

I/12622/2020



भारत सरकार  
Government of India  
विद्युत मंत्रालय  
Ministry of Power  
केंद्रीय विद्युत प्राधिकरण  
Central Electricity Authority  
विद्युत प्रणाली योजना एवं मूल्यांकन प्रभाग-II  
Power System Planning & Appraisal Division-II

सेवा मे / To,

संलग्न सूची के अनुसार  
As per list enclosed

विषय : पूर्वी क्षेत्रीय विद्युत समिति (पारेषण योजना) (ERPCTP) की दूसरी बैठक का कार्यवृत्त ।  
Subject: 2<sup>nd</sup> meeting of Eastern Region Power Committee Transmission Planning (ERPCTP) – Minutes.

महोदय(Sir)/महोदया(Madam),

पूर्वी क्षेत्रीय विद्युत समिति (पारेषण योजना) (ERPCTP) की दूसरी बैठक 30 सितम्बर 2020 को वीडियो कॉन्फ्रेंसिंग के माध्यम से आयोजित की गई थी। बैठक का कार्यवृत्त संलग्न है।

The 2<sup>nd</sup> meeting of Eastern Region Power Committee (Transmission Planning) (ERPCTP) was held on 30<sup>th</sup> September, 2020 through video conferencing. Minutes of the meeting are enclosed herewith.

भवदीय/Yours faithfully,

(प्रदीप जिंदल/ Pardeep Jindal)  
मुख्य अभियंता/ Chief Engineer

Copy for kind information to:

1) PPS to Chairperson/ Member (PS), CEA

Signature Not Verified

Digitally signed by PARDEEP  
JINDAL  
Date: 2020.12.14 10:26:15 IST

File No.CEA-PS-12-15/2/2018-PSPA-II Division-Part(1)

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**List of addressee:**

1. Member Secretary, Eastern Regional Power Committee, 14, Golf Club Road, Tollygunge, Kolkata-700033. Tel. No. 033-24235199	2. Managing Director, Bihar State Power Transmission Company, Vidyut Bhavan (4 <sup>th</sup> floor), Bailey Road, Patna-800021
3. Chairman-cum-Managing Director, Jharkhand Urja Sancharan Nigam Limited Engineering Building, H.E.C., Dhurwa, Ranchi-834004.	4. Chairman-cum-Managing Director, Orissa Power Transmission Corporation Ltd, Jan path, Bhubaneshwar-751022.
5. Principal Chief Engineer cum Secretary, Power Department Government of Sikkim, Sikkim. Tel. No. 03592-2022440 Fax No.03592-202927	6. Managing Director, West Bengal State Electricity Transmission Company Ltd, Vidyut Bhavan (8 <sup>th</sup> Floor), A-block, Salt Lake City, Kolkata-700091.
7. Superintending Engineer, Electricity Department C/O Secretary (GA) Andaman and Nicobar Administration, Secretariat, Port Blair (AN)	8. Chief Operating Officer, Central Transmission Utility (CTU), Power Grid Corporation of India “Saudamini” Plot No. 2, Sector-29, Gurugram-122001
9. Director (System Operations), POSOCO B-9, Qutub Institutional Area, Katwaria Sarai, New Delhi-110016 Tel. No. 26852843 Fax No. 2626524525, 26536901	10. Chairman-cum-Managing Director, Damodar Valley Corporation DVC Towers, VIP Road, Kolkata-700054.
11. Chairman-cum-Managing Director NTPC Limited, NTPC Bhawan, SCOPE Complex, Institutional Area, Lodhi Road,New Delhi – 110003	12. Chairman-cum-Managing Director NHPC Limited, N.H.P.C. Office Complex, Sector-33, Faridabad - 121003 (Haryana)
13. Chairman, Solar Energy Corporation of India Limited, 1 <sup>st</sup> Floor, D-3, A Wing, Prius Platinum Building, District Centre, Saket, New Delhi - 110017.	

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**Minutes of 2<sup>nd</sup> meeting of Eastern Region Power Committee  
(Transmission Planning) (ERPCTP) held on 30<sup>th</sup> September 2020  
through Video Conferencing**

Chairperson/Member (PS) (additional charge), CEA welcomed the participants. After brief introduction of the participants, he requested the committee members to have positive deliberations so that consensus could be reached on critical issues.

Chief Engineer (PSPA-II), CEA stated that the agenda for the meeting has been prepared in accordance with the Terms of Reference (ToR) of the ERPCTP as laid out in MoP Order dated 04<sup>th</sup> November, 2019.

Thereafter, Chief Engineer (PSPA-II), CEA requested Director (PSPA-II), CEA to take up the agenda points.

List of the participants is enclosed at **Annexure-I**.

**1. Confirmation of the minutes of 1<sup>st</sup> meeting of Eastern Region Power Committee (Transmission Planning) (ERPCTP).**

1.1 Director (PSPA-II), CEA stated that minutes of the 1<sup>st</sup> meeting of Eastern Region Power Committee (Transmission Planning) (ERPCTP) held on 14<sup>th</sup> Feb 2020 were circulated vide CEA letter No. CEA-PS-12-15/2/2018-PSPA-II Division-Part (1) dated 13<sup>th</sup> May, 2020.

He informed that, GRIDCO vide their letter No. DC-CGM-PP-158/2019 (Part-I)/1552(4) dated 21.05.2020 had requested for amendment in item No. 26 of the Minutes. Therefore, he proposed that following may be added after 26.2 of the minutes of 1<sup>st</sup> meeting of ERPCTP:

*“Govt. of Odisha vide Notification dated 20.12.2018 has (i) directed OPGC and GRIDCO to execute supplementary agreement to the existing PPA on same terms and conditions as the executed PPA for 50 % (660 MW), for another 25 % (330 MW) of OPGC expansion capacity from the date of COD of units 3&4 which is to be enhanced from 75% to 100% w.e.f. 1st April, 2023 & (ii) directed OPGC, GRIDCO and OPTCL to ensure evacuation of entire capacity of expansion project of OPGC through STU (OPTCL) network in due course.*

*In line with the above directions of Govt. of Odisha, GRIDCO has signed supplementary PPA with OPGC on 24th January 2019.”*

1.2 Members confirmed the minutes of 1<sup>st</sup> meeting of ERPCTP along with above amendment.

<b>A. ToR 2(i) – QUARTERLY REVIEW AND STRENGTHNING OF INTER-REGIONAL TRANSMISSION SYSTEM</b>
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Carry out a quarterly review of the Transmission system in the region; assess the growth in generation capacity and the demand in various parts of the region; and draw up proposals for strengthening inter-Regional transmission system. The transmission planning is required to keep in mind the areas where the generation is likely to grow and areas where load demand will grow so that the transmission system at any point of time is capable to meet the demand in every corner of the country and comply with the mandate under the Tariff policy of developing transmission system ahead of the generation for ensuring smooth operation of the grid.

**2. Quarterly Review of transmission line and substation.**

- 2.1 Director (PSPA-II), CEA presented a list transmission lines and substations/ICTs commissioned in the Eastern Region during FY 2019-20 and Q1 of FY 2020-21 and upto August 2020. He requested the members to update the status, if any.
- 2.2 Representative of WBSETCL stated that they had completed LILO of 400kV D/C Bidhannagar - Arambag line at New Chanditala, LILO of 220kV D/C Malda(PG) - Dalkhola (PG) line at Gajol and LILO of 220 kV D/C Gokarna – Krishnanagar line at Rejinagar in FY 2019-20, which need to be updated.
- 2.3 Chief Engineer (PSPA-II), CEA informed that as per the EA-2003, there is requirement for each state to convey the status of progress of their transmission lines and substations to CEA. However, the information as provided by WBSETCL has been noted and will also be shared with Power System Project Monitoring (PSPM) Division of CEA for record.
- 2.4 The updated list is of transmission lines and substations/ICTs commissioned in the Eastern Region during FY 2019-20 and Q1 of FY 2020-21 and upto August 2020 is enclosed at **Annexure-II**.

**3. Assessment of growth in generation capacity and demand in the region**

- 3.1 Director (PSPA-II) presented the list of existing/ planned generation capacity (MW) and actual/anticipated peak demand of states in Eastern region. He requested members to update the data, if any, for better projection/ reassessment.
- 3.2 Chief Engineer (PSPA-II), CEA stated that there was difference in projected (as per EPS) and actual peak demand met in 2019-20. Further, he enquired, whether States can sustain their demands in 2024-25 with the values as projected according to the 19th EPS.
- 3.3 Representative of WBSETCL stated that anticipated generation capacity of West Bengal will be 8607 MW by 2021-22 and 9267 MW by 2024-25, excluding DVC and Central sector generation, for the state West Bengal. Regarding

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projected demand by 2024-25, he stated that it would be around 95% of demand projection of 19<sup>th</sup> EPS.

- 3.4 Representative of BSPTCL stated that peak demand of Bihar in 2024-25 will be higher than that projected in 19<sup>th</sup> EPS and is expected to touch 6000 MW. However, BSPTCL would inform the revised projection within a week.
- 3.5 JUSNL stated that demand met figure of 1396 MW during 2019-20 is of JBVNL only. For the demand of whole state they will confirm after consulting with distribution entities.
- 3.6 Representative of DVC stated that they would be able to meet the projected demand as mentioned in 19<sup>th</sup> EPS by 2024-25.
- 3.7 Representative of Odisha stated that peak demand of Odisha for 2019-20 was about 300 MW less than the figure presented in CEA report. They expect Peak demand of 5077 MW by 2021-22 and 5530 MW by 2024-25. She asked whether econometric method has been considered for demand forecast. Chief Engineer (PSPA-II), CEA clarified that the projected demand has been considered as available in 19<sup>th</sup> EPS report (Volume-I) i.e. based on Partial End Use Method.
- 3.8 Representative of ERLDC stated that presently Jharkhand SLDC is monitoring demand of JBVNL only. He suggested that Jharkhand may include demand of JBVNL, JUSCO, MES, Tata Steel, SAIL etc. in the total demand of the state. Regarding Odisha, ERLDC stated that the variation in demand is due to embedded Captive Power Plants (CPP) in the state. During tripping of CPP units, drawal from ISTS increases and this higher drawal might not be considered by the state.
- 3.9 Member Secretary, ERPC stated that projection figures of EPS are satisfactory as they are estimated in consonance with the margin kept for all the states. There is not much difference at Regional level.
- 3.10 Director (SO), POSOCO suggested that CEA may carry out an independent exercise on demand forecast (considering the upgradation of transmission and distribution) to arrive at more realistic demand figures which may then be used in transmission planning studies for optimal system planning. He also stated that econometric method can be taken for the estimation of demand. For transmission planning, EPS demand should not be taken as the demand projection is overestimated for all the states. So a realistic estimation of demand may be taken.
- 3.11 Chief Engineer (PSPA-II), CEA stated that there is separate committee/forum for demand forecast. Recently, a committee has been constituted for preparation of 20<sup>th</sup> EPS. Regarding econometric method, CE (PSPA-II) stated that CEA has recently started demand projection through econometric method also. This report has two methods with three scenarios of each method. ER

demand for 2024-25 in these scenarios varies from 35195 MW to 51486 MW. As, states are best judge of their forecast, the projection of 19<sup>th</sup> EPS and updated by the States in this meeting, seems to be optimal for transmission planning. He requested POSOCO to send their suggestions to the Committee constituted for preparation of 20<sup>th</sup> EPS.

- 3.12 CTU mentioned that along with generation addition program, generation decommissioning may also be recorded for proper preparation of LGB and evolution of transmission schemes.
- 3.13 The updated list of list of existing/ planned generation capacity (MW) and actual/anticipated peak demand of states in Eastern region is available at **Annexure-III**.

#### **4. Requirement for strengthening of Inter-regional transmission system**

- 4.1 Director (PSPA-II), CEA stated that for assessment of requirement for strengthening of inter-regional transmission system, following analysis has been carried out:
- (i) Based on the generation/demand pattern of ER in previous three years, nine scenarios have been considered (Annexure-IV(A)).
  - (ii) Demand factors for the scenarios have been calculated in respect of peak demand met (Annexure-IV(B)).
  - (iii) Normalized demand for 2019-20, 2021-22 and 2024-25 have been arrived by multiplying peak demand as per EPS with the demand factors (Annexure-IV(C)).
  - (iv) Fuel wise anticipated installed capacity in the region was considered as agreed in agenda item-3 above. The same is also available at Annexure-IV(D).
  - (v) Considering generation availability factors, under different scenarios for thermal, gas, hydro, Wind/Solar etc. (Available at Annexure-IV(E)), anticipated generation was calculated, which is available at Annexure-IV(F).
  - (vi) From normalized demand and anticipated generation, surplus/deficit scenario of ER for the period 2019 to 2025 was calculated and available at Annexure-IV(G).
  - (vii) It was observed that during 2024-25, maximum surplus in ER would be 10983 MW in August, noon (Scenario-7) and no deficit is estimated. Summary of maximum surplus for the period 2019 to 2025 is available at Annexure-IV(H).

