> ; <a href="mailto:kakali@rpsq.in">kakali@rpsq.in</a> ;
13.	<b>Chairman</b> CESC Limited CESC House, Chowringhee Square Kolkata – 700001 Email: <a href="mailto:kakali@rpsq.in">kakali@rpsq.in</a> ; <a href="mailto:rabi.chowdhury@rpsq.in">rabi.chowdhury@rpsq.in</a>		

## Minutes of 14<sup>th</sup> Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER)

GM (CTUIL) welcomed the participants to the meeting. List of the participants is enclosed at **Annexure-I**. Agenda wise deliberations and decisions are given below:

### 1. Confirmation of minutes of the previous meeting

1.1. The minutes of the 13<sup>th</sup> CMETS-ER held on 29-11-2022 were issued vide letter dated 06-12-2022.

1.2. CTU informed that WBSETCL vide email dated 07-12-2022 has mentioned that some of their observations regarding establishment of New Laxmikantapur S/s has not been incorporated suitably in the minutes. Accordingly, the following para is proposed to be appended in the minutes of the 13<sup>th</sup> CMETS-ER at para 2.6.

*“In response to the proposal of ERPC for implementation of proposed New Laxmikantapur S/s under ISTS, WBSETCL stressed that they will construct the proposed New Laxmikantapur 400/132/33kV S/s as it was conceived by WBSETCL mainly for catering the high growth in load demand at 132kV & 33kV voltage level in that region of the South 24 Parganas district with increased reliability of the downstream 132kV network. Regarding RoW issues, it was stated that in spite of severe RoW problem, WBSETCL has been able to successfully complete the construction of a considerably long 400kV Gokarna-New Chanditala D/c line (approx. 380ckm) very recently.”*

1.3. In view of the above, the minutes of 13<sup>th</sup> CMETS-ER were confirmed with above addition.

### A. Application related matters in Eastern Region (ER)

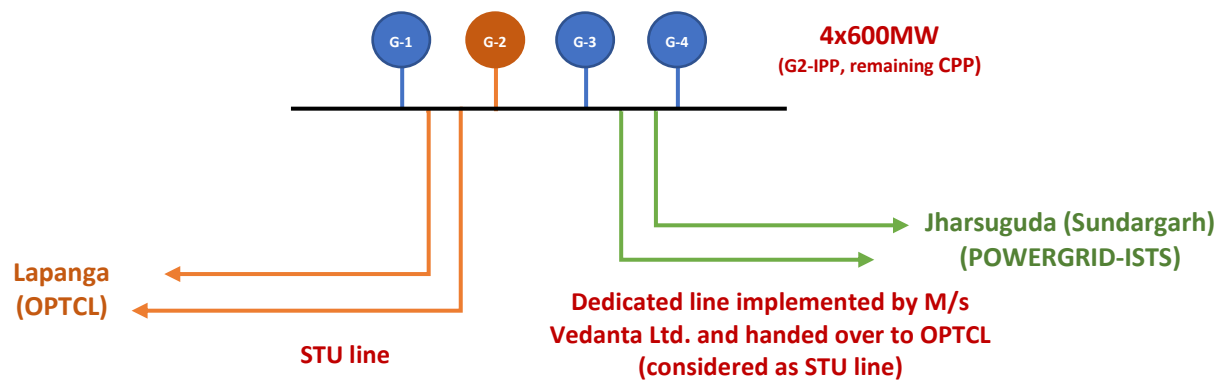
### 2. Application for grant of Connectivity to ISTS

2.1. CTU informed that in the month of Nov 2022, following application has been received for Connectivity to ISTS in ER, under CERC Connectivity Regulations, 2009:

Sl. No.	Application ID	Name of Applicant	Nature of applicant	Application date	Region	Project location	Connectivity location (requested)	Quantum of Connectivity (MW)	Connectivity sought from
1	0041900011	Vedanta Limited	Bulk Consumer	12-11-2022	ER	Jharsuguda, Odisha	Sundargarh	180	01-10-2024

2.2. It was informed that generation units of Vedanta Ltd. (4x600MW) are connected at 400kV. Out of these 4 units, 1 unit i.e. G-2 is an IPP for dedicated supply to GRIDCO through Vedanta – Lapanga/Meramundali 400kV D/c intra state line and the balance units are CPP for meeting the captive requirement of their steel plant. Further, Vedanta is also connected to Sundargarh (ISTS) through Vedanta – Sundargarh 400kV D/c line (implemented by Vedanta Ltd. and

handed over to OPTCL – considered as intra-state line). Schematic in this regard is given below:



2.3. CTU further informed that in a special meeting held at ERPC on 14-10-2016, following was inter alia decided:

- i) Control area jurisdiction of Vedanta will be shifted from ERLDC to SLDC, Odisha;
- ii) Vedanta Ltd. shall be a state embedded entity for all purposes.
- iii) All four units of TPP i.e. 4x600 MW shall be operated in single bus mode;
- iv) Vedanta-Jharsuguda line will no more be a dedicated transmission line and considered as a tie-line between ISTS network and OPTCL
- v) The CTU connectivity of Vedanta may be kept in abeyance.

2.4. In view of the above, Vedanta Ltd. is not considered as connected to ISTS i.e. it's a state embedded entity, as both the 400kV D/c lines emanating from Vedanta Ltd. are considered as STU lines (as per minutes of meeting held at ERPC on 14-10-2016).

2.5. CTU vide email dated 14-12-2022, requested M/s Vedanta Ltd. to clarify certain details regarding their generation (CPP / IPP), load and nature & quantum of connectivity with OPTCL and SLDs demarcation ISTS and intra-state drawl. In regard to above following has been clarified by M/s Vedanta Ltd. vide email dated 22-12-2022:

- Total captive generation is 3015MW (3x600MW + 9x135MW)
- Total IPP generation is 600MW
- Total power demand is 2890MW
- Vedanta Ltd. is state embedded entity of Odisha and has signed connection agreement with OPTCL as "thermal power plant", with point of intra-state connectivity as switchyard of Vedanta Ltd.
- Both Vedanta-Sundargarh & Vedanta-Lapanga 400kV D/c lines are OPTCL's line.
- Vedanta Ltd. is allowed to export/import about 1600MW power through OPTCL system beyond Vedanta Ltd.'s switchyard.

- The instant Connectivity has been sought by M/s Vedanta Ltd. to fulfil its RPO obligation for existing load itself, not for new load.

2.6. A meeting was held at CTU office on 26-12-2022 with Vedanta to discuss the issues related to processing of the instant application. The schematic of Vedanta switchyard and SLD of Plant-2 side along with 4x600MW generation where RE power is required (for which instant connectivity application has been submitted) is given below:

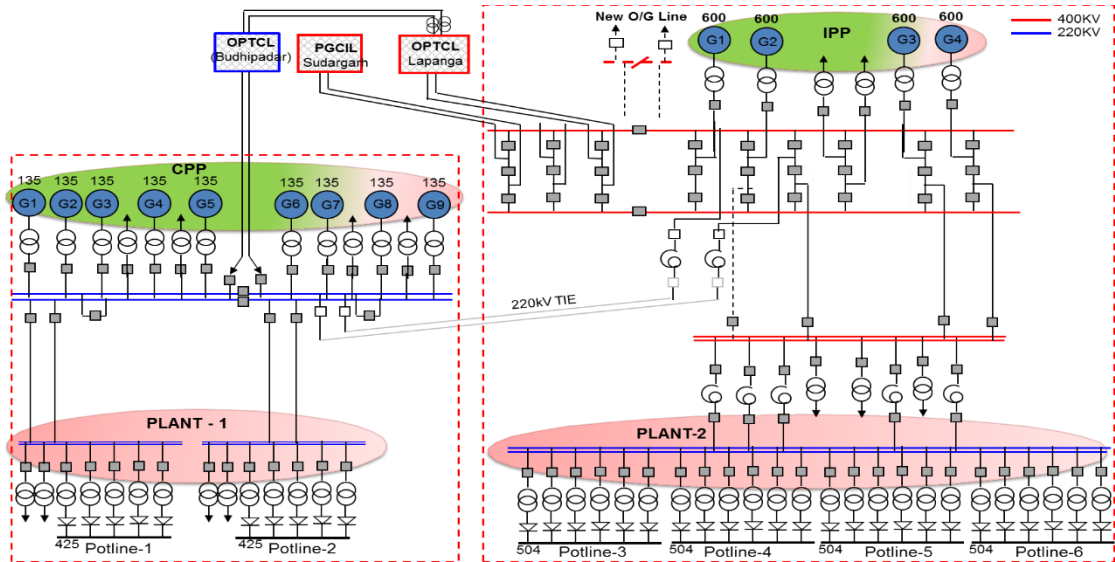


Figure 1: Vedanta schematic

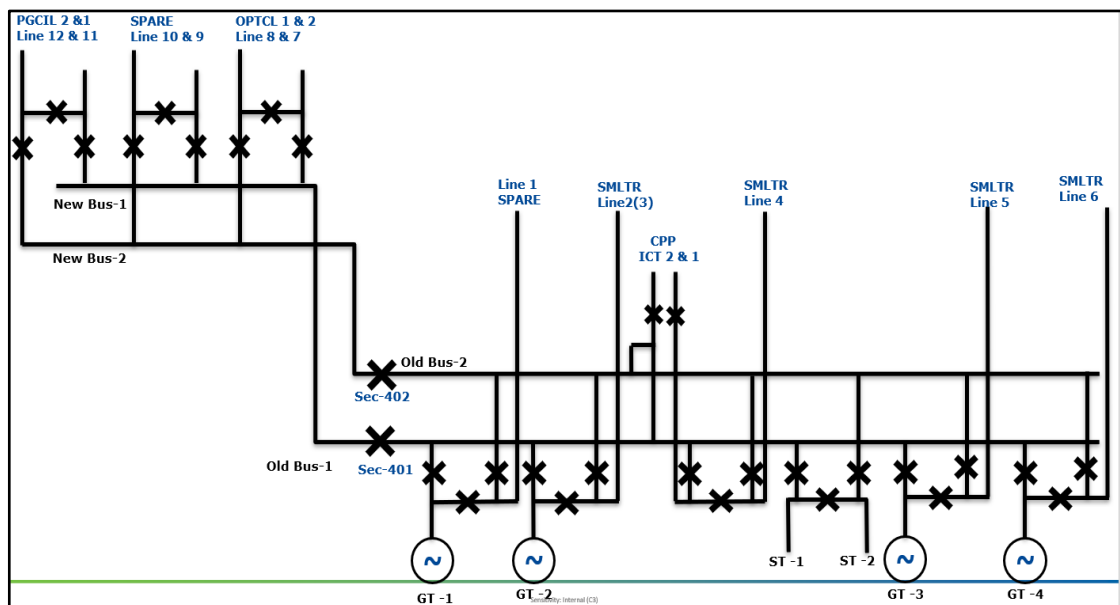


Figure 2: Vedanta SLD

2.7. The brief outcomes of the meeting held at CTU were informed in the CMETS-ER, which are as below:

- Instant connectivity of 180MW as bulk consumer is to meet the RPO obligation which may increase upto 1600-1700MW by 2030.
- The RE power is required on the Plant-2 side load.

- The 220kV interconnection/tie between Plant-1 & Plant-2 shall be kept open.
- Re-arrangement of feeders and generating units was worked out such that Vedanta-Lapanga 400kV D/c line and G-2 (IPP unit dedicated to GRIDCO) is in new bus section and rest of the plant in old bus section comprising of Vedanta-Jharsuguda/Sundargarh 400kV D/c line, smelter load, and CPP units (G-1, G-3 & G-4). Schematic of the same is given below:

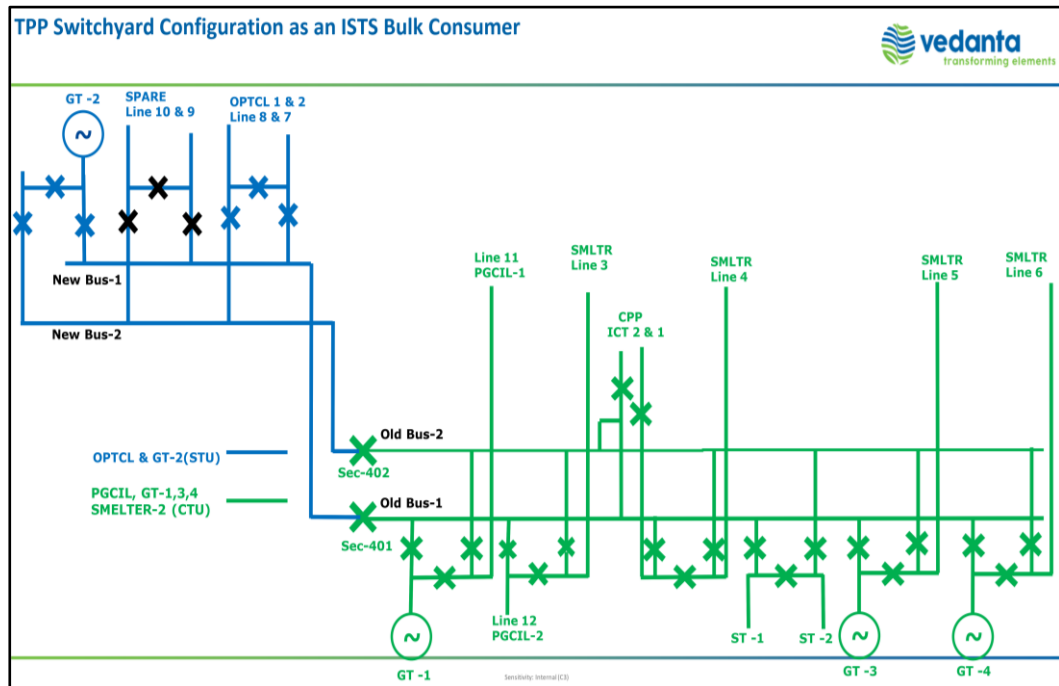


Figure 3: Vedanta SLD with proposed re-arrangement

- With above proposed re-arrangement, Vedanta can fulfil its obligation of supplying power to GRIDCO through G-2 (IPP) from new bus section (BLUE). Vedanta would be connected to OPTCL as IPP through this bus section. The old bus section (GREEN) would be a net deficit area and can be treated as a bulk consumer connected to ISTS through Vedanta-Jharsuguda/Sundargarh 400kV D/c line.
  - The transfer of power between STU and ISTS connected sections could be monitored through suitable metering arrangement at the breaker between the two sections.
  - With this re-arrangement, connectivity can be granted utilizing the existing lines with minor modifications in the Vedanta switchyard. However, for this re-arrangement to fructify, OPTCL needs to agree that Vedanta – Jharsuguda 400kV D/c line (which is currently considered as intra state line) would no longer remain an intra-state line and would be handed back to Vedanta.
- 2.8. OPTCL informed that they had a meeting with Vedanta and GRIDCO on 27-12-2022, wherein the matter was deliberated. Due to non-consensus among the parties and non-presence their distribution licensee viz. TATA Power

Western Odisha Distribution Limited (TPWODL), they requested to defer this agenda for the next meeting. OPTCL informed that in the meantime, they would call meetings with GRIDCO, distribution licensees and Vedanta etc. to deliberate on the modalities of the metering arrangement and dual connectivity issues.

- 2.9. With regard to different nature of Connectivity of Vedanta to STU and ISTS, CTU stated that in the instant re-arrangement proposed the new bus section (BLUE) is getting connected to STU network as IPP, and old bus section (GREEN) is getting connected to ISTS network as Bulk Consumer (subject to Vedanta – Jharsuguda line being treated as non STU line), and suitable metering arrangement is planned between the two sections for commercial and operational purposes.
- 2.10. CTU mentioned that in case of Balco in Western Region, CERC has allowed connectivity to Balco both as IPP and Bulk Consumer through same dedicated line of Balco. Therein, the generation and bulk consumer complexes have been separated with suitable metering arrangement between the two to take care of commercial and operational issues. The schematic of the same is given below:

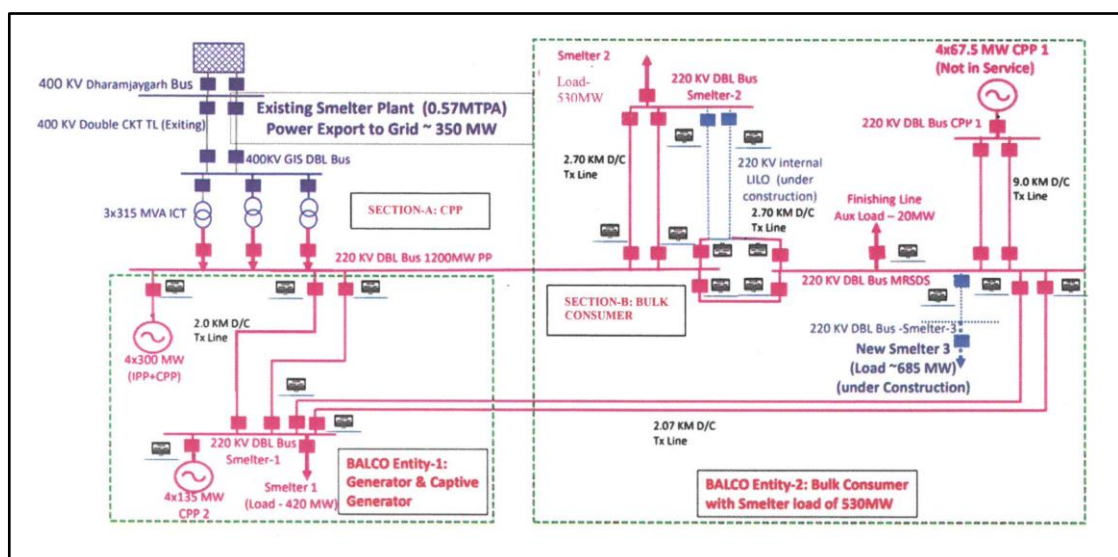


Figure 4: BALCO schematic

2.11. ERLDC raised the following issues in regard to ISTS connectivity for Vedanta Ltd. as Bulk Consumer:

- (a) Applicability of SERC and CERC regulations
- (b) Control Area Jurisdiction
- (c) Dynamic stability to be carried out-stability during smelter load tripping
- (d) Tripping of transmission lines, large load complex, and planning SPS
- (e) Treatment of 400/220kV ICTs. Use and treatment during exigencies
- (f) Islanding scheme
- (g) ICT-2 on HV side is not with one and half switching scheme

