सेंट्रल ट्रांसमिशन यूटिलिटी ऑफ इंडिया लिमिटेड

(पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड के स्वामित्व में)

(भारत सरकार का उद्यम)

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/00/8th/CMETS-ER

दिनांक/Date: 19-07-2022

वितरण सूची के अनुसार/ As per Distribution List

विषय/ Subject: पूर्वी क्षेत्र में पारेषण योजनाओं के विकास के लिए 8वी परामर्श बैठक के कार्यवृत्त (सीएमईटीएस-ईआर) / Minutes of 8th 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 **8वी** परामर्श बैठक **30st जून, 2022** को ईआरपीसी सम्मेलन हॉल, कोलकाता में हाइब्रिड मोड के माध्यम से आयोजित कि गई थी । इस संबंध में बैठक के कार्यवृत्त संलग्न है। यही CTUIL की वेबसाइट (*www.ctuil.in >> ISTS Planning and Coordination >> Consultation Meeting for ISTS >> Eastern Region*) पर भी उपलब्ध है।

The **8th** Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER) was held on **30st June, 2022** at ERPC Conference Hall, Kolkata in hybrid (physical & virtual) mode. In this regard, please find enclosed minutes of the meeting. The same is also available on CTUIL website (*www.ctuil.in >> ISTS Planning and Coordination >> Consultation Meeting for ISTS >> Eastern Region*)

धन्यवाद/ Thanking you,

भवदीय / Yours faithfully,

19/07/2022

(राजेश कुमार) / (Rajesh Kumar)
महाप्रबंधक/ General Manager

A. वितरण सूची / Distribution List:

1.	**Chief Engineer (PSP&A-II)** Central Electricity Authority Sewa Bhawan, R.K.Puram New Delhi-110066	**2.**	**Director (SO)** Power System Operation Corporation Ltd. 9th Floor, IFCI Towers, 61, Nehru Place, New Delhi-110 016
3.	**Member Secretary** Eastern Regional Power Committee 14, Golf Club Road, Tollygunge Kolkata-700033	**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 Bhubaneshwar-751022
7.	**CMD** Bihar State Power Transmission Company Ltd. (BSPTCL) Vidyut Bhavan, 4th 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, 8th Floor, A-Block Salt Lake City, Kolkata-700091

B. विशेष आमंत्रित / Special invitee:

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

Minutes of 8th Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER)

CGM (CTU) welcomed all the participants to the city of joy – Kolkata, for the 8th CMETS-ER. In his welcome address, he thanked ERPC for organizing the CMETS-ER in hybrid mode (physical & virtual) at ERPC meeting hall. He stated that since the start of this consultation meeting for planning of ISTS in ER, this is the first time that most of the stakeholders are meeting physically. He appreciated the participations of the stakeholders in the meeting and suggested that such physical interactions may be held in a span of few months as physical mode of meetings helps in seemless discussions as well as enhances cohesion among stakeholders. This also helps in better coordination in planning of transmission systems in region. He then requested GM (CTU) to take up agenda of 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

CTU informed that the minutes of the 7th meeting of CMETS-ER held on 31-05-2022 were issued vide letter dated 22-06-2022. As no comments have been received, the minutes with the above clarification were confirmed as circulated.

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

2.1. As agreed in the previous meeting, ERLDC gave a presentation (copy enclosed at **Annexure-V**) regarding the operational constraints in the ER grid which included transmission lines and ICTs constraints, high voltage during low hydro in Sikkim/Bhutan, high fault level and reliability concerns like feeder arrangement in one and half breaker scheme, LC resonance and secondary arcing issues due to high compensation in transmission lines, reliable power supply to state capitals, N-1 & N-1-1 compliances etc. ERLDC also stressed upon studying resilience in the grid by considering N-K contingency, outage of complete EHV S/s, outage of large generation complex, black start resources, islanding schemes, requirement of SPS, outage of D/c lines in flood prone areas etc. System constraints in STU network were also highlighted in the presentation.

2.2. CTU stated that the constraints in the ISTS network are regularly monitored and suitable scheme(s) to overcome those constraints are being discussed in the CMETS-ER meeting. STUs were also advised to take up actions to mitigate the constraints observed in present grid and also those being envisaged in the next 4-5 years horizon in the planning scenarios considered by CTU for ISTS Rolling Plan. The Rolling Plan PSSE files/Report are being updated regularly in line with

ISTS Planning Procedure, every six months. The same files can be used by STUs for planning the intra-state system as well.

2.3. All the stakeholders appreciated the initiative of sharing of future plan details of ISTS and intra-state schemes in CMETS as the same helps in better transmission system planning due to availability of updated data and coordination among states, CTU, ERPC, ERLDC & other stakeholders.

2.4. Further, it was decided that E&P Dept., Govt. of Sikkim may also present details regarding load-generation balance and upcoming intra-state schemes of Sikkim for 2026-27 time-frame in the next CMETS-ER, as CTU, ERLDC and all other STUs of ER viz. BSPTCL, JUSNL, WBSETCL, & OPTCL have already given a presentation.

A. Application related matters in Eastern Region (ER)

CTU informed that no open access application has been received in the month of March 2022 with connectivity/drawl/injection in ER.

B. ISTS expansion schemes in Eastern Region

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

3.1. CTU informed that in the 7th CMETS-ER held on 31-05-2022, it was decided that WBSETCL in coordination with HEL and CESC would workout modalities for implementation of LILO of Haldia – Subhasgram 400kV D/c line at New Laxmikantpur, as the same is most suitable technical and economical alternative for providing connection to New Laxmikantpur S/s. Further, in order to balance the drawal of power from New Laxmikantpur 400/132kV and Laxmikantpur 220/132kV S/s, suitable bus splitting scheme at 220/132kV Laxmikantpur 220/132kV S/s may be identified.