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- (viii) Details of inter-regional links with Eastern region are given at Annexure-IV(I). From the details, it is observed that, by 2024-25 ER export and import transmission capacities would be 55,100 MW and 49,600 MW respectively. Import/ export transmission capacities of NER for 2021-22 & 2024-25 and ATC for June 2020 available at Annexure-IV(J).
- (ix) As there is sufficient inter-regional capacity to cater import/export requirement of ER during surplus scenario, additional inter-regional links from ER may not be required by 2024-25.
- 4.2 Representative of ERLDC stated that surplus of more than 10000 MW in ER includes allocation to other Regions also. Sometimes, ER also imports from other regions.
- 4.3 NLDC stated that the duration curve should be used for better visualisation of the present picture of Eastern region. Eastern region should be a net importer so as to absorb the renewable energy from other regions. The maximum surplus will not give clear picture. He suggested that studies should also be done to see the net power flow in Eastern region.
- 4.4 Representative of Odisha stated that the list of generators considered in anticipated installed capacity should be available. Representative of CTU stated that some units will also be decommissioned in the future time frame and those should be accounted in the figures. The list of generation project is enclosed at **Annexure-V**.
- 4.5 CTU stated that they had circulated formats to collect data for system studies of Eastern Region states. It would be regular process, wherein CTU would collect data from states so as to represent their system in a more accurate form.
- 4.6 CTU also stated that earlier POWERGRID had purchased licenses of software for transmission planning studies i.e. PSS®E, distributed to CEA, RPCs, states etc. and doing the AMC. The AMC has now expired and POWERGRID has extended the AMC with Siemens-PTI for further 5 years. Further, in the AMC, the present software PSS®E v34.2 would also be upgraded to v35. For this purpose, the vendor i.e. Siemens would approach the states for replacement of the dongle. He requested for cooperation of members in this regard.
- 4.7 Chief Engineer (PSPA-II), CEA expressed that correctness and detailing of data is important so that a more realistic model and system studies are carried out to assess the requirement of transmission system in Eastern states. The same has been requested to Eastern states in previous meetings of the committee. It is once again requested to submit the data to CTU in the prescribed format. He also stated that upgradation of software and extension of AMC by CTU would be extremely helpful and he requested the members for cooperation.
- 4.8 After deliberations, it was agreed that no additional inter-regional links is to be planned till 2024-25 at present. However, the same would be reviewed in the next meeting of ERPCTP.

**5. Review of Transmission system by system operator**

- 5.1 Director (PSPA-II), CEA stated that as per data obtained from NLDC website, Available Transfer Capability (ATC) for June 2020 for NR-ER, ER-NR, NER-ER, ER-NER and ER-SR corridor were 1800 MW, 4950 MW, 2555 MW, 1255MW and 5700 MW respectively. Further, no limits were specified for SR-ER, WR-ER and ER-WR corridors. He also informed that as per the operational feedback, no congestion was seen in the market in Q1 of 2020-21.
- 5.2 Chief Engineer (PSPA-II) enquired about not specifying TTC/ATC for WR-ER, SR-ER and ER-WR corridors. He stated that a figure regarding the limit of power that can be transferred from these corridors should be calculated. Also, simultaneous ER import and export limits were not specified by NLDC.
- 5.3 NLDC stated that for computing import TTC they keep on reducing demand of NR and NER and observe how much ER can import. But for WR and SR, the cases do not converge after a limit. These figures are not defined as practically transmission constraints not being faced on these corridors for input into ER and simulation to arrive at a finite value do not justify the actual scenario. However, there is always a physical limit.
- 5.4 CTU stated that the cases like import from WR and SR are unrealistic to simulate.
- 5.5 NLDC stated that in view of expected high penetration of RE generation in SR, WR & NR in the near future, simultaneous export and import limit of Eastern Region as a whole may be worked out and plan system, accordingly.
- 5.6 ERLDC presented the list of transmission line constraints, ICT constraints, nodes experiencing high voltage/ low voltage during Q1 of 2020-21. List of constraints faced, is at **Annexure-VI**. He stated that some of the constraints would have been avoided if the transmission elements agreed in the previous standing committee meetings were implemented as planned. CTU/STUs were requested for expediting implementation of the agreed transmission system in time, for smooth operation of the ER grid. The constraints requiring planning of additional elements have been discussed in subsequent paragraphs.
- 5.7 Regarding uneven loading on 220 kV Patna-Sipara T/C line and non-compliance of N-1 criteria, BSPTCL agreed for reconductoring of ckt-1 and ckt-2 of 220 kV Patna-Sipara T/C line. The work will be completed by Feb-2021 when the loading is low or after commissioning of Naubatpur 400kV S/s.
- 5.8 **High loading on 220 kV Durgapur (PG) – Parulia (DVC) D/C line :**  
DVC stated that second 220 kV D/C line between Durgapur (POWERGRID) and Parulia (DVC) through bunching of each circuit with 1<sup>st</sup> D/c line and associated bay upgradation was targeted for March-2021. However, there may be some



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delay due to ongoing COVID situation and the same is now expected to be commissioned by Sep-2021.

CTU stated that the work of shifting of 400kV side of 400/220kV, 315MVA ICT-I from Durgapur-A section to Durgapur-B section without physical shifting of ICT such that all three ICTs are on same 400kV bus section was allocated to them under RTM vide MoP OM dated 25.09.2020. The implementation time frame is 12 months.

**5.9 220 kV Maithon-Dhanbad D/C and 220 kV Maithon-Kalyaneshwari D/C line:**

ERLDC stated that high loading and non-compliance of N-1 contingency criteria was observed on these lines. With addition of 3<sup>rd</sup> 400/220 kV 500 MVA ICT at Maithon, loading on these circuits will further increase.

DVC intimated that they are establishing 220 kV Connectivity of its Mejia-B and Raghunathpur power plants that are having only 400kV connectivity at present.

It was stated that after retirement of old units of Durgapur TPS, there may be issue of meeting the demand of that area. DVC and WBSETCL stated that they would be augmenting ICTs at some sub-stations. However, there might be fault level issues at few places.

It was agreed that the issue will be taken up in a joint study with participation from ERLDC, CTU, WBSETCL and DVC.

**5.10 220kV Muzaffarpur (PG)-Hazipur D/C and 220 kV Hazipur-Amnour D/C lines:**

ERLDC stated that these lines are not N-1 compliant. CTU stated that 4<sup>th</sup> 500 MVA ICT at Muzaffarpur is expected in June 2021. BSPTCL stated that 400kV substation at Sitamarhi is under progress and 400kV Chhapra has been planned by BSPTCL. After commissioning of these elements, the issue would be over.

ERLDC stated that North Bihar is flood prone area, therefore, substation designs in that area need attention. He suggested that two circuits of a line should not be in the same dia and at 132kV level double bus arrangement should be planned where there are more than two lines are emanating.

Members opined that terminating two circuits of a line in different dia should be a preferred solution but may not be always possible due to site conditions.

**5.11 220 kV Gaya-(PG) -Bodhgaya D/C lines :**

ERLDC stated that these lines are not N-1 compliant. BSPTCL stated that with commissioning of 400/220 kV substation at Chandauti by LILO of Gaya-NPGC 400kV D/C line at 400 kV Chandauti and shifting of some load from Bodhgaya to this new substation, loading of the subject line is expected to be reduced. Accordingly, it was decided that no additional system need to be planned. However, if required SPS may be implemented till the system mentioned by BSPTCL is implemented.

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- 5.12 Representative of ERLDC stated that voltage of Arambag fluctuates in the range 410-385 kV. The low voltage has been observed during peak hours of June (when load revival took place during unlock-1 phase of COVID-19 related lockdown) due to insufficient reactive power compensation at 220 kV and below levels.
- 5.13 Representative of WBSETCL stated that presently there is no issue of low voltage. New 80 MVAR capacitor banks are already installed, out of which 30 MVAR are under the command area of Arambag. WBSETCL also intimated that another 290 MVAR is expected to be commissioned by next 6 months and another 300 MVAR by next one year.
- 5.14 Regarding high voltage at 400 kV New PPSP, WBSETCL stated that presently 125 MVAR reactor is at Arambagh. Further, 4 nos. of 125 MVAR reactors have been planned one each at Bidhan Nagar, Kharagpur, Gokarna and Chanditala with target completion schedule of April-2022. This will help in containing these voltages.
- 5.15 For over voltage issue at 400kV Maithon-B and 400 kV Koderma, it was agreed that reactive compensation need to be studied.

<p><b>B. ToR 2(ii) – ASSESSMENT OF TRANSMISSION SYSTEM REQUIREMENTS IN NEAR, MEDIUM AND LONG TERM AND FORMULATE TRANSMISSION SCHEME</b></p>
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- 6. Modification in construction of 220 kV D/C Barjora-Burdwan line of DVC**
  - 6.1 The issue was already discussed at para 5.9 above.
- 7. Interim connectivity to generation projects in ER through LILO arrangement**
  - 7.1 Director (PSPA-II), CEA stated that Sneha Kinetic Power Projects Pvt. Ltd. (Dikchu HEP) and Shiga Energy Pvt. Ltd. (Tashiding HEP) in ER, were connected through temporary LILO arrangement with ISTS. However, as per CERC order dated 07-10-2015 in Petition No.112/TT/13 and dated 28-09-2016 in Petition no. 30/MP/2014 the interim (LILO) arrangement has to be removed.
  - 7.2 He stated that Dikchu HEP is presently connected through LILO of one circuit of Teesta-III – Rangpo 400kV D/c line at Dikchu as interim arrangement and as per discussions in previous meetings, final connectivity will be LILO of one circuit of Dikchu pool – Singhik D/c (Twin Moose) line (220kV line operated at 132kV) at Dikchu HEP.
  - 7.3 CTU stated that Dikchu pool - Singhik line and its LILO at Dikchu HEP are being carried out by POWERGRID under Comprehensive Scheme of Sikkim and

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expected to be completed by December, 2020 and December 2021 respectively.

- 7.4 Regarding, restoration of Teesta-III – Rangpo 400kV D/c line (i.e. disconnection of LILO at Dikchu HEP), Chief Engineer (PSPA-II), CEA stated that to honour the CERC direction, the line will need to be restored. He also suggested that the LILO has to be bypassed at the tower end and not at the Dikchu switchyard end. It was agreed that the line can be restored by M/s TPTL.
- 7.5 Director (PSPA-II), CEA stated that Tashiding HEP is presently connected through LILO of one circuit of Rangpo-New Melli 220kV D/c line at Tashiding through Tashiding-Legship Pool-New Melli 220kV D/C line. As per discussions in previous meetings, final connectivity will be through Tashiding – Legship Pool 220kV D/c line.
- 7.6 CTU stated that Legship Pool substation is being implemented by POWERGRID under Comprehensive Scheme of Sikkim. Recently, retendering for Legship Pool packages has been done and expected completion by December, 2021
- 7.7 Members noted the same.

**8. Uprating of bay equipment at Kahalgaon switchyard matching with capacity of Kahalgaon-Patna 400kV (Quad) D/C line- by POWERGRID**

- 8.1 Director (PSPA-II), CEA stated that in the 1<sup>st</sup> meeting of ERPCTP, it was agreed that NTPC will plan for uprating the bay equipment at Kahalgaon switchyard with matching capacity of Kahalgaon-Patna 400kV (Quad) D/C line and inform the same within 1-2 weeks. Further, NTPC to coordinate with ERPC and ERLDC regarding the outage planning for carrying out the work in switchyard.
- 8.2 Representative of NTPC stated that along with the bay equipments, equipment foundation and Jack Bus also would be changed. He informed that the work will be awarded by December 2020 with completion schedule of September 2022.
- 8.3 Members noted the same.

**9. Drawal of Power from 132kV Rihand (Pipri) (UPPTCL) – Sone Nagar (BSPTCL) at Nagaruntari TSS by LILO arrangement**

- 9.1 Director (PSPA-II), CEA stated that JUSNL vide their letter dated 03.03.2020 had requested CEA for permission for drawal of power from 132kV Rihand (Pipri) (UPPTCL) – Sone Nagar (BSPTCL) at Nagaruntari TSS by LILO arrangement. In this regard, comments from ERPC secretariat, ERLDC and BSPTCL were received. Major observations were on jurisdiction of JUSNL for operational & commercial purpose and treatment of Railway as consumer of Jharkhand.

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He further stated that JUSNL vide letter dated 06.07.2020 stated the following:

- (i) A maximum of 21 MVA power is intended to be drawn by Railways through proposed LILO arrangement.
- (ii) 2.5 Km, 132kV, 3-ph LILO Line alongwith 02 Nos. 132kV, 3-ph feeder bays, 01 no. bus-coupler bays, 132 kV main & transfer bus are to be commissioned.
- (iii) The LILO line section will remain under jurisdiction of RLDC.
- (iv) It was confirmed that switching sub-station at Nagaruntari will be under jurisdiction of JUSNL and not in the jurisdiction of Railways. Nagaruntari will be monitored and supervised by SLDC, Jharkhand and Railways would be consumer of Jharkhand through JBVNL for drawl of power. Further, drawal of power by Railways through the said line will be included in the drawal of JUSNL.
- (v) JUSNL assures to maintain healthiness of this transmission line within jurisdiction of Jharkhand.

- 9.2 Director (PSPA-II), CEA also stated that considering the above confirmations, CEA vide letter dated 14.07.2020 has conveyed that, in principle, CEA have no objection for JUSNL to make LILO of the 132 kV Rihand (Pipri, UPPTCL) - Sonenagar (BSPTCL) at Nagaruntari TSS.
- 9.3 JUSNL stated that present load of Railways would be 5 MVA, which may increase upto 21 MVA in future. He clarified that presently, the LILO is being implemented at Nagaruntari switching station of JUSNL. The switching station is feeding to Nagaruntari TSS of Railways.
- 9.4 ERLDC stated that Nagaruntari switching station need to be manned by JUSNL as it is feeding an essential service of Railways. JUSNL informed that Nagaruntari switching station feeding traction S/s is on the same bus separated by bus sectionaliser and manned by JUSNL.
- 9.5 JUSNL also informed that they are constructing Garhwa Road – Nagaruntari 132kV line, which will feed their Nagaruntari S/s and in turn Nagaruntari TSS. Expected time of commissioning of this system would be September-2021. After implementation of Nagaruntari S/s, whole load of Railways would be fed from JUSNL system and the LILO of the 132 kV Rihand (Pipri, UPPTCL) - Sonenagar (BSPTCL) at Nagaruntari TSS would be removed.
- 9.6 After deliberations, LILO of 132kV Rihand (Pipri) (UPPTCL) – Sone Nagar (BSPTCL) at Nagaruntari switching station of JUSNL as temporary arrangement until the commissioning of Garhwa Road – Nagaruntari 132kV line was agreed. LILO would be removed and original Rihand (Pipri) (UPPTCL) – Sone Nagar (BSPTCL) line would be restored by JUSNL.