(h) GT-2 auxiliary power connection

- 2.12. CTU added that any application cannot be put on hold for long and has to be processed within the timelines specified in CERC Regulations. Accordingly, it was proposed that a physical meeting may be convened at ERPC level among all concerned to discuss and resolve the issues. All agreed with the proposal.
- 2.13. In view of the above, it was decided that a meeting among ERPC, CTU, ERLDC, OPTCL, GRIDCO, M/s Vedanta Ltd. would be convened at ERPC to deliberate and finalise the instant matter of ISTS Connectivity to M/s Vedanta Ltd. as Bulk Consumer.

### 3. LTA Applications with injection in another region and drawl in ER

- 3.1. CTU informed that the following LTA application has been received in the month of Oct 2022 under CERC Connectivity Regulations, 2022:

Sl. No.	Application No.	Applicant	LTA Application date	Connectivity Injection Point	Connectivity Application	Drawl Point	Quantum of LTA (MW)	Start Date of LTA	End date of LTA
1	0412100007	XI Xergi Power Private Limited	06-10-2022	Fatehgarh-III PS, Rajasthan	1200002847	GRIDCO (ER)	200 (PPA/PSA without NoC)	18-01-2024 <sup>#</sup>	17-01-2049

<sup>#</sup>Interim start date of LTA shall be 31/12/2024 as per the deliberations below:

- 3.2. It was informed that stage-II Connectivity (1200002847, 400MW) was granted to M/s XI Xergi Power Private Limited at Fatehgarh-III PS through 220 kV S/c line. 1 no. 220kV line bay at Fatehgarh-III PS is being implemented under ISTS. Based on the above connectivity, M/s XL Xergi has applied for LTA of 200MW on firm basis to GRIDCO-ER (200MW).
- 3.3. The subject transfer of power requires strengthening of ISTS in NR and NR-WR corridor. LTA has been applied on firm basis, and for further drawl of power by GRDICO, ER through STU network from ISTS, NoC from the concerned STU viz. OPTCL shall be required. It was informed that if NoC of concerned STU is not available or the NoC is not effective as on Start Date of LTA, the billing for payment of transmission charges shall be undertaken on the LTA grantee as per CERC Regulations, till such time NoC is made available and becomes effective. The NoC with conditions would be considered effective only upon fulfilment of such conditions. In this regard, request for NoC to OPTCL from CTU was sent on 02-12-2022.
- 3.4. OPTCL informed in the meeting that NOC for the subject power transfer has already been issued on 28-12-2022 with a validity period of 18-01-2024 to 17-01-2049. OPTCL was requested to share the same. Applicant vide email dated 29-12-2022 has forwarded the requisite NoC.
- 3.5. In view of the above, the LTA of 200MW was agreed to be granted to M/s XI Xergi Power Private Limited for power transfer from its generation project pooled

at Fatehgarh-III PS to GRIDCO (ER), with system expansion in NR and NR-WR corridor.

## **B. ISTS expansion schemes in Eastern Region**

### **4. Revised connectivity for Laxmikantpur 400/132kV S/s and split bus arrangement at Laxmikantpur S/s**

4.1. CTU informed that in the 13<sup>th</sup> CMETS-ER held on 29-11-2022, following was deliberated:

(a) The committee proposed to be formed by ERPC (as agreed in the 47<sup>th</sup> TCC/ERPC) may also consider RoW issues while finalising the feasibility of establishment of New Laxmikantpur S/s. The committee may also consider proposal of ERPC regarding establishment of New Laxmikantpur under ISTS through LILO of both circuits of Jeerat (New) – Subhasgram 400kV D/c (Quad) ISTS line.

(b) WBSETCL would provide the recommendations of the committee to CTU with regard to establishment of New Laxmikantpur S/s.

(c) CTU would parallelly carry out studies with regard to establishment of New Laxmikantpur through LILO of one circuit or both circuits of Jeerat (New) – Subhasgram 400kV D/c (Quad) ISTS line.

4.2. On enquiry about the development on the task assigned to committee, WBSTECL informed that a meeting was held on 20-12-2022, wherein following was deliberated:

(a) Considering the urgent requirement of New Laxmikantpur 400/132kV S/s, LILO of one circuit of Haldia-Subhasgram 400kV D/c line (about 0.5km) as a temporary arrangement may be carried out as short term measure.

(b) Parallelly, LILO of one circuit of Subhasgram-Jeerat New 400kV (Quad) D/c line (about 50km) may be taken up, which is expected to take considerable time.

(c) Subsequently, the LILO of one circuit of Haldia-Subhasgram 400kV D/c line would be withdrawn and LILO of second circuit of Subhasgram-Jeerat New 400kV (Quad) D/c may be taken up.

(d) In this regard, HEL may carry out requisite studies for LILO of one circuit of Haldia-Subhasgram 400kV D/c line and inform their decision at the earliest. The regulatory and commercial issues may also be taken care of bilaterally between HEL and WBSETCL.

4.3. HEL stated that they have carried out load flow analysis through a consultant and some network contingency and voltage violations have been observed in the studies.

4.4. CTU informed that as per the decisions in the 13<sup>th</sup> CMETS-ER, studies have been carried out for alternate connectivity of New Laxmikantpur on the latest rolling plan PSSE files of 2027-28 time-frame.

- The assumptions / considerations for the study are given below:
  - (a) Studies have been carried out for 2027-28 timeframe in the Scenario-5 i.e. June (summer) peak load case.
  - (b) The peak demand of West Bengal (without DVC) has been considered as 13.7GW.
  - (c) To simulate the worst case, the despatch from Bakreshwar, Kolaghat and Sagardighi has been considered as zero.
  - (d) 6<sup>th</sup> 400/220kV, 1x500MVA ICT at Subhasgram to be implemented by CESC has been taken into service.
  - (e) The load flow results of the base case scenario (without New Laxmikantpur S/s) and various alternatives to provide connectivity to New Laxmikantpur S/s have been studied.
- Study results were shown in the meeting and the same was also enclosed along with Agenda of the 14<sup>th</sup> CMETS-ER.
- The major highlights of the study are given below:
  - i) Without the New Laxmikantpur S/s in future time-frame (refer Case-0), the Subhasgram 400/220kV ICTs would be critically loaded under N-1 criteria, even after installation of 6<sup>th</sup> ICT at Subhasgram (by CESC).
  - ii) Considering the power drawl requirement (about 300-400MW) of New Laxmikantpur 400/132kV, it is observed that the same can be met through LILO of one circuit of either Haldia-Subhasgram twin line or Subhasgram-Jeerat New quad line (refer Case-1 and Case-2).
  - iii) With the increase in demand at New Laxmikantpur 400/132kV to say about 600-700MW in future, LILO of 2<sup>nd</sup> circuit of the same line can be considered at a later stage (refer Case-4 and Case-5).
  - iv) With LILO of one circuit of Haldia-Subhasgram twin and one circuit of Subhasgram-Jeerat New quad line (refer Case-3), uneven loading is observed which would limit the loadability of lines due to parallel operation of twin and quad lines between Subhasgram and New Laxmikantpur.
  - v) In view of the above, initially / to start with LILO of one circuit of Haldia-Subhasgram 400kV D/c twin line can be carried out at New Laxmikantpur. Subsequently, LILO of both circuits of either Haldia-Subhasgram 400kV D/c twin line or Subhasgram-Jeerat New 400kV D/c quad line needs to be taken up as final arrangement.