3.2. WBSETCL informed that they had taken up the matter with CESC and submitted the plan for LILO of Haldia – Subhasgram 400kV D/c line at New Laxmikantpur, however, they have not received any confirmation from CESC. On enquiry about the apprehensions of CESC in giving consent for the subject LILO, WBSETCL stated that the issue is commercial and regulatory in nature, which needs to be deliberated mutually among the parties involved.

3.3. WBSETCL informed that the peak load at Subhasgram 400/220kV ICTs (4x315+1x500MVA) have crossed 1500MW during this summer in the month of April 2022. Subhasgram S/s in the only ISTS substation in South 24 Parganas district which feeds the important load centres of Kolkata metropolitan city as well as other important loads in the district. In order to improve reliability and reduce dependency on one single substation for meeting major load of Kolkata area, WBSETCL has planned New Laxmikantpur 400/132kV S/s. After implementation of this substation, the drawl by WBSETCL from Subhashgram S/s would reduce thereby increasing the margins in the existing ICTs to feed the

loads of Kolkata metropolitan city. Further, they have identified land for establishment of New Laxmikantpur 400/132kV S/s which is about 1km from the Haldia – Subhasgram 400kV D/c line and implementation of the same may not encounter any RoW constraints, and also this shall be most suited techno economical solution to serve the increasing load in the South 24 Parganas district as agreed in the 7th CMETS-ER meeting.

3.4. WBSETCL informed that they have worked out bus splitting arrangement at Laxmikantpur 220/132kV S/s, such that some portion of load would be fed from existing Laxmikantpur – Subhasgram (POWERGRID) 220kV D/c line and balance from 400/132kV New Laxmikantpur S/s. The feeds at Laxmikantpur 220/132kV S/s from New Laxmikantpur S/s at 132kV level and from Laxmikantpur – Subhasgram (POWERGRID) 220kV D/c line should not be paralleled under normal operating condition. CTU requested WBSETCL to share the bus splitting plan for modelling the same in the future simulation files.

3.5. After detailed deliberation, it was decided that the matter regarding LILO of Haldia – Subhasgram 400kV D/c line for establishment of New Laxmikantpur S/s would be deliberated (including regulatory & commercial issues) along with CESC and HEL at ERPC level. Subsequently, the matter would be discussed in the next CMETS-ER for finalisation of the scheme.

4. Augmentation of transformation capacity at Subhasgram and other intra-state substations of WBSETCL

4.1. CTU informed that in the 7th CMETS-ER held on 31-05-2022, it was decided that that WBSETCL will expeditiously carry out further deliberations and system studies, and would give their observations on installation of 6th 400/220kV, 500MVA ICT at Subhasgram (POWERGRID) S/s.

4.2. WBSETCL stated that out of 5 nos. ICTs at Subashgram, 2x315MVA is owned by CESC and the remaining 2x315+1x500MVA is under ISTS. The two ICTs of CESC were meant from drawl of about 540MW power from HEL plant by CESC through Haldia – Subhasgram 400kV D/c line and 2x315MVA ICTs to the CESC network at 220kV level. These ICTs were not N-1 compliant at the time of planning itself. WBSETCL further mentioned that the peak drawl of CESC has crossed 700-800MW during this summer which is beyond the transformation capacity of ICTs of CESC at Subhashgram. The peak drawl by WBSETCL and CESC occurs at different times during the day, and drawl of WBSETCL under all conditions satisfies the N-1 reliability of 3 nos. of ISTS ICTs. Therefore, WBSETCL mentioned that augmentation at Subhashgram to meet the N-1 reliability may be carried out by CESC or at cost of CESC in ISTS.

4.3. CTU requested ERLDC and POWERGRID to share the drawl pattern of both CESC and WBSETCL for the last one year so that the proportion of power drawl by both the utilities can be assessed and further decision regarding augmentation of transformation capacity can be taken. It was decided to take up the matter again in next CMETS-ER.

4.4. Regarding ICTs augmentation at other intra-state substations, WBSETCL updated as follows:

- Jeerat (4x315MVA): One of the 315MVA ICTs has been damaged. The same is under repairing and is expected to be commissioned by end of 2023. Till that time, some load has been shifted to Rajarhat (POWERGRID) S/s on Rajarhat – Barasat line.
- Kolaghat (2x315MVA): Preliminary studies have been carried out for shifting of one no. 210MW unit from 400kV to 220kV bus of Kolaghat. After shifting of the same, the loading in the 2x315MVA ICTs is expected to be reduced.
- Chanditala (3x315MVA): 4th 315MVA ICT has been planned. Keeping in view the growth of power demand in West Bengal, CTU suggested that the 4th ICT of 500MVA may be installed instead of 315MVA.
- Kharagpur (3x315MVA): The present peak loading on the ICTs at Kharagpur is about 580MW. Augmentation at Kharagpur would be taken up at a suitable time.

4.5. After detailed deliberation, it was decided that the augmentation of ICT at Subhasgram S/s would be discussed in the next CMETS-ER meeting in the presence of CESC and HEL as special invitee. WBSETCL may take up augmentation of ICTs in the STU network at suitable timeframe so as to meet the growing demand of West Bengal in a reliable manner.

5. Reconductoring of Rangpo – Gangtok 132kV D/c line

5.1. CTU informed that in the 7th CMETS-ER held on 31-05-2022, ERES-XXX scheme for augmentation of transformation capacity at Gangtok 132/66kV has been agreed so that total transformation capacity of Gangtok S/s would become 2x100MVA. Presently, Gangtok 132/66kV S/s is fed from only one 132kV D/c line viz. Rangpo – Gangtok 132kV D/c line which is not N-1 compliant. Therefore, reconductoring of Rangpo – Gangtok 132kV D/c line has been proposed for reliable power supply in the capital state of Sikkim, i.e. Gangtok and its nearby areas.