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**10. Augmentation of transformation capacity at 400/220kV Ranchi (POWERGRID) S/s**

- 10.1 Representative of CTU stated that presently, the 400/220kV Ranchi (POWERGRID) S/s is having the transformation capacity of 630MVA (2x315MVA ICT). From the load pattern of both ICTs, it has been observed that the power flow through both the transformers exceeds more than 400-450MW during peak hours, thereby not meeting the N-1 reliability criteria. Further, from system studies it was observed that with the delay in implementation of PVUNL and its associated system, the ICTs at Ranchi gets loaded to about 310MVA per ICT in the base case. In view of above, he proposed to augment the transformation capacity at Ranchi S/s with additional 400/220kV, 500MVA ICT along with associated bays in ISTS.
- 10.2 JUSNL stated that their drawal from 400/220kV Ranchi (POWERGRID) S/s was around 200 MW, which went only up to 320 MW during tripping of Tenughat. After implementation of various works in the intrastate system, the drawal requirement from Ranchi (PG) will further reduce. Accordingly, there is no need for installation of additional ICT at Ranchi S/s.
- 10.3 On query of ERLDC, JUSNL stated that Patratu 400kV substation would be commissioned within six (6) months, however, Mander will take some more time.
- 10.4 CTU stated that loading on ICTs were higher than as mentioned by JUSNL. Further, shutdown was not being allowed by JUSNL quoting high loading for maintenance and even during emergency conditions. JUSNL informed that they have recently given their consent for shutdown.
- 10.5 CTU stated that they can again do the load flow studies as per the inputs of JUSNL. He informed that in the studies done by CTU, they have already considered Patratu and associated lines and still the ICTs were overloaded.
- 10.6 On query from CE(PSPA-II), ERLDC informed that JUSNL also declares their own TTC/ATC. They may share their calculations.
- 10.7 After deliberations, following were agreed:
- (i) JUSNL will provide generation/load data and intra-state transmission system under execution/planned with timelines to CEA/CTU.
  - (ii) JUSNL will share their TTC/ATC calculations files with CEA/CTU/ERLDC.
  - (iii) A joint study will be carried out to examine the issue.
  - (iv) Thereafter, the issue would be discussed in next meeting of ERPCTP.

**C. ToR 2(iii) – APPLICATIONS FOR CONNECTIVITY AND ACCESS**

**11. Connectivity application for Teesta IV HEP (520 MW)**

11.1 Representative of CTU stated that NHPC vide letter dated 04.08.2020 has applied for connectivity for the Teesta IV HE Project (520 MW), Sikkim in accordance with CERC Connectivity Regulation, 2009 & Detailed Procedure and seeking connectivity from 28.02.2027. The 400 kV Teesta-III- Rangpo D/C line is not fully utilized and therefore, it can be LILoed at Teesta-IV HEP. The anticipated commissioning date of Teesta-IV will be 2027. Further, the Teesta-III HEP – Rangpo – Kishanganj line being ISTS and generators connected to it being ISGS in nature it is proposed to implement connectivity system as ISTS.

Accordingly, following transmission system was proposed for grant of Connectivity to Teesta-IV (4x130MW) HEP:

- i. LILo of Teesta-III HEP – Rangpo 400kV D/c (Quad) line at Teesta-IV HEP generation switchyard – under ISTS
  - ii. Establishment of 400kV Teesta-IV generation switchyard – by NHPC
    - Generation step-up to 400kV level
    - 04 nos. of 400kV line bays for 400kV 2xD/c (Quad moose) lines (LILo lines mentioned above)
    - 2x80MVAr, 420kV bus reactors along with bays
- 11.2 NHPC informed that there is space for only one bus reactor in the generation switchyard.
- 11.3 On enquiry by Chief Engineer (PSPA-II), CEA, NHPC informed that GIS switchyard is outside the building and cable is not required for termination of the LILo line.
- 11.4 ERLDC stated that, if one and half breaker scheme is adopted at the Teesta-IV switchyard, the LILo lines should be preferably terminated in a manner such that incoming and outgoing feeder are in same diameter. This will facilitate, bypassing of generating station during emergency conditions.
- 11.5 CTU stated a Bank Guarantee (BG) of Rs 5 Lakhs/MW is required from NHPC. Further, NHPC Ltd. need to sign requisite agreements and provide applicable Bank Guarantee for taking up implementation of immediate evacuation system under ISTS.
- 11.6 After discussion, following transmission system for evacuation was agreed for grant of connectivity to Teesta-IV (4x130MW) HEP:
- (a) LILo of Teesta-III HEP –Rangpo 400kV D/c (Quad) line at Teesta-IV HEP generation switchyard – under ISTS.
  - (b) Establishment of 400kV Teesta-IV generation switchyard – by NHPC

- (i) Generation step-up to 400kV level
- (ii) 04 nos. of 400kV line bays for 400kV 2xD/c (Quad moose) lines (LILO lines mentioned above)
- (iii) 1x80MVAr, 420kV bus reactors along with bay

**D. ToR 2(iv) – REVIEW OF UPSTREAM AND DOWNSTREAM NETWORK**

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

- 12.1 Director (PSPA-II), CEA stated that 220kV and 132kV network was to be implemented by STUs from the various commissioned and under-construction ISTS substations in ER. He requested respective STUs to update the status of the same.
- 12.2 The updated details as per the information provided by STUs is enclosed at ANNEXURE-VII.

**13. Status of 400kV substations being implemented by STUs in ER under intra-state schemes**

- 13.1 Director (PSPA-II), CEA stated that many 400kV substations have been agreed in the previous meetings of SCSPER/ERSCT/ERPCTP under intra-state strengthening schemes in ER. He requested respective STUs to update the status of the same.
- 13.2 The updated details as per the information provided by STUs is enclosed at ANNEXURE-VIII.

**E. ToR 2(v) – EXAMINE AND EVALUATE INTRA-STATE PROPOSALS**

**14. Post-facto approval of LILO of 220 kV Purnea (PG)- Begusarai DCDS line at Khagaria (New)**

- 14.1 Director (PSPA-II) stated that BSPTCL vide their letter dated 23.06.2020 requested CEA for “in-principle” approval for LILO of 220 kV Purnea(PG) – Begusarai DCDS at 220/132/33 kV Khagaria (New) GSS. BSPTCL mentioned that due to rising demand of Central and North Bihar, they had constructed 220/132/33 kV Khagaria (New) GSS with LILO of 220 kV Purnea(PG)-Begusarai DCDS. The LILO work of 220 kV Purnea(PG)-Begusarai DCDS (Zebra) at 220/132/33 kV Khagaria (New) GSS was completed and ready for charging.

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- 14.2 Considering the facts, CEA conveyed “post-facto in-principle” approval for LILO of 220 kV Purnea(PG)-Begusarai DCDS (Zebra) at 220/132/33 kV Khagaria (New) GSS was conveyed to BSPTCL vide letter dated 26.06.2020.
- 14.3 Members concurred the same. However, members opined that transmission schemes should be implemented after agreement in this committee and post facto approval should be avoided.
- 15. Feeding 132 kV Power to 132/33 kV GSS Barsoi (BSPTCL) from 440/220/132 kV GSS Purnea (PGCIL) through jumpering of 132 kV Purnea (PG)- Kishanganj (Old) T/L to 132 kV Kishanganj (New)-Barsoi T/L at the point of overcrossing site.**
- 15.1 Director (PSPA-II), CEA stated that BSPTCL vide letter dated 10.07.2020 has requested CEA to allow them to draw 132 kV power for 132/33 KV GSS Barsoi from 400/220/132 KV GSS Purnea (PGCIL), through the jumpering of 132 KV Kishanganj (New) – Barsoi T /L with 132 KV Purnea (PG)-Kishanganj (Old) T /L at the overcrossing in view of threat to the tower caused by soil erosion by Mahananda river.
- 15.2 He further stated that CEA vide letter dated 17.07.2020 has conveyed “in-principle” approval for above proposal as an interim arrangement to BSPTCL.
- 15.3 Members concurred the “in-principle” approval given by CEA.
- 15.4 Representative of BSPTCL stated that a large part of Bihar is flood prone area and the rivers of Bihar like, Koshi, Mahananda etc., are mighty rivers which change their courses/ directions of flow, endangering the transmission line towers of nearby areas, as happened in case of 132 K V Kishanganj(new)-Barsoi T/L. Also. Bihar faced complete blackout of Darbhanga (DMTCL) due to ingress of flood water in the GSS which caused power outage of about 180 MW in districts of Darbhanga, Madhubani and Muzaffarpur.
- 15.5 He proposed that ERPC/ ERLDC may be empowered to provide “in principle approvals” for interim arrangement on urgent basis to avoid any power crisis under such critical conditions. The “in principle approval” may be discussed and deliberated subsequently in the ERPCTP forum.
- 15.6 It was agreed that, in the scenarios, where interim arrangement is necessitated due force majeure conditions and original configuration is expected to be restored within three (3) months, ERPC in consultation with ERLDC and other stakeholders may allow the interim arrangement. The intimation regarding interim arrangement need to be furnished to CEA and CTU immediately and appraised to ERPCTP forum in its next meeting. However, where interim arrangement is likely to be continued beyond three months, the same shall be implemented only after agreement in ERPCTP.



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**16. Creation of 220 kV bus at Banka (PG) and Lakhisarai (PG)**

- 16.1 Director (PSPA-II), CEA stated that to have 2<sup>nd</sup> source connectivity at their various substations, BSPTCL had proposed for the creation of 220kV voltage level at existing 400/132 kV substations at Banka (PG) and Lakhisarai (PG). In this regard, a meeting was held on 10.09.2020 wherein BSPTCL informed that they will review their proposal and accordingly submit to CEA. BSPTCL vide letter dated 21.09.2020 has revised their proposal and requested to consider for creation of 220 kV Bus at Banka (PG) at present and Lakhisarai (PG) at later stage.
- 16.2 Representative of BSPTCL stated that the Grid Sub-station constructed by them i.e. Nawada(New), Shekhpura(New), Haveli Kharagpur (Jamalpur) and Gauradih (Sabour-New) are drawing power from Khizersarai (BSPTCL) and Khizersarai is dependent on Biharsharif (POWERGRID) and Gaya (POWERGRID). Also, the above mentioned grids are apparently on single source as the remote Gouradih GSS doesn't have any alternate power source. This is causing severe high voltage issue during off peak hours. To provide an alternate source 220 kV at Haveli Kharagpur and Gauradih and to maintain better voltage regulation, it was requested to approve 220 kV Bus creation at Banka (PG) and Lakhisarai(PG) and connect to Gauradih and Havelki Kharagpur respectively. He stated that creation of 220 kV Bus at Banka (PG) and Lakhisarai (PG) are required. However, BSPTCL proposed for the creation of 220kV voltage level at existing 400/132 kV substations at Banka (PG) at present with transformation capacity of 2x315 MVA.
- 16.3 ERLDC stated that there are high voltage issues in that area due to less loading of lines. Accordingly, reactive compensation may be planned.
- 16.4 CTU stated that presently there is space for creation of 220kV level at Banka (PG) S/s in GIS.
- 16.5 After deliberations, following was agreed for implementation:

**Under ISTS:**

**Eastern Region Strengthening Scheme-XXV (ERSS-XXV)**

- (a) Creation of 220kV GIS bus at Banka (POWERGRID) S/s
- (b) 400/220kV, 2x500MVA ICTs along with associated bays (220kV bays in GIS)
- (c) 2 nos. of 220kV GIS line bays at Banka (POWERGRID) for termination of Banka (POWERGRID) - Goradih (Sabour New) 220kV D/c line of BSPTCL
- (d) Space for future 220kV GIS bays: 6 no.

**By BSPTCL:**

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(a) 220kV Banka (POWERGRID) - Goradih (Sabour New) D/C line along with associated bays at Goradih (Sabour New) end. BSPTCL will implement this line matching with the schedule of associated ISTS scheme as above.

16.6 It was also agreed that BSPTCL would study requirement of reactive power in Bihar system and send to CEA/CTU for discussion in the next meeting of ERPCTP.

**F. ToR 2(vi) – REVIEW AND FACILITATE CONSTRUCTION OF INTER-REGIONAL GRID STRENGTHNING SCHEME**

**17. Re-conductoring of Siliguri-Bongaigaon 400kV D/c Twin Moose line with Twin HTLS conductor, reconductoring of Alipurduar – Salakati (Bongaigaon) 220kV D/c line with Single HTLS**

17.1 Director (PSPA-II), CEA stated that reconductoring of the following transmission system under ISTS had been agreed in the 1<sup>st</sup> meeting of NERPCTP held on 08-11-2019 and 1<sup>st</sup> meeting ERPCTP held on 14.02.2020

(i) Re-conductoring of Siliguri – Bongaigaon line with Twin HTLS conductor (ampacity of single HTLS shall be 1596A) along with requisite modifications in line bay equipment at both ends.

(ii) Re-conductoring of Alipurduar – Salakati (Bongaigaon) 220kV D/c line with single HTLS (ampacity of single HTLS shall be 1596A) along with requisite modifications in line bay equipment at both ends.

17.2 CTU informed that MoP has allocated the above work of reconductoring of lines under RTM to POWERGRID on 25-09-2020 with implementation schedule of 30 months.

17.3 Members noted the information.

**G. CROSS BORDER INTERCONNECTIONS**

**18. Katihar (Bihar) – Parbotipur (Bangladesh) – Bornagar (Assam) 765kV D/c line.**

18.1 Director (PSPA-II), CEA stated that in the 6th meeting of Standing Committee on Power System Planning of NER held on 03-10-2016, Katihar (Bihar) – Parbotipur (Bangladesh) – Bornagar (Assam) 765kV D/c line (initially operated at 400kV) along with HVDC back-to-back at Parbotipur (2x500MW, 1x500MW with 400kV operation and 2nd 1x500MW with 765kV operation) was agreed.