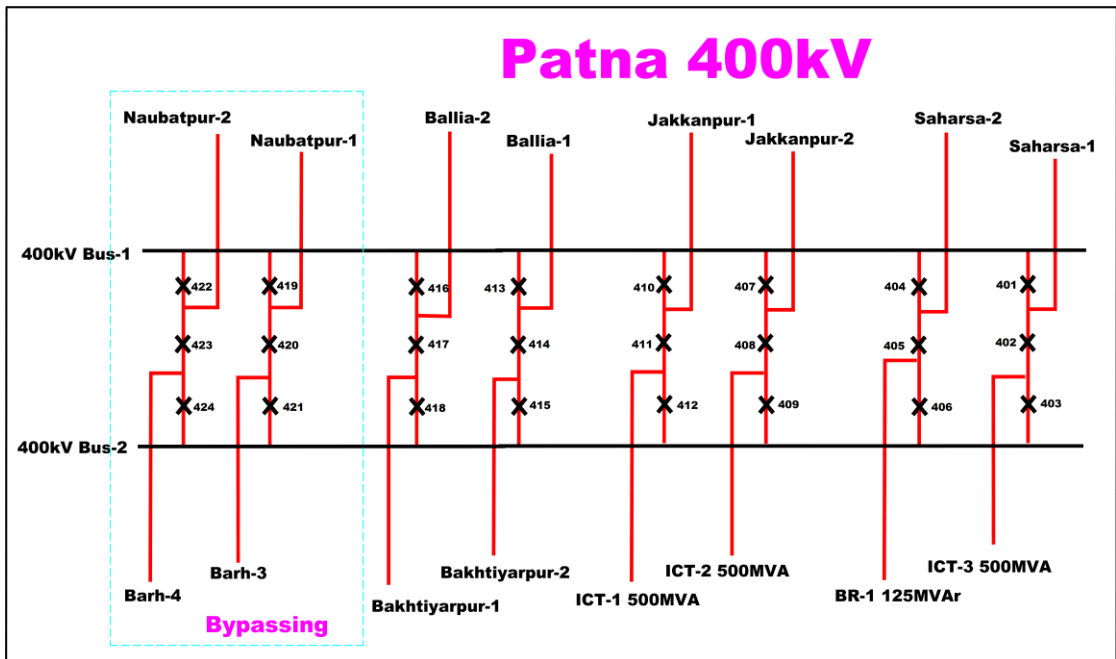
- 4.5. WBSETCL enquired about the uneven loading on Subhasgram – Haldia 400kV Twin / Quad line in case of LILO of one circuit of Haldia-Subhasgram twin line and one circuit of Subhasgram-Jeerat New quad line (Case-3).
- 4.6. CTU stated that there is about 20% uneven loading in Twin and Quad lines. Therefore, it is suggested that LILO of both circuits of either Haldia-Subhasgram 400kV D/c twin line or Subhasgram-Jeerat New 400kV D/c quad line needs to be taken up as final arrangement so as to ensure reliable supply.
- 4.7. WBSETCL stated that they would take up the implementation of New Laxmikantpur 400/132kV S/s initially through LILO of one circuit of Haldia – Subahsgram 400kV D/c line under intra state. Parallely, implementation of LILO of one circuit of Subhasgram – Jeerat New 400kV D/c (Quad) line can be implemented under ISTS.
- 4.8. CTU stated that if the LILO of Subhasgram – Jeerat New 400kV D/c (Quad) line is to be done under ISTS, then the LILO of both circuits should be done for better reliability.
- 4.9. WBSETCL mentioned that after LILO of one or both circuits of Subhasgram – Jeerat New 400kV D/c (Quad) line at New Laxmikantpur, LILO of one circuit of Haldia – Subahsgram 400kV D/c line would be withdrawn. They further proposed that a member from CTU may be co-opted in the committee so as to finalise implementation modalities for New Laxmikantpur S/s. It was also informed that next meeting of committee is schedule in Jan 2023.
- 4.10. After detailed deliberation, following was decided:
  - (a) In the committee which has been established to explore the implementation modalities for New Laxmikantpur S/s, a member from CTU can be co-opted by ERPC/WBSETCL, if necessary.
  - (b) The committee may explore the possibility of establishment of New Laxmikantpur S/s initially through LILO on one circuit of Haldia – Subahsgram 400kV D/c line as suggested by WBSETCL. As final arrangement, LILO of both circuits of either Haldia-Subhasgram 400kV D/c twin line or Subhasgram-Jeerat New 400kV D/c quad line may be planned.
  - (c) The outcomes of the implementation modalities for establishment of New Laxmikantpur S/s would be presented in the CMETS-ER by WBSETCL for finalisation of the scheme.

## **5. Fault level control at Patna (POWERGRID) S/s at 400kV level**

- 5.1. CTU informed that the present fault level of Patna 400kV bus is observed to be about 42kA. With progressive commissioning of new generating units of Barh-1, Buxar, and North Karanpura generation projects and other network expansion schemes around Patna, the three phase fault current at Patna 400kV bus is expected to increase as follows:

Time-frame	New generating units and major 400kV transmission system	Three phase fault current
Dec 2022	Barh-1 U#2 & NKSTPP U#1	43.2kA
Nov 2023	NKSTPP U#2 and Bakhtiyarpur S/s	44.1kA
Dec 2023	Buxar U#1 along with Buxar-Naubatpur line	46.2kA
Mar 2024	Barh-1 U#3 & Buxar U#2	48.2kA
Jun 2024	NKSTPP U#3 along with NKSTPP-Gaya line	48.4kA

5.2. It was informed that the issue of controlling the fault level at Patna (POWERGRID) S/s was discussed in the 9<sup>th</sup> CMETS-ER meeting wherein it was proposed that in order to limit fault current at 400kV side at Patna S/s, Patna – Barh 400kV D/c (Quad) line (ckt-3 & 4) (68.9km) and Patna – Naubatpur 400kV D/c (Quad) line (25.45km) can be bypassed at Patna S/s from within the substation itself using switching arrangement, so as to form Barh – Naubatpur 400kV D/c (Quad) line. The bypassing is proposed through switching arrangement at substation by opening the main CBs (419, 421, 422, and 424) and keeping the tie CBs closed (420 and 423) under normal operating condition.



5.3. Based on the deliberation, it was decided in the 9<sup>th</sup> CMETS-ER that ERLDC would share their observations on the above proposed bypassing arrangements and based on the observations of ERLDC, implementation of the bypassing through switching arrangement at Patna S/s to bypass Patna – Barh 400kV D/c (Quad) line (ckt-3 & 4) and Patna – Naubatpur 400kV D/c (Quad) line at Patna S/s so as to form Barh – Naubatpur 400kV D/c (Quad) line would be taken up.

5.4. CTU informed that studies have been carried for the 2027-28 timeframe and with the proposed bypassing arrangement, the fault level of Patna (POWERGRID) substation at 400kV bus is observed to be reduced from 48.4kA to 36.2kA.

However, the fault level of 220kV bus is observed to be about 47kA. This high fault current at 220kV side is due to injection of fault current from the 220kV state network of Bihar. Further, the fault current at 220kV bus at Patna/Sipara (BSPTCL) and Khagaul substations is also observed to be about 45kA and 31kA respectively.

- 5.5. BSPTCL stated that in general the designed short circuit level for 220kV and 132kV are 40kA and 31.5kA respectively. If the same is required to be upgraded with a higher rating, it would incur a huge cost.
- 5.6. CTU clarified that the proposal is to identify feeders contributing high fault current in the 220kV or 132kV level in the STU system and to take measure like bus sectionalizer, series reactors, bypassing, feeder rearrangement etc. to control the fault level at Patna and nearby areas within the designed limit.
- 5.7. CTU requested BSPTCL to share the designed fault current rating of 220kV and 132kV substations of various substations around Patna area.
- 5.8. ERLDC stated that no major issues are envisaged in the bypassing as the line lengths are small. However, Barh – Patna 400kV line 3 & 4 is one of the evacuation line from the Barh generation project. Therefore, comments, if any, from NTPC may also be obtained on the proposal.
- 5.9. CTU stated that no evacuating lines have been removed in the instant bypassing arrangement and further the bus sectionalizer at Barh switchyard between stage-I & II is planned to be kept normally closed as existing. Therefore, total four number 400kV D/c line would always be in place for evacuation of 5x660MW from Barh-I & II. Only the termination point of one of the D/c is changed from Patna to Naubatpur. Nevertheless, the observations from NTPC would be taken up and incorporated in the minutes.
- 5.10. The proposed bypassing arrangement was in-principally agreed subject to view of NTPC.
- 5.11. NTPC vide email dated 04-01-2023 was requested to confirm the instant proposal of bypassing of lines at Patna S/s to limit fault current. NTPC vide email dated 11-01-2023 has accepted the instant proposal. However, they have mentioned that in exigencies the lines may from Barh may be terminated at Patna S/s for reliable power evacuation. Further, they have mentioned that necessary changes in the relay settings may be done to this effect.
- 5.12. In view the above following was agreed:
  - (a) Bypassing of Patna – Barh 400kV D/c (Quad) line (ckt-3 & 4) (68.9km) and Patna – Naubatpur 400kV D/c (Quad) line (25.45km) at Patna S/s through the tie breaker, so as to form Barh – Naubatpur 400kV D/c (Quad) line. This would be a normal operating condition.
  - (b) The above arrangement would be implemented by POWERGRID in coordination with NTPC and BSPTCL/BGCL. Being an operational matter,

ERLDC would provide directions and timeframe for implementation of the same.