5.2. Based on the input from POWERGRID, the maximum rating of HTLS conductor which can be used for reconductoring is 900 A. Further, the rating of terminal bay equipment as obtained from POWERGRID is given below:

- Gangtok S/s (AIS): 132kV Rangpo bays

  CB: 2000A, 31.5 KA

  Isolator: 1250 A, 31.5 kA

  CT: 600/300/1A, class: 0.2, 40 VA, 5 core

  Wave trap: 1250 A
- Rangpo S/s (GIS): 132kV Gangtok bays

  CB module: 800A, 31.5 KA

  Isolator: 800A, 31.5 kA

CT: 800/400/1A, class: 0.2, 5 core

5.3. From the above, it was observed that Rangpo – Gangtok 132kV D/c line can be reconductored with HTLS of 800A rating so as to meet the power transfer requirement and also there would be minimal requirement of only change of CTs at Gangtok end from 600A to 800A.

5.4. POWERGRID stated that CERC has asked for consent of the beneficiaries to bear the tariff corresponding to the residual value of the transmission line in case of reconductoring of the same before completion of its useful life.

5.5. CTU stated that Rangpo – Gangtok 132kV D/c line is an ISTS line and the tariff of the same shall be borne by all the DICs.

5.6. All the STUs requested POWERGRID to share the residual cost to be recovered as tariff of the transmission line, so that view on reconductoring proposal can be taken. POWERGRID agreed for the same.

5.7. It was decided that matter may be deliberated again in next CMETS-ER after receipt of requisite inputs from POWERGRID.

6. Requirement of refurbishment/replacement of line reactors and bus reactors at Maithon and Jamshedpur

6.1. CTU informed that POWERGRID vide letter dated 25-05-2022 has requested for replacement of following reactors which have completed their useful life based on the condition monitoring and residual life assessment by CPRI:

Sl. No.	Region	Station	Feeder	Line length (km)	Year of Manufacturing
1	ER-II	Maithon	400kV Kahalgaon-I	172	1991
2	ER-II	Maithon	400kV Mejia-I	59.2	1991
3	ER-I	Jamshedpur	400kV Bus Reactor-II	-	1992

6.2. CTU informed that studies have been carried out to assess requirement of these reactors in the present grid scenario and outcomes of the same are as follows:

- 50MVAr line reactor at Maithon-A end of Maithon-A – Kahalgaon-B ckt-1:

  From the studies it is observed that during charging of Maithon-A – Kahalgaon-B ckt-1 without the line reactor, total rise is about 11-12kV from either end. The study results are given below:

400kV line section	Voltage rise on charging from Maithon-A end			Voltage rise on charging from Kahalgaon-B end		
	Source Rise	Line Rise	Total Rise	Source Rise	Line Rise	Total Rise
Maithon-A – Kahalgaon-B ckt-1 (no LR)	3-4kV	7-8kV	11-12kV	2-3kV	7-8kV	10-11kV

400kV line section	Voltage rise on charging from Maithon-A end			Voltage rise on charging from Kahalgaon-B end		
	Source Rise	**Line Rise**	**Total Rise**	**Source Rise**	**Line Rise**	**Total Rise**
Maithon-A – Kahalgaon-B ckt-1 **(with 63MVAr LR at Maithon end)**	1-2kV	7-8kV	9-10kV	1-2kV	Negligible	1-2kV

From the above study results, it is observed that the line reactor may be required for the successful charging of the line. In view of expansion in grid and increasing short circuit strength, it is suggested that new 63MVAr line reactor may be installed in the Maithon-A – Kahalgaon-B ckt-1. With the installation of 63MVAr line reactor in the subject line, the total rise is observed to be 1-2kV while charging from Kahalgaon-B end and 9-10kV while charging from Maithon-A end.

- 50MVAr line reactor at Maithon-B end of Maithon-B – Mejia ckt-1:

  This line is only about 60km in length and the same can be charged without line reactor.

- 50MVAr Bus Reactor - II at Jamshedpur

  Under ERSS-IX scheme, addition of 2x125MVAr bus reactors in parallel with the existing 2x50MVAr bus reactor was approved at Jamshedpur S/s. Further, it was agreed that in case of space constraint for parallel operation of reactors, the existing 50MVAr reactor would be replaced by 125MVAr reactors and the released bus reactor would be utilised as a regional spare. Accordingly, one 125 MVAr bus reactor was installed in parallel to the 50MVAr bus reactor-1 (3x16.67MVAr single phase reactors) and 2nd 125MVAr bus reactor was installed by replacing one of the existing 50MVAr bus reactor-2. In the request letter from POWERGRID, the 50MVAr bus reactor-2 which is presently kept as regional spare has been proposed for replacement.

  As per the operational feedback report, the voltage at Jamshedpur 400kV bus has crossed the IEGC band during winters for almost 35-40% of the time. Therefore, bus reactor is required at Jamshedpur S/s. Accordingly, it was proposed to install new 420kV, 125MVAr bus reactor along with associated bay at Jamshedpur S/s. Further, the 50MVAr bus reactor-2 which is presently serving the purpose of regional spare may be decommissioned.

6.3. BSPTCL enquired whether the benefit of the salvage value of the replaced reactors would pass on to the constituents. POWERGRID stated that as per CERC Tariff Regulations, only 90% of the capital cost is allowed to be recovered as tariff and remaining 10% is considered as salvage value. Thus, salvage value of asset which has completed its useful life is right of the transmission licensee.

6.4. In the meeting, POWERGRID proposed that the 50MVAr bus reactor-1 (3x16.67MVAr single phase reactors) at Jamshedpur S/s may also be considered for decommissioning. Further, POWERGRID confirmed that space is available for installation of new 420kV, 1x125MVAr bus reactor along with associated bay at Jamshedpur (POWERGRID) S/s.