18.2 The issue was discussed in the 8<sup>th</sup> meeting of India-Bangladesh JTT-T held on 15-12-2019 & 06-03-2020. In the 18<sup>th</sup> meeting of JSC on India-Bangladesh Cooperation in Power Sector held on 07<sup>th</sup> March 2020, it was mentioned that

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*“India would like to go ahead with the financing and construction of the entire 765kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link. The Bangladesh side may synchronize through this link at Parbotipur at an appropriate time as suggested by JWG for drawal of power. Bangladesh side welcomed the proposal of India’s financing and construction of the 765 kV D/c lines”.*

- 18.3 Chief Engineer (PSPA-II), CEA requested CTU to present the system study for this link.
- 18.4 CTU stated that presently a 765kV switching station has been considered at Parbotipur (Bangladesh) as Bangladesh has not yet given its commitment to draw power through this link. In the studies two extreme scenarios of NER i.e. High Hydro with off peak demand in NER and Low Hydro with peak demand in NER for the period of 2024-25 have been considered. Major transmission lines of ER-NER and power flow on them have been plotted. In the base case, Katihar-Parbotipur-Bornagar line is not considered. In the case of high hydro, a flow of 1000MW from NER to ER via 765kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link is observed with NER being surplus of about 2500MW. In case of Low Hydro with NER being power deficit of around 3000MW, power flow of about 1400MW from ER to NER via 765kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link is observed.
- 18.5 Chief Engineer (PSPA-II), CEA stated the following:
- (a) The 765kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link is a strategic link and will provide another corridor connecting ER and NER besides the chicken neck area and also assist in additional power exchange between India and Bangladesh in future.
  - (b) As per original proposal Bangladesh was to draw 1000 MW from this line at Parbotipur. However, as per the 18<sup>th</sup> meeting of JSC/JWG for India-Bangladesh cooperation in power sector, Bangladesh has stated that they will not use this link as they will not require any additional power till 2030.
  - (c) For low hydro case, circulation of power flow between the two regions i.e. NER & ER was observed from the studies as 1000MW is supplied from NER to other regions, and 1400MW is fed back to NER via 765kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link. He further informed that power imported from Punatsangchu and Mangdechu in Bhutan to India at Alipurduar could be fed back to NER via AC lines as there is a sink in NER in low hydro case. Further, the line flows depicted in BNC-Alipurduar and Alipurduar-Agra HVDC is only 1000MW wherein the capacity is of 6000MW. Considering appropriate power order on HVDC line and to avoid circulating flow, the 765kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link may transmit about 500MW only.

- (d) For High Hydro case, 765kV D/C Katihar (India) – Parbotipur (Bangladesh) – Bornagar (India) cross border link may carry only 20-30 MW, if HVDC systems are optimised to carry about 2500MW from BNC.
  - (e) As Bangladesh is not going to draw any power from this link, the link may be built with 400 kV voltage level instead of 765 kV voltage level. This will also reduce the amount of investment required for this project.
  - (f) As flooding in North Bihar is a serious issue and impacts the grid, additional system strengthening up to Katihar will be required.
  - (g) Although, the line was agreed, the funding modalities or recovery of investment are yet to be decided. He opined that the transmission charges for the Indian side can be recovered from through PoC mechanism provided states agree for the same. As this link will have financial implications on other region's states also, this proposal may be required to be discussed in all the Regional Power Committees on Transmission Planning (RPCTP).
  - (h) In the 2<sup>nd</sup> meeting of NERPCTP held on 25.09.2020, NER states and NERPC expressed that strategically this link is very important. However, there should not be any financial implication on NER states. They proposed that Central Government may consider construction of this link from their funds.
- 18.6 MS, ERPC stated that about 1000 MW capacity of gas plants are proposed in NER. Further, after new units of Bongaigaon, the utilisation of this cross border links for NER/ER states may not be there.
- 18.7 NLDC stated that line may be charged at 400 kV initially but need to be constructed at 765 kV to secure the corridor. Reactors may be planned in the middle i.e., Parbotipur S/s to provide reactive power compensation.
- 18.8 CTU stated that they have done analysis regarding the voltage level of the line and it was found that as the length of the line is long, charging of line at 400kV would be difficult. Further, there will not be much savings, as there is not much difference between the cost for constructing line at 765kV and 400kV parameters. He also mentioned that Indian side has already agreed for the proposal in the 18<sup>th</sup> JSC/JWG meeting on India-Bangladesh Cooperation in power sector. Taking the proposal to every RPCTP will be time consuming process.
- 18.9 ERPC stated strategic issues are between two countries. However, technical studies need to be carried out for ensuring utilization.
- 18.10 Representative of Odisha, Bihar, West Bengal, DVC and Jharkhand stated that considering ROW constraints at chicken neck area, the link is strategically very important. However, the link should be implemented by funds of Central Government and there should not be any financial implication on them. WBSETCL stated that detailed techno-commercial review is required before taking up the project.

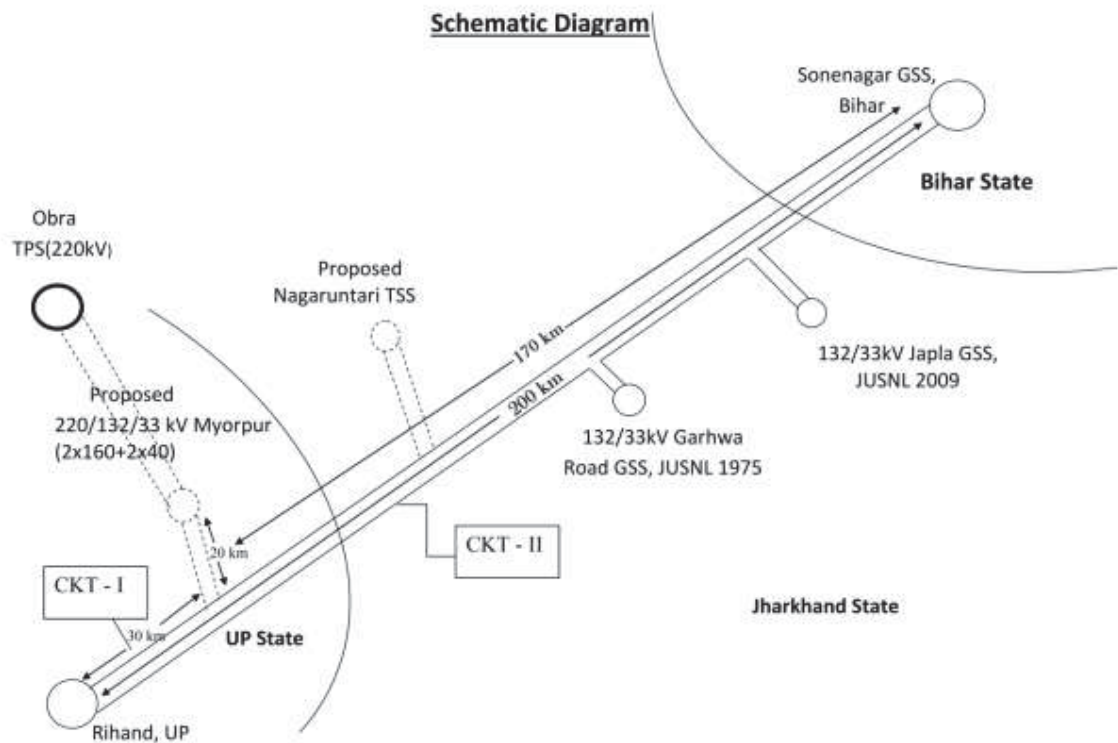
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18.11 It was decided to appraise MoP, accordingly.

### H. Additional Agenda

#### 19. LILO of one ckt 132kV DC line Rihand Hydro (Pipri-UP)-Sonenagar (Bihar) at 220/132/33kV S/S Myorpur UPPTCL – Agenda by UPPTCL

19.1 Representative of UPPTCL stated that in 2<sup>nd</sup> meeting of NRPCTP held on 01.09.2020, proposal for LILO of one circuit of 132kV Rihand Hydro (Pipri-UP) – Sonenagar (Bihar) line at 220/132/33 kV S/s Myorpur(UPPTCL) was deliberated and it was suggested to seek NOC from BSPTCL & ERPCTP. The schematic diagram of the proposal is given below:



19.2 Representative of BSPTCL stated that they had conveyed no objection for this LILO to UPPTCL vide letter dated 29.09.2020.

19.3 Chief Engineer (PSPA-II), CEA stated that the line section in UP is owned by UPPTCL and we may not have any issue in LILO of this line at Myorpur.

19.4 BSPTCL stated that the same circuit of 132 kV Sonenagar – Rihand S/C transmission line will be LILoed at Nabinagar S/s (agreed in the 1<sup>st</sup> meeting of ERPCTP) and Nagaruntari S/s (agreed at agenda para-9 above). As this line is very old and LILo at three places i.e. Myorpur, Nagaruntari and Nabinagar, he proposed for reconductoring of this line with high capacity conductor.

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- 19.5 Chief Engineer (PSPA-II), CEA stated that the LILO at Myopur is proposed as the line from Obra to Myopur have some RoW issue. Further, as mentioned by JUSNL at para-9 above, the LILO at Nagaruntari will be temporary and would be closed after completion of Garhwa – Nagaruntari line. After connection of Myorpur with Obra TPS, the line may be used for extending more supply to Bihar, in case of requirement. Accordingly, there may not be any requirement of reconductoring.
- 19.6 After deliberations, LILO of one circuit of 132kV Rihand Hydro (Pipri-UP) – Sonenagar (Bihar) line at 220/132/33 kV S/s Myorpur (UPPTCL) by UPPTCL was agreed in principle.

**20. Breakdown of FSTPS-N. PURNEA & GOKARNA-N. PURNEA lines and reconfiguration of the lines to supply Gokarna – Agenda by ERPC**

- 20.1 Representative of ERPC stated that 400kV New Purnea – FSTPS, and 400kV New Purnea - Gokarna lines were under forced outage wef. 22:31 Hrs and 22:02 Hrs respectively of 04-09-20, due to critical condition of tower no. 1103 (DD+0) (having normal opencast foundation) of these lines, which was caused by soil erosion of the right bank of Ganga due to flooding. Tower no 1104 (DD+25) and onward towers up to 1112 (9no pile) are on pile foundations situated in the main stream of river Ganga. The right bank of river Ganga is under continuous erosion due to severe flood in the river. As a precautionary measure, both the circuits 400 kV Purnea - Gokarna and 400 kV Purnea -Farakka were taken out of service on 04.09.20. In order to avoid any consequential damage, the conductor in the span 1102 to 1103 had been lowered.
- 20.2 He further stated that based on the request of WBSETCL to consider an alternative restoration arrangement of transmission line between 400kV Farakka and Gokarna, an interim arrangement was envisaged after discussion with ERLDC, WBSETCL and PGCIL to enhance the reliability of supply to Gokarno by shorting of the healthy sections of 400kV FSTPS-New Purnea and 400kV Gokarna - New Purnea lines at location between the span of 807 and 808 to form a direct line from FSTPS to Gokarna. The above interim arrangement is in service from 6<sup>th</sup> September 2020.
- 20.3 Representative of CTU informed that Sagardighi – Gokarna 400kV D/C line is under implementation and only one location is pending. This line will help in enhancing reliability of power supply to Gokarna.
- 20.4 WBSETCL stated that in Gokarna-Sagardighi 400 kV D/C line, the work is pending for railway clearance for shut down to avail stringing work at railway crossing. This is pending since long for not receiving clearance from railway department despite repeated persuasion. After getting their clearance, it is

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expected to complete the job within 5 days. WBSETCL already submitted way leave charges to railway dept. however, blocking clearance is still pending.

- 20.5 Members noted the interim arrangement. Regarding, issue in getting clearance for stringing of Gokarna-Sagardighi 400 kV D/C, WBSETCL was advised to follow up with Railways and approach CEA with all documents, if the issue remains unresolved.

**21. Nabinagar (BRBCL) TPP, 1000 MW (4x250MW unit) Power evacuation plan**

- 21.1 Representative of NTPC & BRBCL stated that Nabinagar (BRBCL) TPP 1000 MW (4x250MW unit) Power evacuation is via 400 kV Nabinagar-Sasaram (Pusauli) Double Circuit link (Single tower configuration). In this arrangement of connectivity outage/failure of Tower/circuit leads to complete loss of power to station.

- 21.2 He further stated the issue was discussed in a special meeting on 2<sup>nd</sup> August 2019 wherein BRBCL to plan for alternate path for reliable power evacuation. The matter was also taken up in 41<sup>st</sup> ERPC/TCC meeting held on 26<sup>th</sup> Aug 2019. Thereafter, BRBCL submitted the following alternate/additional Power evacuation arrangement for consideration:

(a) 400 kV BRBCL –Gaya link via NPGCL

(b) 400 kV BRBCL –Gaya link

(c) 400 kV BRBCL –Daltonganj link

- 21.3 It was also mentioned that Nabinagar-II (NPGCL i.e., Nabinagar Power Generation Company Pvt. Ltd., 3x660 MW)- Nabinagar-I (BRBCL) 400 kV Link is under construction as an interim arrangement for start-up/Infirm power and has to be kept shutdown in normal operation.

- 21.4 BRBCL also stated that OCC of ERPC has advised BRBCL to expedite the construction of alternate evacuation path as per the decisions taken in 41<sup>st</sup> TCC & ERPC meetings so that such issues do not arise in near future.

- 21.5 Chief Engineer (PSPA-II), CEA stated that as per CEA's Manual on Transmission Planning Criteria, 400 kV Nabinagar (BRBCL) – Sasaram (Pusauli) are sufficient for evacuation of power from 4x250 MW generating station. Accordingly, no additional lines are required.

- 21.6 NLDC stated that in the 16<sup>th</sup> Standing Committee on Power System Planning in Eastern region, it was decided that the tie line Nabinagar-II (NPGCL)-Nabinagar-I (BRBCL) 400 kV link would be constructed by NTPC for startup power for NPGCL. It was also decided that the proposed tie line would be always switched off after commissioning of plant, except in case of extreme exigencies. Therefore, in case of outage/failure of Tower/circuit leading to complete loss of power to station of BRBCL, this tie line can be used. Therefore, it was suggested to expedite construction of the tie line.