- (c) Under exigencies or as per system conditions, and based on instructions from Grid-India/ERLDC, the Patna – Barh 400kV D/c (Quad) line (ckt-3 & 4) and Patna – Naubatpur 400kV D/c (Quad) line, as and when required can be terminated at Patna S/s.

**6. Status of downstream 220kV or 132kV network by STUs from the various commissioned and under-construction ISTS substations in ER**

- 6.1. CTU informed that 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-II**.

**7. Status of 400kV substations being implemented by STUs/entities in ER to be connected through ISTS**

- 7.1. CTU informed that 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 intra-state substations and associated lines as updated by STUs in the meeting is given at **Annexure-III**.

**8. Status of space allocated at various ISTS substations to STUs for implementation of line bays under intra state system) for their intra state lines**

- 8.1. CTU informed that space at various ISTS substations have been allocated to STUs for creation of line bays for termination of their new intra-state lines. Status of the lines planned from the bays allocated at ISTS S/s as updated by STUs in the meeting is given at **Annexure-IV**.

**9. Implementation of Paradeep 765kV substation in Odisha under ISTS to meet the power requirement of upcoming industrial demand – Additional agenda**

- 9.1. CTU informed that in the 1<sup>st</sup> CMETS-ER held on 25-11-2021, implementation of 765/400/220kV Paradeep substation at Paradeep under intra-state scheme was agreed to meet the upcoming industrial demand in the area. The feed was provided to Paradeep from Angul (POWERGRID) S/s through 765kV D/c line.
- 9.2. Now, Principal Secretary to Government, Department of Energy, Govt. of Odisha vide letter dated 27-12-2022 addressed to Secretary (Power), Ministry of Power, Govt. of Odisha has proposed for construction of Paradeep 765kV substation under ISTS. Brief highlights of the proposal is as below:

- a. New industrial demand have large quantum of power requirement is expected in Paradeep area starting from FY 2023-24.
- b. Paradeep is emerging as Green Hydrogen Hub and various industries have expressed investment intentions to set up Green Hydrogen and Green Ammonia plants in Paradeep due its location advantage. There is also potential of export. Following is the list of such industries:

Sl. No.	Name of the Industry	Project details
1.	ACME Cleantech Solutions	Green Ammonia- 3300 MTPD
2.	ReNew Power	Green Hydrogen- 2x50 KPTA
3.	Canyon Consultancy Pvt. Ltd	Green Hydrogen- 5 TPD
4.	Palasah Urja hydrogen LLP	Green Hydrogen / Ammonia-20000 TPA
5.	Aditya Birla Renewable Limited	Green Hydrogen-20 KPTA Green Ammonia-300 TPD

- c. To meet the demand of upcoming Green Hydrogen and Green Ammonia plants there is a requirement of ISTS corridor to supply RE power from outside Odisha i.e. from RE rich states to Paradeep.
- d. A new 400kV substation is already under implementation by OPTCL for which state has already received high contract demand. To meet additional power requirement in the area, a new 765kV substation in Paradeep / Mahakalapada is required.
- e. In addition to power requirement of above industries, other power intensive industries are also coming up in the area, some which are as follows:

Sl. No.	Load Centre	Load (MW)
1	Arcellor Mittal	849
2	JSW Utkal Steel	340
3	IOCL	280
4	Essar Steel	400
5	PCPIR	1800
	<b>Total</b>	<b>3669</b>

- f. The industries shall source RE power through ISTS to comply with RPO.
  - g. Establishment of Paradeep / Mahakalapada has been proposed through LILO of Angul – Srikakulam 765kV D/c line.
- 9.3. From the above proposal, it is understood that there is heavy drawl requirement by various energy intensive and Green Hydrogen/Ammonia industries in the Paradeep area. The industries shall be sourcing power directly from ISTS and mainly RE power from RE rich states to meet the RPO. Thus, keeping in view critical nature of large industrial demand and quantum of power requirement it is essential that Paradeep substation is feed reliably from ISTS, and with high capacity lines. Nearest 765kV substation in ISTS are at Angul (about 190km)

and Medinipur (about 310km). Further, nearest ISTS line is Angul – Srikakulam 765kV D/c line. In this regard, following alternatives were explored:

- (a) LILO of Angul – Srikakulam 765kV D/c line at Paradeep
- (b) Angul – Paradeep – Medinipur 765kV D/c line

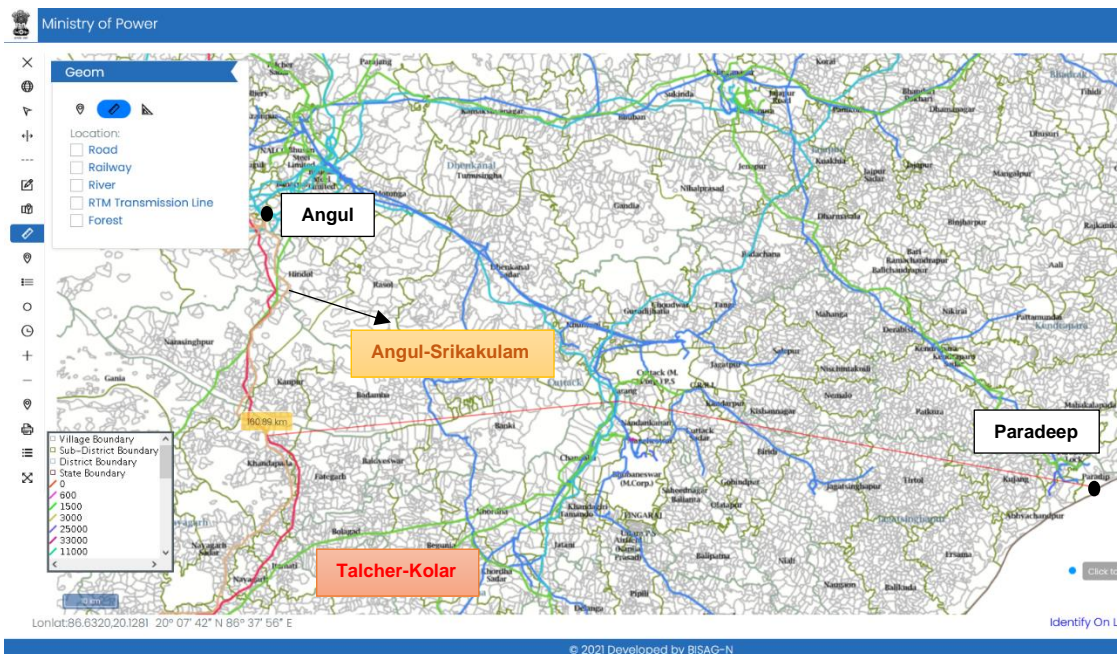
9.4. CTU stated that load flow studies have been carried out in consultation with OPTCL and assumptions & observations of load flow study results are as follows:

(a) In the minutes of meeting taken by CEA on 25-11-2022, it was agreed that implementation time-frame of ISTS projects may generally be 24 months. Odisha has mentioned that new demand is expected to be progressively added in Paradeep area from FY 2023-24. Accordingly, studies have been carried out for two time-frames viz. 2024-25 and 2027-28 (latest PSSE files of Rolling Plan).

(b) Two alternatives have been studied viz. **(i) Alt-1:** the proposal mentioned in the letter i.e. LILO of Angul – Srikakulam 765kV D/c line at Paradeep and **(ii) Alt-2:** Angul – Paradeep – Medinipur 765kV D/c line

(c) **Observations on Alt-1** i.e. LILO of Angul – Srikakulam 765kV D/c line at Paradeep

- Snapshot of line routing of Angul-Srikakulam line (from PM Gati-Shakti portal) along with distance of Paradeep from the line is given below.



- It can be observed from above that LILO point on Angul – Srikakulam line would be about 160-170km from Paradeep, and LILO point would be about 40-50km southwards of Angul. The original Angul – Srikakulam line is about 275km. Thus, with LILO line length of two sections viz. Angul – Paradeep and Paradeep – Srikakulam would be about 220km and 395km.