6.5. In view of the above and after detailed deliberations following was agreed in the meeting:

(a) The existing 50MVAr line reactor at Maithon-A end of Maithon-A – Kahalgaon-B ckt-1 400kV line may be decommissioned.

(b) As long as the 50MVAr line reactor at Maithon-B end of Maithon-B – Mejia ckt-1 is serviceable, the same may be operated and thereafter it may be decommissioned.

(c) As long as the 50MVAr bus reactor-1 (3x16.67MVAr single phase reactors) at Jamshedpur S/s (which is presently installed in parallel with a 125MVAr bus reactor) is serviceable, the same may be operated and thereafter it may be decommissioned.

(d) The 50MVAr bus reactor-2 at Jamshedpur S/s which is presently kept as regional spare may be decommissioned.

(e) Implementation of ISTS scheme Eastern Region Expansion Scheme-XXXI (ERES-XXXI) with implementation time-frame of 18 months from date of allocation with following scope of works:

- Installation of new 420kV, 1x63MVAr line reactor at Maithon-A end of Maithon-A – Kahalgaon-B ckt-1 400kV line along with new 700ohm NGR (with NGR bypass arrangement for operation of line reactor as a bus reactor)

  Note: *The existing 50MVAr line reactor along with NGR in this line at Maithon-A end may be decommissioned prior to commissioning of above new 63MVAr line reactor and NGR.*

- Installation of new 420kV, 1x125MVAr bus reactor along with associated bay at Jamshedpur (POWERGRID) S/s

7. ISTS Rolling Plan – Adequacy of transmission system by 2026-27 timeframe

7.1. CTU presented the outcomes of the latest ISTS Rolling Plan published in March 2022 for 2026-27 timeframe. Constraints pertaining to ISTS were discussed and it was informed that some of the constraints have already been addressed and for balance detailed studies are being carried out and outcomes of the studies along with proposed system expansion would be deliberated in the subsequent meetings.

7.2. STUs were also requested to review the constraints observed in their respective network and take necessary actions at an appropriate time for meet the future power exchange requirement with ISTS with reliability.

7.3. OPTCL mentioned about the demand projections used in the studies, as 19th EPS document is old and does not include load reduction due to factors such as COVID-19.

7.4. CTU stated that the most appropriate and detailed load projections of future timeframe are available only in CEA's EPS, which are prepared after detailed discussion with all central and state utilities. Accordingly, in the latest Rolling Plan, the demand data are considered as per 19th EPS (latest available). As and when new EPS is available, the same would be taken into consideration for planning new ISTS. Nevertheless, if any state has any specific observation on demand to be considered for that state for system planning, state may give their observations.

7.5. STUs were requested to regularly validate their transmission network and load generation projections in the PSSE files shared by CTU (for preparation of ISTS Rolling Plan) in a time bound manner as per timelines specified in the ISTS Planning Procedure so that system studies can be carried out as per timelines. This shall help in timely planning of new transmission systems in ISTS and Intra-state for seamless transfer of power from the generation pockets to the load centres in a reliable manner.

8. Eastern Region Expansion Scheme-XXX (ERES-XXX)

8.1. In the 7th CMETS-ER meeting, augmentation of ICT at Gangtok 132/66kV S/s under ERES-XXX scheme was agreed, resulting in enhancement of transformation capacity from 2x50MVA to 2x100MVA.

8.2. Now, before proceeding further for approvals, POWERGRID has requested that a joint survey needs to be carried out for finalization of detailed scope for installation of ICTs in parallel including feasibility of transportation of new 100MVA ICT to Gangtok. Accordingly, the ERES-XXX scheme would be taken up after the outcome of joint survey report by CTU and POWERGRID.

8.3. Stakeholder noted and agreed for the same.

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

9.1. 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.

9.2. Based on the information provided by the states, updated information on planned/under-construction downstream system is given at **Annexure-II.**

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

10.1. 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.

10.2. Status of intra-state substations and associated lines as updated by STUs in the meeting is given at **Annexure-III**.

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

11.1. 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. List of such ISTS substations as per available information is given at **Annexure-III**.

11.2. Status of the bays allocated at ISTS S/s as updated by STUs in the meeting is given at **Annexure-IV**.

Annexure-I

List of participants of 8th Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER)

Sl. No.	Name	Designation	Organization	Email id
1.	Sh. Jasbir Singh	CGM	CTU	jasbir@powergrid.in
2.	Sh. Rajesh Kumar	GM	CTU	rajeshkumar@powergrid.in
3.	Sh. Manish Ranjan Keshari	Manager	CTU	manish.keshari@powergrid.in
4.	Sh. Shyam Sunder Goyal	Manager	CTU	shyam.goyal@powergrid.in
5.	Sh. Chinmay	Manager	CTU	chinmays@powergrid.in
6.	Sh. Anupam Kumar	Manager	CTU	i.anupamk@powergrid.in
7.	Sh. Abhilash Thakur	Engineer	CTU	abhilash.28@powergrid.in
8.	Sh. Amit Kumar	Engineer	CTU	emailamit0014@gmail.com
9.	Sh. Pradeep Kumar	CGM	POWERGRID	pradeepkumar@powergrid.in
10.	Sh. Sanjay Kumar Singh	CGM, ER-1	POWERGRID	singhsk@powergrid.in
11.	Sh. Subhendra Sen	SGM	POWERGRID	subhendra@powergrid.in
12.	Sh. Partha Ghosh	CM	POWERGRID	Partha.ghosh@powergrid.in
13.	Sh. S. Kejriwal	S.E.	ERPC	shyam.ies11@gmail.com
14.	Sh. P.P. Jena	EE	ERPC	ppjena.erpc@gov.in
15.	Sh. Shyamal konar	GM	ERLDC	Konar-s@posoco.in
16.	Sh. Saugato Mondal	DGM	ERLDC	saugato@posoco.in
17.	Sh. Saurav Kr Sahay	Chief Manager	ERLDC	saurav.sahay@posoco.in
18.	Sh. Chandan Kumar	Manager	ERLDC	chandan@posoco.in
19.	Sh. Shabari Pramanick	Manager	ERLDC	shabari.pramanick@posoco.in
20.	Sh. Pritam Mukherjee	Dy. Mgr.	ERLDC	
21.	Sh. Debashis Chaki	CE, CPD	WBSETCL	cpd.wbsetcl@gmail.com
22.	Sh. Gautam Nayak	CE,SLDC	WBSETCL	Gautam.nayak@wbsetcl.in