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- 21.7 BRBCL quoted of higher auxiliary requirement for which ERLDC intimated that they should explore alternate auxiliary power arrangement for emergency usage from any 132 kV substation of Bihar.
- 21.8 After deliberations, the proposal of NTPC for additional transmission line for evacuation of power from Nabinagar (BRBCL) station was not agreed.

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**Annexure-I****2<sup>nd</sup> meeting of Eastern Region Power Committee (Transmission Planning) (ERPCTP) held on 30<sup>th</sup> September 2020 through video conferencing**

Sl. No.	Name	Designation
<b>Central Electricity Authority (CEA)</b>		
1.	P.S.Mhaske	Chairperson & Member (PS)-In chair
2.	Pardeep Jindal	Chief Engineer (PSPA-II)
3.	B.S. Bairwa	Director(PSPA-II)
4.	Suyash Ayush Verma	Assistant Director(PSPA-II)
<b>Eastern Regional Power Commission (ERPC)</b>		
5.	N. S. Mondal	Member Secretary
6.	S. Kejriwal	Superintending Engineer
7.	D. K. Bauri	Superintending Engineer
8.	J. G. Rao	Executive Engineer
9.	Saswat Swain	Assistant Engineer
<b>POWERGRID(CTU)</b>		
10.	Subir Sen	COO (CTU)
11.	Rajesh Kumar	ED (ER-II)
12.	Alok	CGM (I/c) (Odisha Projects)
13.	Ashok Pal	CGM (CTU)
14.	S K Singh	CGM (ER-I)
15.	Puneet Tyagi	Sr. GM (CTU)
16.	R K Dutta	Sr. GM (Odisha Projects)
17.	Rajesh Kumar	GM (CTU)
18.	Laxmi Kant	DGM (CTU)
19.	Dibyasundar Rautaray	DGM (ER-II)
20.	Manish Ranjan Keshari	Manager (CTU)
21.	Shyam Sunder Goyal	Manager (CTU)
22.	Anupam Kumar	Dy. Manager (CTU)
23.	Dwaipayan Sen	Dy. Manager (CTU)
24.	Abhilash Thakur	Engineer (CTU)
<b>POSOCO</b>		
25.	S.R. Narasimhan	Director (System Operation)
26.	D.K. Jain	ED, ERLDC
27.	Saurav Kumar Sahay	CM
28.	Amaresh Mallick	CGM
29.	Surajit Banerjee	Sr. GM
30.	Rajeev Porwal	GM
31.	Ashok Kumar	Sr. Dy. GM
32.	Tushar R. Mohapatra	Dy. GM
33.	Saurav Kr Sahay	Chief Manager(SS)
34.	Chandan Kumar	Manager(SS)

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Sl. No.	Name	Designation
35.	Rohit Anand	Manager(SO)
36.	Prabhankar Porwal	Dy. Manager
37.	Saibal Ghosh	Dy. Manager
	<b>BSPTCL</b>	
38.	H.R. Panday	Director(Proj)
39.	B. Sharma	Advisor (Trans)
40.	Deepak Kumar Jha	CE(P&E)
41.	Ravi S. Parsad	ESE/ P&E
42.	Abhishek Kumar	EEE/P&E
	<b>JUSNL</b>	
43.	Atul Kumar	Director (Projects)
	<b>OPTCL</b>	
44.	G.C. Pati	CGM (Construction)
	<b>Sikkim (E&amp;PD)</b>	
45.	Dinesh Kharel	Chief Engineer (Trans)
	<b>WBSETCL</b>	
46.	P.K. Kundu	CE, SLDC
47.	Shri A. Karmakar	CE(CPD)
48.	Shouvik Banerjee	SE(CPD)
	<b>DVC</b>	
49.	S.K. Bose	ED (Sys)
50.	P.K. Das	CE-I
51.	S Nag	Deputy Chief Engineer (Commercial)
52.	Jayanta Dutta	Deputy Chief Engineer(SPE)
	<b>NTPC</b>	
53.	Subhash Thakur	Addl. GM(PE-E)
	<b>NHPC</b>	
54.	J. R. Choudhary	ED (T&RE)
55.	J. C. Sarkar	GM (T&RE)
	<b>SECI</b>	
56.	R.K. Agarwal	Consultant
	<b>GRIDCO</b>	
57.	Harapriya Behera	AGM

**Annexure-II****A. Transmission lines commissioned in the Eastern Region during 2019-20:**

State/Sector	Executing Agency	Transmission Lines	Voltage Level (in KV)	Circuit Type	Length (Ckm)	Commissioning Month	Quarter
Central Sector	PGCIL	Re-conductoring of New Purnea - Purnea line	220	D/C	2	Dec-19	Q3
	PGCIL	400 kV S/C New Purnear - Gokarna line and 400 kV S/C New Purnear - Farakka line (part of Rajarhat - Purnea line)	400	S/C	302	Nov-19	Q3
	PGCIL	Nabinagar-II - Patna line (Q)	400	D/C	282	Jul-19	Q2
Private Sector	NIL						
Bihar	NIL						
Jharkhand	NIL						
Odisha	OPTCL	Balimela - Malkangiri 2nd Ckt.	220	S/C	21	Jan-20	Q4
	OPTCL	LILO of one ckt of Indravati - Thervali line at Jaypatna	220	D/C	32	Jul-19	Q2
	OPTCL	Bhanjanagar - Aska	220	D/C	57	May-19	Q1
West Bengal	WBSETCL	Bidhannagar-Arambag LILO at New Chanditala	400	D/C	96.8	July-19	Q2
	WBSETCL	Malda(PG)-Dalkhola (PG) LILO at Gajol	220	D/C	6.06	July-19	Q2
	WBSETCL	Gokarna - Krishnanagar LILO at Rejinagar	220	D/C	9	Oct-19	Q3
Sikkim	NIL						

**B. Substations/ICTs commissioned in the Eastern Region during 2019-20:**

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State/Sector	Executing Agency	Substation/ICTs	Voltage Ratio	Transformation Capacity (MW/MVA)	Commissioning Month	Quarter
Central Sector	PGCIL	Repl. of 1x315 MVA ICT with 1x500 MVA ICT at Pusauli s/s (ICT-II)	400/220	185	Jan-20	Q4
	PGCIL	Extn. at Banka s/s	400/132	315	Dec-19	Q3
	PGCIL	Extn. at Lakhisarai s/s	400/132	315	Dec-19	Q3
	PGCIL	Jharsuguda (Sundargarh) S/S (Addl.)	765/400	3000	Nov-19	Q3
	PGCIL	Uttra (Pindiabil) S/S	400/220	1000	Nov-19	Q3
	PGCIL	Alipurduar HVDC S/S	400/220	630	Nov-19	Q3
	PGCIL	Repl. at Malda (50-160)	220/132	110	Oct-19	Q3
	PGCIL	Extn. at Biharshariff	400/220	500	Sep-19	Q2
	PGCIL	Rajarhat (GIS) S/S (2x500 MVA) ICT-II	400/220	500	Aug-19	Q2
	PGCIL	Extn at Durgapur S/s (3rd ICT)	400/220	315	Jun-19	Q1
DVC	Dhanbad (Auto-Xmer) T/F-I	220/132	160	Jan-20	Q4	
Private Sector	NIL					
Bihar	BSPTCL	Laukahi (Supaul new)	220/132/33	320	May-19	Q1
Jharkhand	JUSNL	Govindpur GSS (PGCIL)	220/132/33	400	Nov-19	Q3
Odisha	OPTCL	Bolangir S/S	220/132	160	Feb-20	Q4
	OPTCL	Jaypatna T/F-II	220/132	160	Jan-20	Q4
	OPTCL	Lapanga S/S (ICT-II)	400/220	315	Aug-19	Q2
	OPTCL	Kashipur S/S	220/33	20	Jul-19	Q2
	OPTCL	Jaypatna S/S	220/132	160	Jul-19	Q2
	OPTCL	Aska S/S	220/132	320	Jun-19	Q1

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State/Sector	Executing Agency	Substation/CTs	Voltage Ratio	Transformation Capacity (MW/MVA)	Commissioning Month	Quarter
West Bengal	WBSETCL	Rejinagar S/S	220/132	320	Oct-19	Q3
	WBSETCL	Gazol GIS	220/132	320	Jul-19	Q2
	WBSETCL	New Haldia NIZ GIS	220/132	160	Jun-19	Q1
Sikkim	NIL					

**C. Transmission lines commissioned in the Eastern Region during Q1 of 2020-21 and upto August, 2020:**

State/Sector	Executing Agency	Transmission Lines	Voltage Level (in KV)	Circuit Type	Length (Ckm)	Commissioning Month	Quarter
Central Sector	PGCIL	Baharampur (PG) - Bheramerar (Bangladesh) line (2nd Ckt.) - India Portion	400	D/C	172	May-20	Q1
	PGCIL	Rajarhat - Purnea line (Triple Snowbird) (Balance Portion)	400	D/C	420	July-20	Q2
Private Sector	NIL						
Bihar	NIL						
Jharkhand	JUSNL	Daltonganj (PG)- Garhwa	220	D/C	183	Aug-20	Q2
	JUSNL	Godda - Dumka line	220	D/C	142	Aug-20	Q2
	JUSNL	Godda - Lalmatia	220	D/C	44	Aug-20	Q2
	JUSNL	Jasidih - Dumka	220	D/C	149	Aug-20	Q2
	JUSNL	Jasidih - Giridih line	220	D/C	154	Aug-20	Q2
Odisha	OPTCL	LILO of Meramundali	220	S/C	12	May-20	Q1

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State/Sector	Executing Agency	Transmission Lines	Voltage Level (in KV)	Circuit Type	Length (Ckm)	Commissioning Month	Quarter
		- Duburi Ckt-I at Goda					
	OPTCL	Bolangir (OPTCL) - Bolangir (PGCIL)	220	D/C	3	July-20	Q2
West Bengal	NIL						
Sikkim	NIL						

**D. Substations/ICTs commissioned in the Eastern Region during Q1 of 2020-21 and upto August, 2020:**

State/Sector	Executing Agency	Substation/CTs	Voltage Ratio (kV/kV)	Transformation Capacity (MW/MVA)	Commissioning Month	Quarter
Central Sector	PGCIL	Extan. at Maithon	400/220	500	July-20	Q2
Private Sector	NIL					
Bihar	NIL					
Jharkhand	JUSNL	Garhwa	220/132	300	Aug-20	Q2
	JUSNL	Giridih S/S	220/132	300	Aug-20	Q2
	JUSNL	Godda GSS	220/132	300	Aug-20	Q2
	JUSNL	Jasidih S/S	220/132	300	Aug-20	Q2
Odisha	OPTCL	Goda S/S	220/132/33	320	May-20	Q1
	OPTCL	Joda S/S	220/132/33	160	July-20	Q2
West Bengal	NIL					
Sikkim	NIL					

**ANNEXURE-III****A. Generation capacity plan of Eastern Region:**

State	Coal	Hydro	Solar	Gas	DG	2019-20	2021-22	2024-25
Bihar	660	0	0	0	0	660	1980	1980
Jharkhand	420	130	0	0	0	550	550	550
Odisha	1740	2142	0	0	0	3882	3882	3882
Sikkim	0	0	0	0	0	0	0	0
West Bengal	7545	1062	0	100	0	8607	8607	9267
Central Sector	19050	1005	0	0	0	20055	24145	28345
Private	7667	1599	0	0	0	9266	9122	9239
<b>Total</b>	<b>37082</b>	<b>5938</b>	<b>0</b>	<b>100</b>	<b>0</b>	<b>43020</b>	<b>48286</b>	<b>53263</b>

**B. Actual/anticipated demand of states in Eastern region:**

Peak Demand (in MW) according to 19th EPS				Actual	Anticipated
State	2019-20	2021-22	2024-25	Peak (2019-20)	Peak (2024-25)
Bihar	5,308	6,576	8,003	5,835	>8,003 <sup>1</sup>
DVC	3,129	3,598	4,439	3,014	4,439
Jharkhand*	3,332	3,755	4,385	1,396	4,385 <sup>2</sup>
Odisha	5,016	5,340	5,878	5,292	5,530
West Bengal*	9,919	10,528	11,624	9,263	11,043
Sikkim	154	170	197	115	197
<b>Total</b>	<b>24,869</b>	<b>27,747</b>	<b>31,968</b>	<b>23,421</b>	<b>31,108<sup>3</sup></b>

\*Excluding DVC part

<sup>1</sup> BSPTCL to inform the revised projection.

<sup>2</sup> JUSNL stated that they will confirm after consulting with distribution entities.

<sup>3</sup> To be updated based on above inputs.