- The Paradeep – Srikakulam section would have 240MVA line reactor at Srikakulam end (existing) and new 330MVA line reactor can be planned. With this, the percentage line compensation would be about 55%. Further, at Paradeep end only loads are being connected and with this LILO arrangement short circuit level is observed to be about 12kA (15.6MVA).
- Voltage rise of about 60-65kV is expected during charging of Srikakulam – Paradeep section from Srikakulam end and 80-85kV on charging from Paradeep end (with Angul – Paradeep section in service). Due to comparatively low short circuit MVA at Paradeep and long line, high voltage rise is being observed on line charging.
- In view of the above, it is not technically suitable to LILO Angul – Srikakulam line for establishment of Paradeep 765kV S/s.

(d) **Observations on Alt-2** i.e. Angul – Paradeep – Medinipur 765kV D/c line

- The power demand at Paradeep would increase in progressive manner. Further, looking at quantum of power requirement by industries, it is understood that some power requirement would also be at 220kV level, say of JSW Utkal Steel (340MW); IOCL (280MW) and Essar Steel (400MW). Accordingly, it is proposed to establish a 765/400/220kV substation at Paradeep under ISTS with two different sources viz. Angul and Medinipur in phased manner.
- The new 765/400/220kV substation under ISTS at Paradeep would be in place of earlier approved new 765kV substation at Paradeep under intra-state.
- The 765kV Paradeep (ISTS) and 400kV Paradeep (OPTCL) substations are proposed to be connected through 400kV D/c (Quad) line.
- Studies have been carried out for two scenarios viz. Scenario-1 (Aug Max Solar condition) and Scenario-2 (Aug peak demand). In Scenario-1, there is maximum import by ER due high renewable generation in RE rich regions and Scenario-2 corresponds to maximum demand scenario of ER.
- Accordingly, the following system has been considered in the studies considering phased power requirement at Paradeep:

**A. By 2024-25 (Phase-I):** for about 1400-1500MW load demand at Paradeep

- (i) 765/400kV/220kV, 3x1500MVA + 2x500MVA substation at Paradeep
- (ii) Angul – Paradeep 765kV D/c line
- (iii) Paradeep – Paradeep (OPTCL) 400kV D/c (Quad) line

**Note:** Paradeep (OPTCL) 400/220kV, 2x500MVA substation along with Paradeep – Duburi 400kV D/c line and Paradeep – Pratapsasan 220kV D/c line is expected by Dec 2024 (being implemented by OPTCL under intra-state scheme).

**B. Upto 2027-28 (Phase-II):** for about 5500-6000MW load demand at Paradeep

(i) \*Installation of additional 765/400kV, 3x1500MVA ICTs and 400/220kV, 3x500MVA ICTs at Paradeep

(ii) #Angul – Paradeep 765kV D/c (2<sup>nd</sup>) line

(iii) #Paradeep – Medinipur 765kV D/c line

**Note:** \*These ICTs would be installed in a phased manner depending on the drawl requirement of OPTCL and/or Industries.

#To be taken up as per system requirement.

- With establishment of Paradeep – Medinipur 765kV D/c link, Angul – Paradeep – Medinipur – Ranchi (New) – Dharamjaygarh – Sundargarh – Angul 765kV ring shall be established, which shall help in reliable transfer of RE power to various ER states during high RE scenarios. The critical loading observed on WR-ER corridors viz. 400kV and 765kV lines in 2027-28 time-frame in ISTS Rolling Plan study files also subsides with establishment of the Angul – Paradeep – Medinipur corridor as portion of RE power being earlier injected on Dharamjaygarh – Ranchi (New) – Medinipur corridor is now injected into ER through Dharamjaygarh – Sundargarh – Angul – Paradeep – Medinipur corridor.
- For voltage control, 2x330MVA bus reactors at 765kV level and 2x125MVA bus reactors at 400kV level are proposed at Paradeep S/s under first phase.

9.5. On enquiry, OPTCL informed the demand of the industries and the tentative commissioning timeframe in the meeting, which is given below:

Sl. No.	Industry	Type	Power Demand (MW)	Expected commissioning (Month & Year)
1	Arcellor Mittal	Steel	849	2025-26
2	JSW Utkal Steel	Steel	340	2025-26
3	IOCL	Petro-Chemical	280	2023-24
4	Essar Steel	Steel	400	2024-25
5	PCPIR	Petro-Chemical	1800	-
		<b>Sub-total</b>	<b>3669</b>	-
6	ACME Cleantech Solutions	Green Ammonia- 3300 MTPD	1500	2027-28
7	ReNew Power	Green Hydrogen- 2x50 KPTA	1500	150MW in 2025-26, 1350MW in 2029-30
8	Canyon Consultancy Pvt. Ltd	Green Hydrogen- 5 TPD	-	-
9	Palasah Urja hydrogen LLP	Green Hydrogen / Ammonia-20000 TPA	-	-
10	Aditya Birla Renewable Limited	Green Hydrogen-20 KPTA	-	-
		<b>Sub-total</b>	<b>3000</b>	
		<b>TOTAL</b>	<b>6669</b>	

- 9.6. From the above it was observed that major portion of the load i.e. about 1340MW is expected in 2025-26 timeframe. Considering the timeline for approval and award of scheme and thereafter 24 months for construction, the expected commission schedule of Phase-I of the system would fall in 2025-26 timeframe. IOCL-280MW and Essar Steel-400MW which are expected prior to 2025-26, in the interim period can be supplied from nearby substations of OPTCL including Paradeep 400kV, subsequently, if required, they may be connected to ISTS Paradeep 765kV S/s.
- 9.7. ERLDC stated that as huge quantum of industrial demand is proposed to be met from Paradeep, additional studies such as stability studies, reactive power planning considering nature of loads etc. may be carried out.
- 9.8. CTU stated that the present proposal is a broad transmission system which has been planned considering the anticipated demand requirement of various industries as mentioned in the letter of Principal Secretary, Odisha. The necessary additional studies for planning of reactive power compensation devices like STATCOM etc. would be carried out in future when exact nature of loads is identified and the industries apply for connection to ISTS.
- 9.9. OPTCL confirmed that 765kV substation planned under intra-state at Paradeep in the 1<sup>st</sup> CMETS-ER would not be taken up by them in view of the ISTS 765kV substation at Paradeep. Further, they confirmed that space would be provided for 2 nos. 400kV line bays at Paradeep 400kV (OPTCL) S/s for termination of Paradeep (ISTS) – Paradeep (OPTCL) 400kV D/c (Quad) line. Paradeep (OPTCL) S/s is expected in Dec 2024.
- 9.10. Space for two nos. 765kV line bays identified at Angul S/s for earlier intra-state proposal would now be used for termination of Angul – Paradeep 765kV D/c ISTS line.
- 9.11. It was also suggested that, OPTCL may also plan 400kV and 220kV lines from Paradeep (ISTS) S/s for meeting their demand in nearby areas.
- 9.12. In view of the above, following transmission system was agreed to be implemented under ISTS under the Eastern Region Expansion Scheme-XXXIV (ERES-XXXIV) with implementation time-frame of 24 months from allocation:

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA) / line length (km)/ Nos.
i.	Establishment of Paradeep 765/400/220kV 3x1500MVA + 2x500MVA substation  <b>Additional space for future expansion:</b> - 765/400kV, 3x1500MVA ICTs (10x500MVA single phase units including one spare) along with	765/400kV, 1500MVA ICTs: 3 nos. (10x500MVA single phase units including one spare)  400/220kV, 500MVA ICTs: 2 nos.  765kV ICT bays: 3 nos. 400kV ICT bays: 5 nos. 220kV ICT bays: 2 nos.

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA) / line length (km)/ Nos.
	<p>associated ICT bays at both voltage levels</p> <ul style="list-style-type: none"> <li>- 400/220kV, 3x500MVA ICTs along with associated ICT bays at both voltage levels</li> <li>- 765kV, 2x330MVA (7x110MVA single phase units including one spare) bus reactor along with associated bays</li> <li>- 420kV, 2x125MVA bus reactor along with associated bays</li> <li>- 10 nos. of 765kV line bays (along with space for switchable line reactor) for future lines</li> <li>- 12 nos. of 400kV line bays (along with space for switchable line reactor) for future lines</li> <li>- 12 nos. of 220kV line bays for future lines</li> <li>- 765kV bus sectionaliser bay: 1 set</li> <li>- 400kV bus sectionaliser bay: 1 set</li> <li>- 220kV Bus sectionalizer bay :1 set</li> <li>- 220kV Bus coupler bay: 1 no.</li> <li>- 220kV Transfer bus coupler bay:1 no.</li> </ul>	<p>765kV, 330MVA Bus reactor: 2 nos. (7x110MVA single phase units including one spare unit for both bus and line reactors)</p> <p>420kV, 125MVA Bus reactor: 2 nos.</p> <p>765kV Bus reactor bays: 2 nos.</p> <p>400kV Bus reactor bays: 2 nos.</p> <p>765kV line bays: 2 nos.</p> <p><i>[for termination of Angul (POWERGRID) – Paradeep 765kV D/c line along with 765kV, 1x330MVA switchable line reactor at Paradeep end in both circuits]</i></p> <p>765kV, 330MVA (3x110MVA single phase units) switchable line reactor along with associated bay and 500ohm NGR (with NGR bypass arrangement): 2 nos.</p> <p><i>[at Paradeep end in both circuits of Angul (POWERGRID) – Paradeep 765kV D/c line]</i></p> <p>400kV line bays: 2 nos.</p> <p><i>[for termination of Paradeep – Paradeep (OPTCL) 400kV D/c (Quad) line]</i></p> <ul style="list-style-type: none"> <li>- 220kV Bus coupler bay: 1 no.</li> <li>- 220kV Transfer bus coupler bay:1 no.</li> </ul>
ii.	Angul (POWERGRID) – Paradeep 765kV D/c line along with 765kV, 1x330MVA switchable line reactor with 500ohm NGR (with NGR bypass arrangement) at Paradeep end in both circuits	190km
iii.	Paradeep – Paradeep (OPTCL) 400kV D/c (Quad) line	10km