Sl. No.	Name	Designation	Organization	Email id
23.	Sh. Shouvik Banerjee	ACE, SLDC	WBSETCL	svkbanerjee@yahoo.com
24.	Sh. Ranjan Das	Addl. CE	WBSETCL	cpd.wbsetcl@gmail.com
25.	Sh. Jayanta Dutta	Chief Engineer	DVC	jayanta.dutta@dvc.gov.in
26.	Sh. Swarup Kumar Pal	Sr. Div. Engg.	DVC	swarup.pal@dvc.gov.in
27.	Sh. Satyenarayan Sahoo	Manager	OPTCL	ele.snsahoo@optcl.co.in
28.	Sh. Ajit Kumar Bhagat	Sr Manager	JUSNL	cetjusnl@gmail.com
29.	Sh. H R Pandey	Director (Projects)	BSPTCL	dir.proj.bsptcl@gmail.com
30.	Sh. D K Jha	CE(P&E)	BSPTCL	ceplanningengg@gmail.com
31.	Sh. Praveen Kumar	EEE(STU)	BSPTCL	stubsptcl2019@gmail.com
32.	Sh. Abhishek Kumar	EEE(P&E)	BSPTCL	abhishek.bsptcl@hotmail.com
33.	Sh. Rajdeep Bhattacharjee	ESE, RE Kolkata	BSPHCL	rekolbsphcl@gmail.com
34.	Sh. Bhanu Basnett	SE	Sikkim	
35.	Sh. S.K. Maharane	DGM	GRIDCO	ele.skmaharane@gridco.co.in
36.	Sh. Abhimanyu Gartia	Sr. Adv.	GRIDCO	agartia@gmail.com
37.	Sh. Hemanta Kr. Ghosh	L.O.	GRIDCO	hemanta62@gmail.com
38.	Ms. Sweety Kumari			
39.	Sh. Alok Pratap Singh			
40.	Ms. Aditi Sen Pradhan			
41.	Ms. Shweta Nirmata			

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 31-03-2023.
3.	Dhanbad	Jharkhand	400/220kV	220	4	Existing bay	LILO of 1st circuit of 220kV Dumka – Govindpur D/c line at Dhanbad (23km)	Bid evaluation is in progress. Price bid opened	Expected by Dec 2023.
							LILO of 2nd 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 Dec 2022.
5.	Subashgram	West Bengal	400/220kV, 3x315MVA	220	2	Existing bay	Subashgram (POWERGRID) – Baraipur 220kV D/c line		220kV Baruipur substation charged. 132kV downstream delayed due to RoW.
6.	Rajarhat	West Bengal	400/220kV, 2x500MVA	220	2	Existing bay	Rajarhat (POWERGRID) – New Town AA2C 220kV D/c		Severe RoW (2.5km) in cable laying. Expected by Oct 2022.
7.	Sitamarhi (New)	Bihar	400/220/132kV, 2x500MVA + 2x200MVA	132	2	Existing bay	LILO of Benipatti - Pupri 132kV S/c at Sitamarhi (New)		Expected by Mar 2023 due to flooding
8.	Saharsa (New)	Bihar	400/220/132kV, 2x500MVA + 2x200MVA	220	2	Existing bay	Saharsa (New) - Begusarai 220kV D/c line		Line ready for commissioning. Expected by July 2022 end.
				132	2-ISTS (addln.4		Saharsa (New) - Saharsa 132kV D/c line formed by LILO of Saharsa - Banmankhi		04 nos. of bays are under construction by BSPTCL at Saharsa (New). Two bays

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
					by state)		and Saharsa - Uda Kishanganj 132kV S/c line		are expected in Sep 2022, and balance two in Nov 2022.
9.	Banka	Bihar	400/220/132kV, 2x500MVA + 2x200 & 1x315MVA	220	2	Under Bidding	Banka (POWERGRID) – Goradih (Sabour New) 220kV D/c line	Funds tied up. Tender documents ready	Expected by Mar '24

Annexure-III

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	**Bakhtiyarpur GIS**	400/220/132kV, 2x500MVA + 2x160MVA	26.11.2019	Progressively from Oct'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.
Ii	**Chappra (New)**	400/220/132kV, 2x500MVA + 2x200MVA	Funds not yet tied up	SOR rates increased. Cabinet approval to be taken up.
a)	LILO of 400 kV Barh (NTPC) - Motihari (DMTCL) D/C (Quad) transmission line at Chappra	400kV 2xD/c	Funds not yet tied up	SOR rates increased. Cabinet approval to be taken up.
B	**Odisha (to be implemented by OPTCL)**			
I	**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
II	**Therubali**	400kV switching station along with 420kV, 1x125MVAr bus reactor	Survey in progress	2025-26
III	**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
IV	**Paradeep***	400/220kV, 2x500MVA		24 months
a)	Paradeep – Duburi 400kV D/c line	400kV D/c	Line package awarded and substation awarded in May'22	24 months
V	**Paradeep***	765/400kV, 2x1500MVA	Survey in progress	2025-26
a)	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