## ANNEXURE-IV

**Demand and generation scenario in ER**

## A. Scenarios considered for studies

Scenario -1	Scenario-2	Scenario-3	Scenario-4	Scenario-5	Scenario-6	Scenario-7	Scenario-8	Scenario-9
<b>February</b>			<b>June</b>			<b>August</b>		
Noon	Evening Peak	Night off peak	Noon	Evening Peak	Night off peak	Noon	Evening Peak	Night off peak

## B. Demand Factor for the 09 scenarios:

Scenario-1	Scenario-2	Scenario-3	Scenario-4	Scenario-5	Scenario-6	Scenario-7	Scenario-8	Scenario-9
0.68	0.9	0.55	0.78	0.95	0.66	0.75	0.97	0.7

## C. Normalized Demand (= Peak Demand as per EPS x Demand Factor)

	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9
<b>2019-20</b>	16911	22382	13678	19398	23626	16414	18652	24123	17408
<b>2021-22</b>	18868	24972	15261	21643	26360	18313	20810	26915	19423
<b>2024-25</b>	21738	28771	17582	24935	30370	21099	23976	31009	22378

## D. Anticipated Installed Capacity (MW):

	Coal	Hydro	Solar	Gas	DG	Total
2019-20	34827	5862	0	100	0	40789
2021-22	39667	5958	0	100	0	45725
2024-25	43247	6695	0	100	0	50042

## E. Availability Factor for the scenarios:

Scenario	Sc-1	Sc-2	Sc-3	Sc-4	Sc-5	Sc-6	Sc-7	Sc-8	Sc-9
<b>Coal</b>	0.7	0.8	0.6	0.7	0.8	0.6	0.7	0.8	0.6
<b>Hydro</b>	0.3	0.7	0.3	0.6	0.85	0.7	0.7	0.9	0.7



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<b>Solar</b>	0.7	0	0	0.6	0	0	0.5	0	0
<b>Gas</b>	0	0.3	0	0	0.3	0	0	0.3	0
<b>DG</b>	0	0	0	0	0	0	0	0	0

F. Anticipated Available Generation:

	<b>Sc-1</b>	<b>Sc-2</b>	<b>Sc-3</b>	<b>Sc-4</b>	<b>Sc-5</b>	<b>Sc-6</b>	<b>Sc-7</b>	<b>Sc-8</b>	<b>Sc-9</b>
<b>2019-20</b>	26138	31995	22655	27896	32874	25000	28482	33167	25000
<b>2021-22</b>	29554	35934	25588	31342	36828	27971	31938	37126	27971
<b>2024-25</b>	32281	39314	27957	34290	40318	30635	34959	40653	30635

G. ER surplus/deficit scenario for the period 2019 to 2025:

	<b>Sc-1</b>	<b>Sc-2</b>	<b>Sc-3</b>	<b>Sc-4</b>	<b>Sc-5</b>	<b>Sc-6</b>	<b>Sc-7</b>	<b>Sc-8</b>	<b>Sc-9</b>
<b>2019-20</b>	9227	9613	8977	8498	9249	8586	9831	9044	7591
<b>2021-22</b>	10686	10962	10327	9699	10468	9658	11127	10211	8548
<b>2024-25</b>	10543	10543	10374	9355	9949	9536	10983	9644	8257

**Note:** In case of high RE generation during June and August in SR, WR & NR, the ER despatch may have to be brought down. Thus reducing the surplus.

H. Max Surplus (No deficit is estimated upto 2024-25):

	<b>Max Surplus</b>
<b>2019-20</b>	9831
<b>2021-22</b>	11127
<b>2024-25</b>	10983

I. Details of inter-regional links with Eastern region are given below:

<b>Corridor</b>	<b>Present</b>	<b>Expected by 2022</b>	<b>Expected by 2024-25</b>
<b>EAST-NORTH (ER-NR)</b>			
Dehri-Sahupuri 220 kV S/c	130	130	130
Muzaffarpur-Gorakhpur 400 kV D/c (with Series Cap+TCSC)	2,000	2,000	2,000
Patna – Balia 400kV D/c (Quad)	1,600	1,600	1,600

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<b>Corridor</b>	<b>Present</b>	<b>Expected by 2022</b>	<b>Expected by 2024-25</b>
Biharshariff – Balia 400kV D/c(Quad)	1,600	1,600	1,600
Barh – Balia 400kV D/c (Quad)	1,600	1,600	1,600
Gaya - Balia 765kV S/c	2,100	2,100	2,100
Sasaram-Allahabad/Varanasi 400kV D/C line (Sasaram HVDC back to back has been bypassed)	1,000	1,000	1,000
Sasaram - Fatehpur 765kV2x S/c	4,200	4,200	4,200
Barh-II-Gorakhpur 400kV D/c (Quad) line	1,600	1,600	1,600
Gaya-Varanasi 765 kV S/c line	2,100	2,100	2,100
LILO of Biswanath Chariali - Agra +/- 800 kV, 3000 MW HVDC Bi-pole at new pooling station in Alipurduar and addition of second 3000 MW module	3,000	3,000	3,000
Biharsharif-Varanasi 400kV D/c line (Quad)	1,600	1,600	1,600
<b>Subtotal</b>	<b>22,530</b>	<b>22,530</b>	<b>22,530</b>
<b>EAST-WEST (ER-WR)</b>			
Budhipadar-Korba 220 kV 3 ckts.	390	390	390
Rourkela-Raipur 400 kV D/c with series comp.+TCSC	1,400	1,400	1,400
Ranchi –Sipat 400 kV D/c with series comp.	1,200	1,200	1,200
Rourkela-Raipur 400 kV D/c (2 <sup>nd</sup> ) with series comp.	1,400	1,400	1,400
Ranchi - Dharamjayagarh - WR Pooling Station 765kV S/c line	2,100	2,100	2,100
Ranchi - Dharamjayagarh 765kV 2nd S/c	2,100	2,100	2,100
Jharsuguda-Dharamjayagarh 765kV D/c line	4,200	4,200	4,200
Jharsuguda-Dharamjayagarh 765kV 2nd D/c line	4,200	4,200	4,200
Jharsuguda- Raipur 765kV D/c line	4,200	4,200	4,200
<b>Subtotal</b>	<b>21,190</b>	<b>21,190</b>	<b>21,190</b>
<b>EAST- SOUTH (ER-SR)</b>			
Balimela-Upper Sileru 220kV S/c	130	130	130
Gazuwaka HVDC back-to-back	1,000	1,000	1,000
Talcher-Kolar HVDC bipole	2,000	2,000	2,000
Upgradation of Talcher-Kolar HVDC Bipole	500	500	500
Angul - Srikakulum 765 KV D/C line	4,200	4,200	4,200
<b>Subtotal</b>	<b>7,830</b>	<b>7,830</b>	<b>7,830</b>
<b>EAST- NORTH EAST</b>			
Birpara-Salakati 220kV D/c	260	260	350 (After HTLS reconductoring)
Malda - Bongaigaon 400 kV D/c	1,000	1,000	1,600 (After HTLS reconductoring)
Siliguri - Bongaigaon 400 kV D/c (Quad) line	1,600	1,600	1,600
<b>Subtotal</b>	<b>2,860</b>	<b>2,860</b>	<b>3,550</b>
<b>Total</b>	<b>54410</b>	<b>54410</b>	<b>55100</b>

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J. ER Import/export capacity/capability:

	<b>ER Export (in MW)</b>	<b>ER Import (in MW)</b>
June 2020 ATC*	11905+WR	4,355+SR+WR
By 2021-22	54,410	48,910
By 2024-25	55,100	49,600

*\*No simultaneous Export or Import capability provided by NLDC.*

## Generators considered for anticipated generation in ER

STATE	FUEL TYPE	PROJECT NAME	Total Capacity	Capacity added till March, 2020	Capacity to be added during 2020-22(MW)	2022-25	SECTOR	DEVELOPER
Bihar	Coal	Barauni TPS Extn.	250	250			Central	BSEB
Bihar	Coal	Barh STPP-I	660		660		Central	NTPC
Bihar	Coal	Barh STPP-I	660		660		Central	NTPC
Bihar	Coal	Barh STPP-I	660		660		Central	NTPC
Bihar	Coal	Jas Infra. TPS	660				Private	JICPL
Bihar	Coal	Jas Infra. TPS	660				Private	JICPL
Bihar	Coal	Jas Infra. TPS	660				Private	JICPL
Bihar	Coal	Jas Infra. TPS	660				Private	JICPL
Bihar	Coal	Nabi Nagar TPP	250		250		Central	JV of NTPC & Rly.
Bihar	Coal	New Nabi Nagar TPP	660		660		State	JV of NTPC & BSPGCL
Bihar	Coal	New Nabi Nagar TPP	660	660			State	JV of NTPC & BSPGCL
Bihar	Coal	New Nabi Nagar TPP	660		660		State	JV of NTPC & BSPGCL
Bihar	Coal	Barauni TPS Extn.	250	250			Central	BSEB
Bihar	Coal	Muzaffarpur TPS	195	195			Central	NTPC
Bihar	Coal	Nabi Nagar TPP	250	250			Central	JV of NTPC & Rly.
Bihar	Coal	Nabi Nagar TPP	250	250			Central	JV of NTPC & Rly.
Bihar	Coal	Barh STPP II U-4	660	660			Central	NTPC
Bihar	Coal	Barh STPP II U-5	660	660			Central	NTPC
Bihar	Coal	Muzaffarpur TPS	195	195			Central	NTPC
Bihar	Coal	Nabi Nagar TPP	250	250			Central	JV of NTPC & Rly.
Bihar	Coal	Barauni TPS	210	210	-210		Central	NTPC
Bihar	Coal	Kahalgaon TPS	840	840			Central	NTPC
Bihar	Coal	Kahalgaon TPS	1500	1500			Central	NTPC
Bihar	Coal	Muzaffarpur TPS	220	220	-220		Central	NTPC & BIHAR
Bihar	Coal	Buxar TPP	1320			1320	Central	SJVNL
Jharkhand	Hydro	Maithon HPS (WB as per PDM)	63.2	63.2			Central	DVC
Jharkhand	Hydro	Panchet HPS	80	80			Central	DVC

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STATE	FUEL TYPE	PROJECT NAME	Total Capacity	Capacity added till March, 2020	Capacity to be added during 2020-22(MW)	2022-25	SECTOR	DEVELOPER
Jharkhand	Hydro	Subernrekha HPS	130	130			State	Jharkhand Urja Utpadan Nigam Ltd.
Jharkhand	Coal	Chandrapura (DVC) TPS	130	0			Central	DVC
Jharkhand	Coal	Chandrapura (DVC) TPS	260	0			Central	DVC
Jharkhand	Coal	Koderma TPS	500	500			Central	DVC
Jharkhand	Coal	Matrishri Usha TPP Ph-I	270				Private	Corporate Power Ltd.
Jharkhand	Coal	Matrishri Usha TPP Ph-I .	270				Private	Corporate Power Ltd.
Jharkhand	Coal	Matrishri Usha TPP Ph-I .	270				Private	Corporate Power Ltd.
Jharkhand	Coal	Matrishri Usha TPP Ph-I .	270				Private	Corporate Power Ltd.
Jharkhand	Coal	Tori TPP	1800				Private	Essar Power
Jharkhand	Coal	North Karanpura TPP	660		660		Central	NTPC
Jharkhand	Coal	North Karanpura TPP	660		660		Central	NTPC
Jharkhand	Coal	North Karanpura TPP	660			660	Central	NTPC
Jharkhand	Coal	Patratu TPS	315				State	
Jharkhand	Coal	Patratu TPS	455				State	
Jharkhand	Coal	Adhunik Power TPP U1,2	540	540			Private	APNRL
Jharkhand	Coal	Bokaro TPS "A"EXP U-1	500	500			Central	DVC
Jharkhand	Coal	Koderma TPP	500	500			Central	DVC
Jharkhand	Coal	Bokaro TPS B	630	210	-210		Central	DVC
Jharkhand	Coal	Chandrapura (DVC) TPS	500	500			Central	DVC
Jharkhand	Gas	Maithon GT(liq)	90				Central	DVC
Jharkhand	Coal	Jojobera TPS	240	240			Private	TATA POWER
Jharkhand	Coal	Maithon RB TPP	1050	1050			Private	MAITHON POWER LIMITED
Jharkhand	Coal	Tenughat TPS	420	420			State	
Jharkhand	Coal	Patratu TPS	2400			1600	Central	PVUNL (JV of NTPC & Govt. of Jharkhand)
Odisha	Coal	Ind Barath (Utkal) TPP U2	350			800	Private	Ind Barath

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STATE	FUEL TYPE	PROJECT NAME	Total Capacity	Capacity added till March, 2020	Capacity to be added during 2020-22(MW)	2022-25	SECTOR	DEVELOPER
Odisha	Hydro	Balimela HPS	510	510			State	
Odisha	Hydro	Hirakund HPS	275.5	275.5			State	
Odisha	Hydro	Chiplima HPS	72	72			State	
Odisha	Hydro	Machkund HPS	114.75	114.75			State	
Odisha	Hydro	Rengali HPS	250	250			State	
Odisha	Hydro	Upper Indravati HPS	600	600			State	
Odisha	Hydro	Upper Kolab HPS	320	320			State	
Odisha	Coal	Darlipalli STPP	800	800			Central	NTPC
Odisha	Coal	Darlipalli STPP	800		800		Central	NTPC
Odisha	Coal	Ib valley TPP	1320	1320			State	OPGCL
Odisha	Coal	KVK Nilanchal TPP	350				Private	KVK Nilanchal
Odisha	Coal	KVK Nilanchal TPP	700				Private	KVK Nilanchal
Odisha	Coal	Lanco Babandh TPP	660				Private	Lanco Babandh
Odisha	Coal	Lanco Babandh TPP	660				Private	LBP Ltd.
Odisha	Coal	Malibrahmani TPP	525				Private	MPCL
Odisha	Coal	Malibrahmani TPP	525				Private	MPCL
Odisha	Coal	Derang TPP	1200	1200			Private	JIPL
Odisha	Coal	Ind Barath (Utkal) TPP U1	350	350			Private	Ind Barath Power Ltd
Odisha	Coal	Kamalanga TPP	700	700			Private	GMR Energy
Odisha	Coal	Kamalanga TPP U-1	350	350			Private	GMR kamalanga Energy ltd
Odisha	Coal	Ib valley TPS	420	420			State	
Odisha	Coal	Sterlite TPP	1200	1200			Private	
Odisha	Coal	Talcher (old ) TPS	240	240	-240		Central	NTPC
Odisha	Coal	Talcher (old ) TPS	220	220	-220		Central	NTPC
Odisha	Coal	Talcher STPS	3000	3000			Central	NTPC
Odisha	Coal	Rourkela TPS Exp.	250		250		Central	JV of NTPC & SAIL
Sikkim	Hydro	Bhasmey	51			51	Private	Gati Infrastructure
Sikkim	Hydro	Dikchu	96	96			Private	Sneha Kinetic Power Projects Pvt. Ltd.
Sikkim	Hydro	Panan	300				Private	Madhya Bharat Power

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STATE	FUEL TYPE	PROJECT NAME	Total Capacity	Capacity added till March, 2020	Capacity to be added during 2020-22(MW)	2022-25	SECTOR	DEVELOPER
								Corporation Ltd.
Sikkim	Hydro	Rangit-II HPS	66			66	Private	SHPL
Sikkim	Hydro	Rangit-IV HPS	120				Private	Jal Power
Sikkim	Hydro	Rongnichu	96		96		Private	MBPCL
Sikkim	Hydro	Tashiding	97	97			Private	Shiga Energy Pvt. Ltd.
Sikkim	Hydro	Teesta- III	1200	1200			Private	Teesta Urja Ltd
Sikkim	Hydro	Teesta V HPS	510	510			Central	NHPC
Sikkim	Hydro	Teesta- VI	500			500	Central	NHPC/LANCO
Sikkim	Hydro	Chujachen HEP	110	110			Private	Gati Infrastructure Ltd.
Sikkim	Hydro	Jorethong Loop U-1,2	96	96			Private	DANS PVT. LTD
Sikkim	Hydro	Rangit HPS	60	60			Central	NHPC
West Bengal	Coal	DPL TPS	60				State	DURGAPUR PROJECTS LIMITED
West Bengal	Coal	DPL TPS	220				State	DURGAPUR PROJECTS LIMITED
West Bengal	Coal	DPL TPS	110				State	DURGAPUR PROJECTS LIMITED
West Bengal	Coal	India Power TPP	150	150			Private	Haldia Energy Ltd.
West Bengal	Coal	India Power TPP	150	150			Private	Haldia Energy Ltd.
West Bengal	Coal	India Power TPP	150				Private	Haldia Energy Ltd.
West Bengal	Coal	New Cossipore TPS	60				Private	
West Bengal	Coal	New Cossipore TPS	100				Private	
West Bengal	Coal	Sagardighi TPS-II	500	500			State	WBDCL
West Bengal	Coal	DPL TPP EXT.	250	250			State	DURGAPUR PROJECTS LTD.
West Bengal	Coal	DPL TPP EXT.	300	300			State	DURGAPUR PROJECTS LTD.