Sl. No.	Scope of the Transmission Scheme	Capacity (MVA) / line length (km)/ Nos.
iv.	Extension at Angul (POWERGRID) S/s	765kV line bays (along with space for future switchable line reactor): 2 nos.  <i>[for termination of Angul (POWERGRID) – Paradeep 765kV D/c line along with 765kV, 1x330MVar switchable line reactor at Paradeep end in both circuits]</i>
v.	Extension at Paradeep (OPTCL) S/s	400kV line bays: 2 nos.  <i>[for termination of Paradeep – Paradeep (OPTCL) 400kV D/c (Quad) line]</i>

**Note:**

- a) POWERGRID shall provide space at Angul (POWERGRID) 765/400kV S/s for implementation of 2 no. of 765kV line bays (along with space for future switchable line reactor) for termination Angul (POWERGRID) – Paradeep 765kV D/c line.
- b) OPTCL shall provide space at under implementation Paradeep (OPTCL) 400/220kV S/s for implementation of 2 no. of 400kV line bays for termination of Paradeep – Paradeep (OPTCL) 400kV D/c (Quad) line.

– x – x –

## Annexure-I

**List of participants of 14<sup>th</sup> Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER)**

Sl. No.	Name	Designation	Organization	Email id
1.	Sh. Ashok Pal	Dy. COO	CTU	<a href="mailto:ashok@powergrid.in">ashok@powergrid.in</a>
2.	Sh. Rajesh Kumar	GM	CTU	<a href="mailto:rajeshkumar@powergrid.in">rajeshkumar@powergrid.in</a>
3.	Smt. Ankita Singh	Chief Manager	CTU	<a href="mailto:ankita@powergrid.in">ankita@powergrid.in</a>
4.	Sh. Manish Ranjan Keshari	Manager	CTU	<a href="mailto:manish.keshari@powergrid.in">manish.keshari@powergrid.in</a>
5.	Sh. Shyam Sunder Goyal	Manager	CTU	<a href="mailto:shyam.goyal@powergrid.in">shyam.goyal@powergrid.in</a>
6.	Sh. Amit kumar	Engineer	CTU	<a href="mailto:emailamit0014@powergrid.in">emailamit0014@powergrid.in</a>
7.	Sh. P P Jena	EE	ERPC	<a href="mailto:erpc-protection@gov.in">erpc-protection@gov.in</a> ;
8.	Sh. Saurav Kr Sahay	Chief Manager	ERLDC, GRID-INDIA	<a href="mailto:saurav.sahay@posoco.in">saurav.sahay@posoco.in</a>
9.	Smt. Shabari Pramanick	Manager	ERLDC	<a href="mailto:shabari.pramanick@posoco.in">shabari.pramanick@posoco.in</a>
10.	Sh. Chandan Kumar	Chief Manager	ERLDC, GRID-INDIA	<a href="mailto:chandan@posoco.in">chandan@posoco.in</a>
11.	Sh. Chandan Mallick	Manager (SO)	ERLDC	<a href="mailto:chandan.mallick@posoco.in">chandan.mallick@posoco.in</a>
12.	Sh. Saibal Ghosh	Manager	GRID-INDIA	<a href="mailto:saibal@posoco.in">saibal@posoco.in</a>
13.	Sh. Debashis Chaki	CE, CPD	WBSETCL	<a href="mailto:cpd.wbsetcl@gmail.com">cpd.wbsetcl@gmail.com</a>
14.	Sh. Ranjan Das	Addl. CE	WBSETCL	<a href="mailto:cpd.wbsetcl@gmail.com">cpd.wbsetcl@gmail.com</a>
15.	Sh. Jayanta Dutta	Chief Engineer	DVC	<a href="mailto:jayanta.dutta@dvc.gov.in">jayanta.dutta@dvc.gov.in</a>
16.	Sh. Sandip pal	CE(SYSTEM)	DVC	<a href="mailto:sandip.pal@dvc.gov.in">sandip.pal@dvc.gov.in</a>
17.	Sh. Amiyaranjan Swain	Executive Engineer	DVC	<a href="mailto:amiyaranjan.swain@dvc.gov.in">amiyaranjan.swain@dvc.gov.in</a>
18.	Sh. S. K. Panigrahi	CGM, Corp. Planning	OPTCL	<a href="mailto:sgm.cp@optcl.co.in">sgm.cp@optcl.co.in</a>
19.	Sh. A. K. Banerjee	DGM	OPTCL	<a href="mailto:ele.akbanerjee@optcl.co.in">ele.akbanerjee@optcl.co.in</a>
20.	Sh. H R Pandey	Director (Projects)	BSPTCL	<a href="mailto:dir.proj.bsptcl@gmail.com">dir.proj.bsptcl@gmail.com</a>
21.	Sh. Ratan Kumar	CE (Project)	BSPTCL	<a href="mailto:ce.trans664@gmail.com">ce.trans664@gmail.com</a>
22.	Sh. Deepak Kumar Jha	CE(P&E)	BSPTCL	<a href="mailto:ceplanningengg@gmail.com">ceplanningengg@gmail.com</a>
23.	Sh. R S Prasad	ESE(P&E)	BSPTCL	<a href="mailto:eeebspgcl@gmail.com">eeebspgcl@gmail.com</a>
24.	Sh. Praveen Kumar	EEE(STU)	BSPTCL	<a href="mailto:stubsptcl2019@gmail.com">stubsptcl2019@gmail.com</a>
25.	Sh. Chiranjiv Bhomi	GM	HEL	<a href="mailto:chiranjib.bhowmik@rpsg.in">chiranjib.bhowmik@rpsg.in</a>
26.	Sh. Rajesh	GM	BGCL	
27.	Sh. Ajit Kumar Bhagat	Sr Manager	JUSNL	<a href="mailto:cetjusnl@gmail.com">cetjusnl@gmail.com</a>
28.	Sh. Md Zeyauddin	Director (PS&RE)	Vedanta	<a href="mailto:md.zeyauddin@vedanta.co.in">md.zeyauddin@vedanta.co.in</a>
29.	Sh. Ninad Nigam	Manager	Vedanta	<a href="mailto:ninad.nigam@vedanta.co.in">ninad.nigam@vedanta.co.in</a>
30.	Sh. Mangu Srinivas	GM Power system	Vedanta	<a href="mailto:mangu.srinivas@vedanta.co.in">mangu.srinivas@vedanta.co.in</a>
31.	Sh. K A Vishwanath		XL Xergi	<a href="mailto:ka.vishwanath@o2power.in">ka.vishwanath@o2power.in</a>
32.	Sh. Arzaan Dordi	Chief Manager	Serentica/Vedanta	<a href="mailto:arzaan.dordi1@serenticaglobal.com">arzaan.dordi1@serenticaglobal.com</a>

## Annexure-II

## 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 Dec 2023.
3.	Dhanbad	Jharkhand	400/220kV	220	4	Existing bay	LILO of 1 <sup>st</sup> circuit of 220kV Dumka – Govindpur D/c line at Dhanbad (23km)	Bid evaluation is in progress. Price bid opened. Additional funds are required, proposal sent to state govt. for approval.	Expected by June 2024.
							LILO of 2 <sup>nd</sup> circuit of 220kV Dumka – Govindpur D/c line at Dhanbad		
4.	Keonjhar	Odisha	400/220kV, 2x315MVA	220	2	Existing bay	Keonjhar (POWERGRID) – Turumunga (OPTCL) 220kV D/c		Expected by Mar 2023.
5.	Rourkela	Odisha	400/220kV, 4x315MVA	220	-	-	Reconductoring of Rourkela – Tarkera 220kV D/c line with HTLS conductor	Tender floated. Award expected in Jan 2023	Expected by June 2023.
6.	Subashgram	West Bengal	400/220kV, 2x315MVA+ 1x500MVA	220	2	Existing bay	Subashgram (POWERGRID) – Baraipur 220kV D/c line		220kV substation charged. 132kV downstream

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
									delayed due to RoW. Expected by Mar 2023.
7.	Rajarhat	West Bengal	400/220kV, 2x500MVA	220	2	Existing bay	Rajarhat (POWERGRID) – New Town AA2C 220kV D/c		Line charged on 26-09-2022 from Rajarhat S/s. Substation is expected by Mar 2023.
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 Jul 2023.
9.	Saharsa (New)	Bihar	400/220/132kV, 2x500MVA + 2x200MVA	132	2-ISTS (addln.4 by state)	Existing bay	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). These bays are expected in Apr 2023.
10.	Banka	Bihar	400/220/132kV, 2x500MVA + 2x200 & 1x315MVA	220	2	Oct 2024	Banka (POWERGRID) – Goradih (Sabour New) 220kV D/c line (around 45km)	Being re-awarded. Award expected in Feb 2023.	18 months from date of award.
11.	Durgapur	DVC	400/220kV, 3x315MVA	220	-	-	Reconductoring of Durgapur – Parulia (DVC) 220kV D/c line with HTLS conductor. (1000A)	Awarded in Feb 2022.	Expected by Aug 2023.