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
C	**Jharkhand (to be implemented by JUSNL)**			
I	**Chandil (New)**	400/220kV, 2x500MVA	NIT has been floated on 05-03-2022. Bid opening expected on 11-07-2022.	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)		
II	**Koderma**	400/220/132/33kV, 2x500MVA + 2x200MVA + 2x80MVA		
a)	PVUNL – Koderma 400kV D/c (Quad) line	400kV D/c (Quad)		
III	**Latehar**			Nov 2022
a)	Patratu – Latehar 400kV D/c line	400kV D/c		
b)	Latehar – Chandwa (POWERGRID) 400kV D/c line	400kV D/c		
IV	**Jasidih**	400/220kV, 2x500MVA	-	No firm plan now. To be taken up in future.
a)	Koderma (JUSNL) – Jasidih 400kV D/c (Quad) line	400kV D/c (Quad)	-	
b)	Jasidih – Dumka 400kV D/c (Quad) line	400kV D/c (Quad)	-	
V	**Mander**	400/220kV, 2x500MVA	-	
a)	LILO of Patratu – Ranchi (New) 400kV D/c line at Mander	400kV 2xD/c	-	
VI	**Dumka (New)**	400/220kV, 2x500MVA	-	
a)	Dumka (New) – Dhanbad (ISTS) 400kV D/c (Quad) line	400kV D/c (Quad)	-	
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
II	**Falakata**	220/132kV, 2x160MVA		Mar 2024
a)	LILO of Birpara – Alipurduar 220kV D/c line	220kV 2xD/c		Mar 2024

* ***As per inputs from OPTCL:*** *Paradeep 765/400kV S/s shall be established at a different location from the already under-construction Paradeep 400/220kV S/s, accordingly, 400kV 2xD/c line shall be established between two substations.*

The 400kV infeed to Laxmikantpur 400/132kV S/s is under discussion in the item no 3. Based on the deliberations, the lines would be updated, if required.

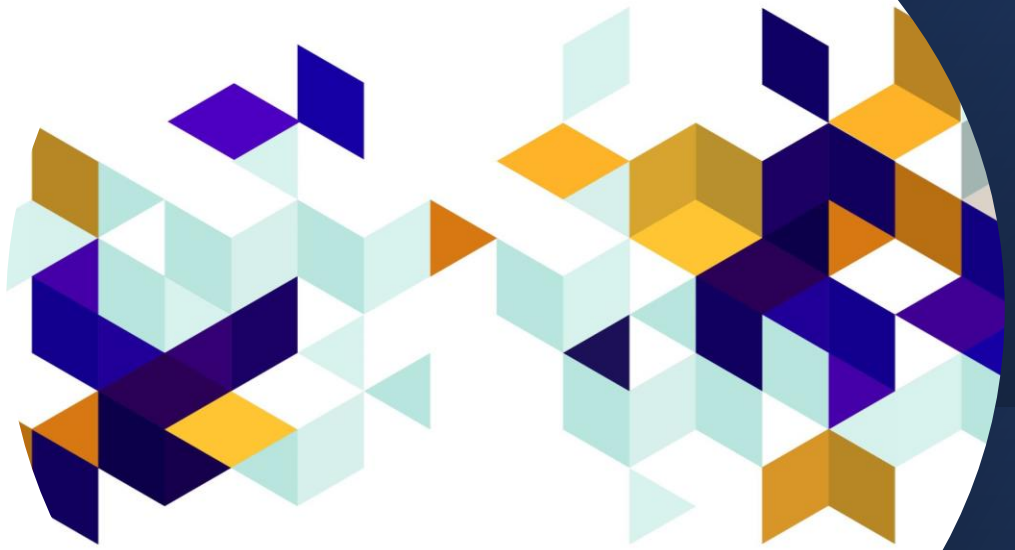
Annexure-IV

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	CMETS
1.	Angul (POWERGRID)	2 nos. 765kV lines bays for termination of Angul (POWERGRID) – Paradeep 765kV D/c line (including suitable switchable line reactors)		Survey is going on. Expected by 2025-26	**1st**
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 1st D/c line	**1st & 7th**
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	**1st**
4.	Maithon (POWERGRID)	2 No. 220kV lines bays for implementation of Maithon (POWERGRID) – Asansol 220kV D/c line		Survey to start shortly	**7th**

Annexure-V

Operational Feedback on Transmission Constraint



Eastern Region

Provision for Operational Feedback

- **NLDC rules 2005:** 4.j
- **IEGC :** 2.2.1.j
- **CERC(Planning, Coordination and Development of Economic and Efficient Inter-State Transmission System by Central Transmission Utility and other related matters) Regulations, 2018. :** 5.2

"The National Load Dispatch Centre and Regional Load Dispatch Centre(s) shall provide periodic operational statistics and feedback to Central Transmission Utility and CEA along with supporting analysis and details which have a bearing on the planning process of the inter-state transmission system."