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STATE	FUEL TYPE	PROJECT NAME	Total Capacity	Capacity added till March, 2020	Capacity to be added during 2020-22(MW)	2022-25	SECTOR	DEVELOPER
West Bengal	Coal	Haldia TPP	600	600			Private	M/s Haldia Energy Limited
West Bengal	Coal	Raghunathpur TPP Ph-I	600	600			Central	DVC
West Bengal	Coal	Raghunathpur TPP, Ph-I	600	600			Central	DVC
West Bengal	Coal	Sagardighi TPP EXT	500	500			State	WBPDCCL
West Bengal	Hydro	Jaldhaka HPS ST-I	27	27			State	WBSEDCL
West Bengal	Hydro	Jaldhaka HPS ST-II	9	9			State	WBSEDCL
West Bengal	Hydro	Purulia PSS HPS	900	900			State	
West Bengal	Hydro	Rammam - III	120			120	Central	
West Bengal	Hydro	Rammam HPS	50	50			State	WEST BENGAL STATE ELECTRICITY DISTRIBUTION CO. LIMITED
West Bengal	Hydro	Teesta Low Dam-IV	40	40			Central	NHPC
West Bengal	Hydro	Teesta Low Dam-IV	40	40			Central	NHPC
West Bengal	Hydro	Teesta Low Dam-III HEP	99	99			Central	NHPC
West Bengal	Hydro	Teesta Low Dam-IV HEP	80	80			Central	NHPC
West Bengal	Coal	Durgapur TPS	130				Central	DVC
West Bengal	Coal	Durgapur TPS	210	210	-210		Central	DVC
West Bengal	Coal	Durgapur Steel TPS	1000	1000			Central	DVC
West Bengal	Coal	Mejia TPS	840	840			Central	DVC
West Bengal	Coal	Mejia TPS	500	500			Central	DVC
West Bengal	Coal	Mejia TPS	1000	1000			Central	DVC
West Bengal	Hydro	Teesta Low Dam-III HEP	33	33			Central	NHPC
West Bengal	Coal	Bakreswar TPS	1050	1050			State	
West Bengal	Coal	Bandel TPS	120	120	-120		State	
West Bengal	Coal	Bandel TPS	120				State	
West Bengal	Coal	Bandel TPS	210	210	-210		State	
West Bengal	Coal	Budge Budge TPS	750	750			Private	
West Bengal	Coal	Chinakpuri TPS	30				Private	



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STATE	FUEL TYPE	PROJECT NAME	Total Capacity	Capacity added till March, 2020	Capacity to be added during 2020-22(MW)	2022-25	SECTOR	DEVELOPER
West Bengal	Coal	Dishergarh TPP	12	12			Private	DISHERGARH POWER SUPPLY COMPANY LIMITED
West Bengal	Coal	Farakka STPS	600	600			Central	NTPC
West Bengal	Coal	Farakka STPS	1500	1500			Central	NTPC
West Bengal	Coal	Kolaghat TPS	1260	1260			State	
West Bengal	Coal	Sagardighi TPS	600	600			State	WBPDC
West Bengal	Coal	Santaldih TPS	480				State	WBPDC
West Bengal	Coal	Santaldih TPS	500	500			State	WBPDC
West Bengal	Coal	Southern REPL. TPS	135	135			Private	
West Bengal	Coal	Titagarh TPS	240	240	-240		Private	
West Bengal	Gas	Haldia GT (liq)	40	40			State	WBPDC
West Bengal	Gas	Kasba GT(liq)	40	40			State	WBPDC
West Bengal	Gas	Siliguri GPS	20	20			State	WBPDC

## ANNEXURE-VI

Operational constrains faced in Eastern Region by the system operator during Q1 of 2020-21 are given below:

## A. Transmission line constraints

Sl. No.	Transmission Element	Description of Constraints	Remedial Action
1	220 kV Patna-Sipara T/C	There are three 220 kV lines between Patna (POWERGRID) and Sipara (BSPTCL) S/s. Major loads of Patna are fed from 220 kV Sipara substation. The length of the line is extremely short (less than 500 m). Further, Sipara is connected with Khagaul as well as to Fatuah at 220 kV level and is partly feeding these loads also. This is leading to higher loading of 220 kV Patna-Sipara T/C and violation of N-1 security criteria constraint for most of the time.	<ol style="list-style-type: none"> <li>220 kV Patna PG-Khagaul 2 &amp; 3 circuit has been commissioned which has reduced the loading to some extent on these ckts.</li> <li>As these ckts are of very short length (only 400 meters (ckt 1&amp;2) &amp; 200 m (ckt-3 which is twin zebra)) Ckt-1 and 2 are recommended for uprating by reconductoring with HTLS conductor.</li> <li>BSPTCL has planned 400/220 kV Naubatpur, 400/220 kV Bakhtiyarpur, 400/220 kV Jakkanpur to ensure higher reliability by providing more in-feeds to the loads presently catered by Patna alone.</li> </ol>
2	220 kV Durgapur (PG) – Parulia (DVC) D/C	Parulia (Durgapur) is a major load center in DVC control area. Due to decommissioning of DVC units (at Bokaro-B and CTPS) and low generation from internal plants particularly at Mejia and Waria, the load of Parulia and nearby area is practically met through importing large quantum of power from Durgapur substation of PG through 220 kV Durgapur(PG)-Parulia(DVC) D/C. This resulted	<ol style="list-style-type: none"> <li>Reconductoring of 220 kV Durgapur(PG)-Parulia(DVC) D/C line with high capacity HTLS conductor or second 220 kV Durgapur(PG)-Parulia(DVC) D/C to be commissioned.</li> <li>Improve generation at Waria and Mejia.</li> <li>Planning and connecting the existing 400 kV generating stations of</li> </ol>

		<p>in very high loading of above line and even crossed the N-1 security limit. In addition, it is observed from studies as well as established through trial operation that these loading further increase with 400 kV bus split operation of Durgapur (PG) and third 400/220 kV ICT operation at Durgapur which has already been taken into service from June 2019.</p>	<p>DVC at suitable locations of the 220 kV STU network by constructing 400/220 kV substation at existing Mejia-B and DSTPS power stations.</p> <p><b>As per 7<sup>th</sup> State SCM decision:</b></p> <ol style="list-style-type: none"> <li>1. DVC informed that LILO of 220 kV Waria-Parulia(DVC) D/C at DSTPS would reduce the loading of 220 kV Durgapur (PG)-Parulia (DVC). The LILO would be completed within a year.</li> <li>2. Reducing the loading on 220 kV Waria-Bidhannagar(WB) D/C, whenever direction of power flow is towards Bidhannagar (one circuit had been kept open during split bus operation at 400 kv Durgapur): WBSETCL has planned installation of 400/220 kV 315 MVA 3<sup>rd</sup> ICT at Bidhan Nagar.</li> </ol> <p><b>As per 1<sup>st</sup> ERPC (Planning Committee) decision:</b></p> <ol style="list-style-type: none"> <li>1. Shifting of 400/220 kV, 315MVA ICT-1 from Durgapur-A section to Durgapur-B section has been agreed.</li> <li>2. Reconductoring of 220 kV Durgapur(PG)-Parulia D/C line with high capacity HTLS conductor or second 220 kV Durgapur-Parulia D/C has been proposed.</li> </ol>
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			Till implementation of the above measures Durgapur (PG) 400kV bus sections are being operated in integrated mode.
3	220 kV Maithon-Dhanbad D/C and 220 kV Maithon-Kalyaneshwari D/C	High loading of 220 kV Maithon-Dhanbad D/C and 220 kV Maithon-Kalyaneshwari D/C is observed due to  1. Less generation at CTPS 2. Low/ NIL generation at Bokaro-B 3. Less generation at Koderma	1. Improve generation at CTPS, Bokaro-B and Koderma. 2. Reconductoring of 220 kV Maithon-Dhanbad D/C and 220 kV Maithon-Kalyaneshwari D/C line with high capacity HTLS conductor.  DVC need to strengthen their 220 kV intra-state Network to satisfy the N-1 reliability.
4	220 kV Rajarhat-Newtown D/C and 220 kV Subhasgram-EMSS D/C	These lines are not N-1 compliant. In this qtr, 220 kV Shubhasgram-EMSS loading is low however it is more during the summer season.	1. Commissioning of Rajarhat (POWERGRID) – New Town AA2 220 kV D/c, Rajarhat (PGCIL) – Barasat/Jeerat 220 kV D/c and Subashgram (PGCIL) – Baraipur 220 kV D/c. 2. Load trimming scheme has been implemented on 220 kV Subhasgram-EMSS D/C..
5	220 kv Mujaffarpur (PG)-Hazipur D/C and 220 kv Hazipur-Amnour D/C	These lines are not N-1 compliant.	1. Commissioning of 400/220 kV Sitamarhi substation along with associated lines. In addition, 220 kV Amnour-Mujaffarpur D/C commissioning along with Proposed 220/132 kV Digha-Amnour connectivity will also result in better reliability. 2. A new 400/220/132 kV substation at Chapra (2 X 500 MVA+2 X 200 MVA) has been proposed. The 220 kV connectivity has been proposed at 220

			kV Chhapra(New)- Amnour D/C and 220 kV Chhapra(New)- Gopalganj D/C
6	220 kV Gaya-(PG) - Bodhgaya D/C	These lines are not N-1 compliant.	<b>BSPTCL</b> need to plan additional 220kV transmission system for taking care of the N-1 contingency of these circuits.  With commissioning of 400/220 kV substation at Chandauti by LILO of Gaya- NPGC 400kV D/C line at 400 kV Chandauti and shifting of some load from Bodhgaya to this new substation loading of this line is expected to be reduced.

**B. ICT constraints**

Sl. No.	Transmission Element	Description of Constraints	Remedial Action
1	400/220 kV 2 X 500 MVA ICTs at Maithon	220 kV side of 400 /220 kV substation at Maithon (PG) is connected with Dhanbad and Kalyaneswari S/stns of DVC and to Dumka S/Stn of JUSNL. As the generation of DVC thermal power plants connected at 220 kV level was low, DVC had to draw heavy power through Maithon ICT to meet these loads. Import by JUSNL through Maithon- Dumka D/C was also high. Thus (n-1) security got violated.	After the implementation of 400 kV bus-splitting arrangement at Maithon loading of ICTs has somewhat reduced. Further, a 3 <sup>rd</sup> 500 MVA, 400/220 kV ICT is already planned for installation at Maithon, under ERSS-XX scheme.
2	400/132 kV 2 X 200 MVA Motihari ICT	Motihari ICTs are feeding to loads of North Bihar as well as to Nepal through 132 kV Raxaul- Parwanipur circuits. Due to the increase in Load in North Bihar these ICTs do not satisfy N-1 Criteria.	1. Commissioning of 400/220 kV Sitamarhi Substation, 400 kV Darbhanga-Sitamari- Motihari D/C lines and associated 220 kV and 132kV transmission system within Bihar

			<p>would reduce the loading on the Motihari ICT.</p> <p>2. Expediting the 3rd 315 MVA 400/132 kV ICT which is already planned for Motihari</p> <p>3. Interim SPS has been implemented for Load trimming in the case of N-1 contingency.</p>
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**C. Under voltage constraints**

Sl. No.	Transmission Element	Description of Constraints	Remedial Action
1	Arambag	The voltage of Arambag fluctuates in the range 410-385 kV. The low voltage has been observed during peak hours of June (when load revival took place during unlock-1 phase of COVID-19 related lockdown) due to insufficient reactive power compensation at 220 kV and below levels.	In the 1st meeting of ERPCTP, WBSETCL informed that they have planned capacitor banks in various areas including 400 kV Arambag with 30 MVAR capacitor bank to be completed by 31st March 2020. West Bengal may update.