## Annexure-III

**Status of 400kV & 220kV substations being implemented by STUs/entities in ER to be connected to ISTS**

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
<b>A Bihar (to be implemented by BSPTCL)</b>				
<b>I</b>	<b>Bakhtiyarpur GIS</b>	400/220/132kV, 2x500MVA + 2x160MVA	26.11.2019	Progressively from Jul 2023 onwards.
a)	LILO of both circuits of Barh – Patna (PG) 400kV D/c (Quad) line-1 at Bakhtiyarpur 400 kV 2xD/c line	400kV 2xD/c	26.11.2019	Line ready to be charged matching with Bakhtiyarpur S/s.
<b>II</b>	<b>Chappra (New)</b>	400/220/132kV, 2x500MVA + 2x200MVA	Cabinet approval under process	24 months from date of award
a)	LILO of 400 kV Barh (NTPC) - Motihari (DMTCL) D/C (Quad) transmission line at Chappra	400kV 2xD/c	Cabinet approval under process	24 months from date of award.
<b>B Odisha (to be implemented by OPTCL)</b>				
<b>I</b>	<b>Digapahandi</b>	400/220kV, 2x500MVA	Tendering activity to be taken up shortly along with Pandiabili-Digapahandi 400kV D/c line	2025-26
a)	Digapahandi – Therubali – Jeypore 400kV D/c line	400kV D/c	To be taken after tendering of Digapahandi S/s	2025-26
<b>II</b>	<b>Therubali</b>	400kV switching station along with 420kV, 1x125MVAr bus reactor	Survey completed. Land schedule is under preparation	2026-27
<b>III</b>	<b>Bhadrak</b>	400/220kV, 2x500MVA	Tender was cancelled due to high cost. Exploring Self funding	2025-26
a)	LILO of Baripada – Duburi and Baripada – Pandiabili	400kV D/c	Tender was cancelled due to high cost.	2025-26

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
	400kV line sections at Bhadrak		Exploring Self funding	
<b>IV</b>	<b>Paradeep</b>	400/220kV, 2x500MVA	Awarded in Dec 2022	Dec 2024
a)	Paradeep – Duburi 400kV D/c line	400kV D/c	Line work started	Jun 2024
<b>V</b>	<b>Paradeep</b>	765/400kV, 2x1500MVA	Dropped. To be taken up in ISTS	
a)	Angul (POWERGRID) – Paradeep (OPTCL) 765kV D/c line	765kV D/c	Dropped. To be taken up in ISTS	
<b>VI</b>	<b>Joda New</b>	400/220kV, 3x500MVA	To be taken up under intra state TBCB. Assigned to PFC.	2025
a)	LILO of Rourkela (POWERGRID) – Talcher (NTPC) 400kV D/c line at Joda New	400kV D/c	To be taken up under intra state TBCB. Assigned to PFC.	2025
<b>C</b>	<b>Jharkhand (to be implemented by JUSNL)</b>			
<b>I</b>	<b>Chandil (New)</b>	400/220kV, 2x500MVA	Bid price very high. NIT cancelled by BoD. Revised cost under preparation.	24 months
a)	PVUNL – Chandil 400kV D/c (Quad) line	400kV D/c (Quad)		
b)	Chandil – Chaibasa (POWERGRID) 400kV D/c (Quad) line	400kV D/c (Quad)		
c)	Chandil – Dhanbad 400kV D/c (Quad) line	400kV D/c (Quad)		
<b>II</b>	<b>Koderma</b>	400/220/132/33kV, 2x500MVA + 2x200MVA + 2x80MVA		
a)	PVUNL – Koderma 400kV D/c (Quad) line	400kV D/c (Quad)		
<b>III</b>	<b>Latehar</b>			
a)	Patratu – Latehar 400kV D/c line	400kV D/c	Forest Stage-I clearance is awaited.	Jun 2023
b)	Latehar – Chandwa (POWERGRID) 400kV D/c line	400kV D/c	All clearances have been obtained. Work has been started.	Apr 2023
<b>IV</b>	<b>Jasidih</b>	400/220kV, 2x500MVA	-	No firm plan now. To be taken up in
a)	Koderma (JUSNL) – Jasidih 400kV D/c (Quad) line	400kV D/c (Quad)	-	

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
b)	Jasidih – Dumka 400kV D/c (Quad) line	400kV D/c (Quad)	-	future. May be dropped from this list. Would be taken up in second stage after implementation of Koderma and Chandil substations and associated lines.
V	<b>Mander</b>	400/220kV, 2x500MVA	-	
a)	LILO of Patratu – Ranchi (New) 400kV D/c line at Mander	400kV 2xD/c	-	
VI	<b>Dumka (New)</b>	400/220kV, 2x500MVA	-	
a)	Dumka (New) – Dhanbad (ISTS) 400kV D/c (Quad) line	400kV D/c (Quad)	-	
<b>D</b>	<b>West Bengal</b>			
<b>(to be implemented by WBSETCL)</b>				
<b>I</b>	<b>Laxmikantpur GIS</b>	400/132kV, 2x315MVA	Land identified. In process of acquisition.	
a)	#LILO of Haldia – Subhasgram 400kV D/c line at Laxmikantpur	400kV D/c	-	-
<b>II</b>	<b>Falakata</b>	220/132kV, 2x160MVA	Initial civil works have been started.	Mar 2024
a)	LILO of Birpara – Alipurduar 220kV D/c line at Falakata substation (LILO portion length around 9km)	220kV 2xD/c		Mar 2024
<b>(to be implemented by CESC)</b>				
<b>III</b>	<b>Subhasgram (POWERGRID)</b>	-	-	-
	Installation of new 400/220kV, 500MVA (6th) ICT at Subhasgram (POWERGRID) S/s along with associated ICT bays and OLTC by CESC at its own cost	400/220kV, 1x500MVA (6 <sup>th</sup> ICT)		WBSETCL was requested to arrange updated status from CESC from next meeting onwards.

# The 400kV infeed to New Laxmikantpur 400/132kV S/s is under discussion. Based on the deliberations, the lines would be updated, if required.

## Annexure-IV

**Space allocated at various ISTS substations to STUs for implementation of line bays under intra state system for their intra state lines**

Sl. No.	Substation/ Location	Space for	Date of award of line and bays	Completion Schedule	Agreed in CMETS-ER
1.	Angul (POWERGRID)	2 nos. 765kV lines bays for termination of Angul (POWERGRID) – Paradeep 765kV D/c line (including suitable switchable line reactors)		Dropped. To be taken up in ISTS.	1 <sup>st</sup>
2.	Rourkela (POWERGRID)	2 No. 220kV lines bays for termination of Rourkela (POWERGRID) – Tarkera 220kV D/c (HTLS) line		Would be taken up after reconductoring of 1 <sup>st</sup> D/c line. Award of reconductoring of 1 <sup>st</sup> D/c line is expected by Jan 2023 with completion by Jun 2023.	1 <sup>st</sup> & 7 <sup>th</sup>
3.	Keonjhar (POWERGRID)	2 No. 220kV lines bays for termination of Keonjhar (POWERGRID) – Tikarpada 220kV D/c line	NIT yet to be taken up	Expected by 2024-25	1 <sup>st</sup>
4.	Maithon (POWERGRID)	2 No. 220kV lines bays for implementation of Maithon (POWERGRID) – Asansol 220kV D/c line	Tender expected to be floated by Jan 2023 and award expected by Mar 2023. Line bays being implemented by POWERGRID under deposit works	18 months from LoA.	7 <sup>th</sup>