Being submitted on a quarterly basis since year 2012

Operational feedback Includes

General Aspects of Grid Security : Summary of Indian power system operation

Section 1: Regional Operational Constraints

- Transmission Line Constraints
- ICTs constraints
- High and low voltage nodes

Section 2: Action taken for mitigation of regional constraints ‘

- Elements opened for voltage control
- Elements opened for loading control

Section 3: Delay in Transmission/generation adversely impacting grid operation

Section 4: Outage of FSCs, Oscillations in the Grid, Tower Collapse

Section 5: Elements for improving transfer capability, Prolonged outage, High fault level of substations

Section 6 : Congestion in system impacting market

Any additional issues

Submitted with Data and Plots

Summary of Operational feedback for year 2021-2022 for ER Grid

- Major constraints in 220 kV Lines
- Loading issues of various 400/220 kV ICTs
- Pockets of High voltage due to seasonal load and hydro generation variation
- High fault level
- Other issues

400/220 kV ICTs

Sagardighi	Shubhasgram	Ranchi
Gokarno	Motihari	Bokaro

220 kV Transmission lines

220 kV Patna-Sipara T/C
220 kV Muzaffarpur (PG)-Hajipur D/C
220 kV Hajipur-Amnour D/C
220 kV Gaya-(PG) -Bodhgaya D/C
220 kV Sasaram-Pusauli New DC

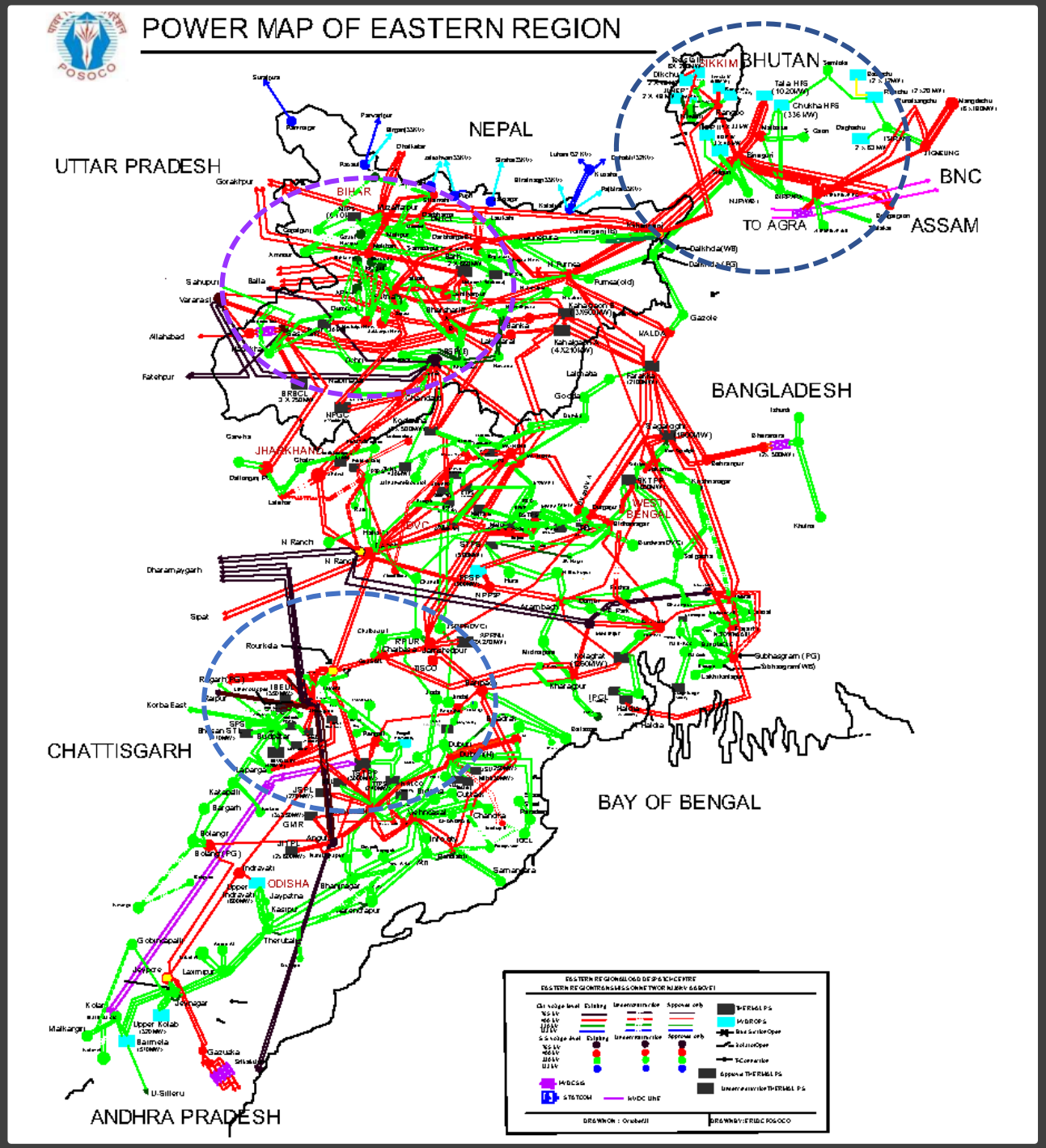
220 kV Maithon Dumka D/C

DVC

220 kV Waria-Bidhan Nagar D/C
220 kV Waria-Mejia D/C
220 kV Maithon-Dhanbad D/C
220 kV Maithon-Kalyaneshwari D/C

220 kV Rajarhat- Newtown AA3 D/C
220 kV Rajarhat-Barasat D/C
220 kV Subhasgram-EMSS D/C
220 kV Subhasgram (WB)-Lakshmikantpur D/C
220 kV Subhasgram (PG) – Subhasgram (WB) D/C

220 kV Budhipadar-Lapanga D/C, 220 kV Budhipadar Vedanta D/C and 220 kV Rourkela-Tarkera D/C, 220 kV Pandiabili Atri D/C
220 kV Lapanga-Katapalli D/C , 220 kV Katapali-New Bargarh-Sadepalli (New Bolangir) S/C 220 kV Katapali- Bolangir (PG)- S/C



High Voltage Challenges

- Sikkim Complex
- North West Bihar
- West-Central Odisha

High fault Level

765 kV Jharsuguda

Bus split yet to operationalize

400 kV Kahalgaon

Bus split yet to operationalize

400 kV Durgapur

Bus split yet to operationalize

400 kV Farakka

400 kV Ranchi

400 kV Sagardighi

220 kV Bihar Sharif (BSPTCL)