**D. Over voltage constraints:**

Sl. No.	Transmission Element	Description of Constraints	Remedial Action
1	400 kV Patna, NPGC	High voltage is observed during the off-peak hour due to lightly loaded condition of 400 kV Barh-Patna Q/C, 400 kV Patna-Balia Q/C lines, Patna-NPGC D/C. Power drawal by Bihar through 400/220 kV Patna ICTs reduces drastically whenever heavy rains or weather disturbances occur. This is also responsible for occurrence of high voltage	Barh units (2X660MW) to absorb reactive power up to capability limit and operation of NPGC units to its full planned capacity.

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2	400 kV Barh	High voltage is observed during the off-peak hour due to the lightly loaded condition of 400 kV Barh-Patna Q/C and 400 kV Patna-Balia Q/C lines	Barh units (2X660MW) to absorb reactive power up to capability limit
3	400 kV Binaguri,	High voltage at Binaguri occurs during low hydro generation in Sikkim and Bhutan. There are two long Qd Moose lines to Bongaigaon(NER) and four Qd. Moose lines to Alipurduar connected to Binaguri. Due to the extremely light loaded condition of the lines, high voltage was aggravated at Binaguri	One circuit of Binaguri-Alipurduar had to be opened as last resort
4	400 kV New PPSP	Light loading of 400kV NPPSP-Ranchi D/C and NPPSP-Arambag D/C lines, which are more than 200 km each and absence of PPSP units during part of the lean hours caused high voltage at New PPSP and other nearby stations.	Need of additional reactors at N. PPSP Or Purulia pump storage HPS. Presently one circuit of N. PPSP – Arambag 400 kV D/C line is being opened on daily basis to control voltage.
5	400 kV Maithon B	Lightly loaded condition of 400kV Gaya-Maithon Qd. Moose lines coupled with inadequate reactive power absorption by Mejia-B units caused high voltage at Maithon B	Additional reactive power planning may be considered at Maithon.
6	400 kV New Dubri	During lean hours Odisha's consumption at N. Duburi area falls to low values leading to an extremely underloaded condition of N. Duburi-Baripada and N. Duburi – Pandiabil 400kV lines	Addition of 125 MVAR shunt reactor at N. Duburi has already been planned by OPTCL
7	400 kV Koderma	Koderma TPS is connected to each of Gaya and Biharshariff through Qd. Moose D/C lines, besides to Bokaro-A TPS of DVC. During off-peak period the lines to Gaya and Biharshariff become extremely underloaded. DVC's own consumption through the 2X315 MVA 400/220 kV	Higher reactive power absorption by KTPS units during lean hours is necessary

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		ICTs at KTPS is also low. Further, inadequate reactive power absorption by the units, one of which is sometimes not in service, at Koderma aggravates high voltage conditions.	
8	400 kV Kharagpur, Kolaghat	Light loading of 400kV Kharagpur-Kolaghat D/C and 400kV Kharagpur – N. Chanditala D/C lines during lean hours and low generation at Kolaghat during COVID19 lockdown has caused high voltage at Kharagpur and Kolaghat and other nearby stations.	No Action as with gradual load restoration after COVID19 lockdown, high voltage occurrence has reduced.
9	400 kV DSTPS, Bokaro	Light loading of 400kV lines connected to DSTPS and Bokaro-A TPS with low generation at DSTPS and Bokaro during COVID19 lockdown has caused high voltage at DSTPS and Bokaro and other nearby stations.	No Action as with gradual load restoration after COVID19 lockdown, high voltage occurrence has reduced.
10	400 kV Jeypore	Light loading of lines connected to Jeypore together with low hydro generation in S. Odisha in off-peak during COVID19 lockdown caused high voltage at Jeypore on some occasion.	No Action as with gradual load restoration after COVID19 lockdown, high voltage occurrence has reduced.

**Note:** Percentage High Voltage of these above nodes is calculated based on SCADA data.



## ANNEXURE-VII

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

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Updated Completion Schedule
<b>A</b>	<b>Existing Substations:</b>			
	<b>To be implemented by WBSETCL:</b>			
<b>A1</b>	<b>Rajarhat</b>	<b>400/220kV</b>		
i)	Rajarhat (POWERGRID) – New Town AA3	220kV D/c	Commissioned	
ii)	Rajarhat (POWERGRID) – New Town AA2	220kV D/c	--	Dec'21
iii)	Rajarhat (POWERGRID) – Barasat/Jeerat	220kV D/c	--	Dec'21
<b>A2</b>	<b>Subashgram</b>	<b>400/220kV</b>		
i)	Subashgram (POWERGRID) – Baraipur	220kV D/c	--	Dec'20
	<b>To be implemented by OPTCL:</b>			
<b>A3</b>	<b>Pandiabil</b>	<b>400/220kV</b>		
i)	Pratapsasan (OPTCL) – Pandiabil (POWERGRID)	220kV D/c		March'21
<b>A4</b>	<b>Bolangir</b>	<b>400/220kV</b>		
i)	LILO of one ckt of Sadeipalli – Kesinga 220kV D/c at Bolangir	220kV		June'21
<b>A5</b>	<b>Keonjhar</b>	<b>400/220kV</b>		
i)	Keonjhar (POWERGRID) – Turumunga (OPTCL)	220kV D/c		June'21
	<b>To be implemented by JUSNL:</b>			
<b>A6</b>	<b>Daltonganj</b>	<b>400/220/132kV</b>		

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<b>Sl. No.</b>	<b>Substation/Location</b>	<b>Transformation Capacity/ Element</b>	<b>Date of Award</b>	<b>Updated Completion Schedule</b>
i)	Daltonganj (POWERGRID) – Latehar	220kV D/c		Dec,21
ii)	Daltonganj (POWERGRID) – Garhwa	220kV D/c		Dec,21
iii)	Daltonganj (POWERGRID) – Chatarpur	132kV D/c		Dec,21
<b>A7</b>	<b>Chaibasa</b>	<b>400/220kV</b>		
i)	Chaibasa (POWERGRID) – Jadugoda (JUSNL)	220kV D/c		No update
<b>B</b>	<b>Under Construction Substations:</b>			
<b>B1</b>	<b>Sitamarhi</b>	<b>400/220/132kV</b>		expected by Jan 2021
i)	Sitamarhi (New) – Motipur (BSPTCL)	220kV D/c		Oct, 2020
ii)	Sitamarhi (New) – Raxaul (New)	220kV D/c (Twin Moose)		Jan, 2021
iii)	Sitamarhi (New) – Runni Saidpur	132kV D/c		Oct, 2020
iv)	LILO of Benipatti – Pupri 132kV S/c at Sitamarhi (New)	132kV S/c		Mar, 2021
<b>B2</b>	<b>Saharsa</b>	<b>400/220/132kV</b>		expected by Mar 2021
i)	Saharsa (New) – Khagaria	220kV D/c		Mar, 2021
ii)	Saharsa (New) – Begusarai	220kV D/c		Mar, 2021
iii)	Saharsa (New) – Saharsa 132kV D/c line formed by LILO of Saharsa – Banmankhi and Saharsa – Uda	132kV D/c		Dec, 2020

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<b>Sl. No.</b>	<b>Substation/Location</b>	<b>Transformation Capacity/ Element</b>	<b>Date of Award</b>	<b>Updated Completion Schedule</b>
	Kishanganj 132kV S/c lines			
<b>B3</b>	<b>Chandauti</b>	<b>400/220/132kV</b>		<b>Expected by Mar 2021</b>
i)	LILO of Gaya (POWERGRID) – Sonenagar 220kV D/c at Chandauti (New)	220kV D/c		Dec, 2020
ii)	LILO of Chandauti (BSPTCL) – Rafiganj 132kV S/c at Chandauti (New)	132kV S/c		Dec, 2020
iii)	LILO of Chandauti (BSPTCL) – Sonenagar 132kV S/c at Chandauti (New)	132kV S/c		Dec, 2020
<b>B4</b>	<b>Dhanbad</b>	<b>400/220kV</b>		<b>expected by Oct 2020</b>
i)	LILO of the 220 kV Tenughat – Govindpur D/c line at Jainamore and at Dhanbad.	220kV	(Approval expected in next budget)	2024-25

## ANNEXURE-VIII

Status of 400kV substations being implemented by STUs in ER under intra-state schemes

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
<b>A</b>	<b><u>Bihar (to be implemented by BSPTCL/BGCL)</u></b>			
<b>I</b>	<b>Naubatpur GIS</b>	<b>400/220/132/33kV, 2x500MVA + 2x160MVA + 2x80MVA</b>	<b>26.04.2018</b>	
a)	Naubatpur	2x500 MVA +2x160 MVA+2x80 MVA 400/220/132 kV S/S		31.03.2021
b)	LILO of circuits 3 & 4 of Patna (PG)-Balua 400 kV D/c (Quad) line at Naubatpur 400 kV 2x D/C	400 kV 2x D/C		March'21
c)	LILO of both circuits of Ara (PG) – Khagaul (BSPTCL) line at Naubatpur (New) 220 kV 2xD/C	220 kV 2xD/C		March'21
d)	Naubatpur (New)-Bihta (BSPTCL)	220kV D/c		March'21
e)	Naubatpur (New)-Bhusaula (New)	220kV D/c		March'21
f)	Naubatpur (New)- Paliganj	132kV D/c		May'21
g)	Naubatpur (New)- Masaurhi (existing)	132kV D/c		March'21
<b>II</b>	<b>Bakhtiyarpur GIS:</b>	<b>400/220/132kV, 2x500MVA + 2x160MVA</b>	<b>26.11.2019</b>	
a)	Bakhtiyarpur	2x500 MVA +2x160 MVA 400/220/132 kV GIS S/S		December 2021.
b)	LILO of both circuits of Barh – Patna (PG) 400kV D/c (Quad) line-1 at Bakhtiyarpur 400 kV 2xD/C	400kV 2xD/c		31.03.2021.

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c)	Bakhtiyarpur (New) - Sheikhpara (New)	220 kV D/C		31.03.2021.
d)	Bakhtiyarpur (New) - Hathidah (New)	220 kV D/C		31.03.2021.
e)	Bakhtiyarpur (New) - Fatuha (BSPTCL)	220 kV D/C		31.03.2021.
f)	Bakhtiyarpur (New) - Harnaut (BSPTCL)	132 kV D/C		31.12.2020.
g)	Bakhtiyarpur (New) - Baripahari (BSPTCL)	132 kV D/C		31.12.2020.
h)	LILO of 132 kV S/C Line Baripahari – Harnaut at Bakhtiyarpur	132kV S/c		31.12.2020.
<b>III</b>	<b>Jakkanpur GIS</b>	<b>400/220/132/33kV, 2x500MVA + 3x160MVA + 4x80MVA</b>	<b>26.04.2018</b>	
a)	Jakkanpur	2x500 MVA +3x160 MVA+3x80 MVA 400/220/132/33 kV GIS S/S		31.01.2021.
b)	LILO of both circuits of Nabinagar-II – Patna (PG) 400kV D/c at Jakkanpur 400 kV 2xD/C	400 kV 2xD/C		Jan 2021.
c)	LILO of both circuits of Sipara (BSPTCL)-Bihta (BSPTCL) line at Jakkanpur (new) 2x220 kV D/C	2x220 kV D/C		March 2021.
d)	LILO of Khagaul (BSPTCL) - Sipara (BSPTCL) 220 kV S/C line at Jakkanpur (New) 220 kV D/C	220 kV D/C		Jan 2021.
e)	LILO of both circuits of Jakkanpur-Sipara line at Jakkanpur New (being reconducted with HTLS by BSPTCL) 2x132 kV D/C	2x132 kV D/C		March 2021.
f)	LILO of 132 KV S/C Jakkanpur/Mithapur-Fatuha			

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	line at Jakkanpur New (being re-conducted with HTLS by BSPTCL) 132 kV D/C	132kV S/c		Jan 2021
IV	<b>Chhapra (New):</b>			
	Establishment of 2x500 MVA +2x200 MVA 400/220/132/kV GSS S/S at Chhapra	400/220/132/kV	Scheme under consideration at Bihar Government	2021-22
	LILO of 400 kV Barh (NTPC) - Motihari (DMTCL) D/C (Quad) transmission line at Chhapra (about 40 km)	400 kV		
	220 kV Chhapra (New) - Gopalganj DCDS (about 100 km)	220 kV		
	220 kV Chhapra(New) - Amnour DCDS (about 25 km)	220 kV		
	132 kV Chhapra(New) - Maharajganj DCDS (about 45 km)	132 kV		
	132 kV Chhapra(New) - Raghunathpur DCDS (about 80 km)	132 kV		
<b>B</b>	<b><u>Odisha (to be implemented by OPTCL)</u></b>			
a)	Meramundali-B:	400/220kV, 2x500MVA		Mar'21
b)	Narendrapur (New):	400/220kV, 2x500MVA		Dec'23
c)	Khuntuni:	400/220kV, 2x500MVA		Mar'23
d)	Bhadrak:	400/220kV, 2x500MVA		June'23
e)	Paradeep:	400/220kV, 2x500MVA		Oct'23

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f)	<b>Begunia:</b> 765/400kV, 2x1500MVA along with Angul-Begunia 765kV D/c line and LILO of Pandiabil – Narendrapur 400kV D/c line at Begunia – Land Acquisition problem.	765/400kV, 2x1500MVA		Expected by 2024-25.
g)	Narendrapur – Therubali – Jeypore 400kV D/c line along with 400kV switching station at <b>Therubali</b> and 420kV, 1x125MVA r bus reactor	400kV D/c		Dec'23
<b>C</b>	<b><u>Jharkhand (to be implemented by JUSNL)</u></b>			
a)	Jasidih:	400/220kV, 2x500MVA	RFQ/RFP will be floated after approval of the transmission scheme by JSERC	2024-25
b)	Chandil (New):	400/220kV, 2x500MVA		
c)	Koderma:	400/220kV, 2x500MVA		
d)	Mander:	400/220kV, 2x500MVA		
e)	Dumka (New):	400/220kV, 2x500MVA		
<b>D</b>	<b><u>West Bengal (to be implemented by WBSETCL)</u></b>			
a)	Laxmikantpur GIS	400/132kV, 2x315MVA		Aug'22