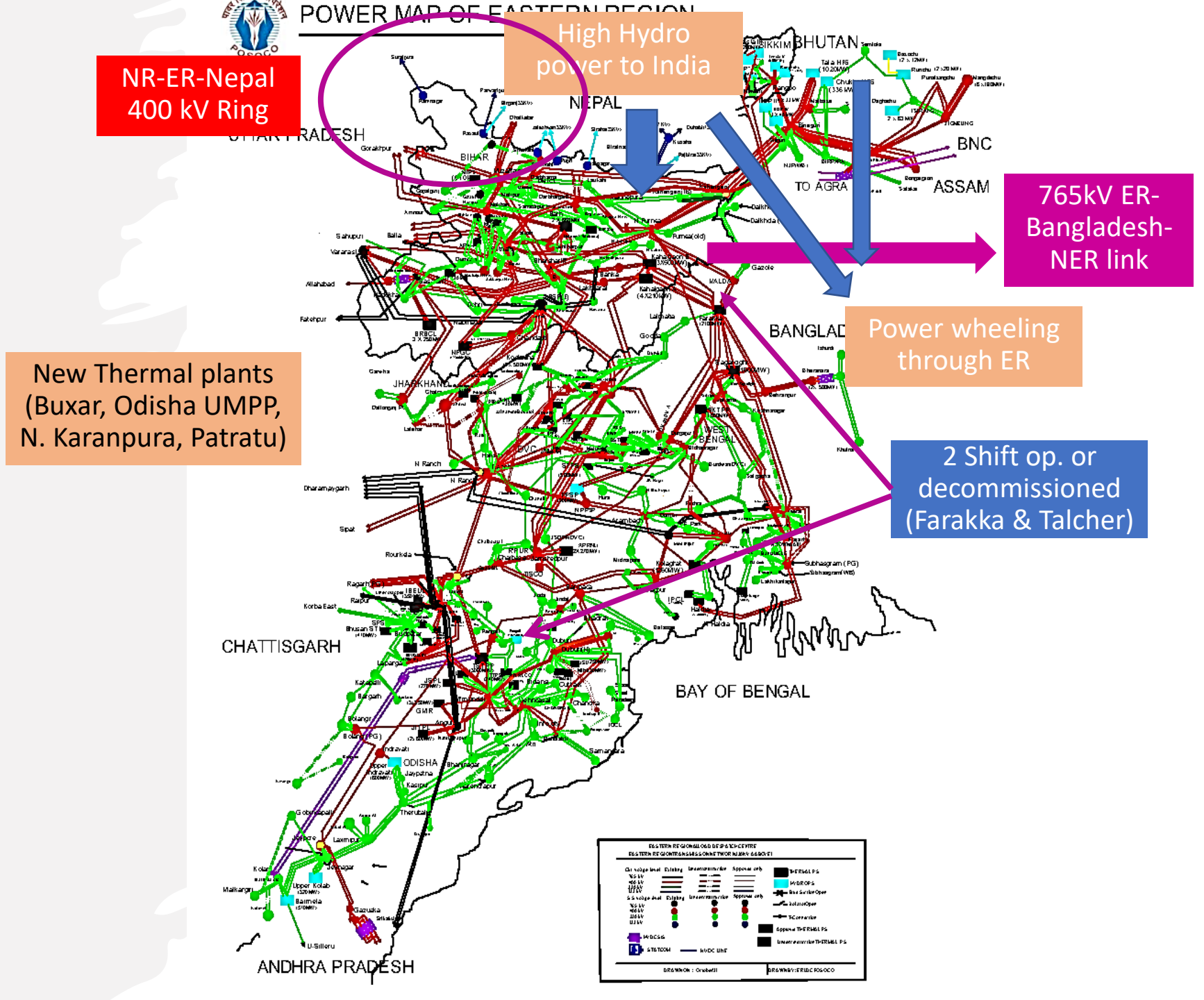
220 kV Bidhannagar (WBSETCL)

220 kV Meramundali (OPTCL)

Feedback on many others operational issues

One and Half Scheme Feeders arrangement in diameter
Major Reliability issues in special pockets (Sikkim Hydro/Buddhipadar)
LC Resonance and secondary arcing issue due to high compensation
Reliable power supply to state capitals (Kolkata/Patna/Ranchi/Gangtok, Bhuvneshwar)
Many others…

A Glimpse of Future Eastern Grid



Challenges and Required Preparedness in planning time frame

- Resilience: N-K Study for outage of complete EHV substation, Large power plants, transmission line passing through same corridors.
- Defence mechanism performance: Evaluation for required review
- Reducing inertia: Inertia analysis in planning time frame
- FIDVR: Industrial loads (Induction motor) and single-phase residential AC load
- Captive load : High drawal from grid
- Requirement of cold spares : Large size ICTs
- Black Start Resources
- Requirement of SPS : To be studied as part of planning

Required Support from STUs

- Planned system for removal of constraints: Project status and time frame
- Data of Generators: More focus on new RE interconnection as per format of CTU
- Validation of Line and equipment rating in Planning Study case and sharing with SLDC for Operational Study case
- Protection coordination in State network
- Fault level control measures
- Planning of resilience measures for major cities
- Generation interconnection studies from Generating plant
- Coordination in PSS tuning activities

Required Support from SLDCs

- Operational study for contingency plan and constraints
  - N-1 and N-1-1 ACCC studies
  - Fault level studies
- Feedback on operational constraints
- Planning of resilience measures for major cities with CTU/STU
- New element impact studies prior to charging (at least 6 months ahead to ensure no adverse impact)
- Operational study data cross verification with planning data and field level data

Thank You