सेंट्रल ट्रांसमिशन यूटिलिटी ऑफ इंडिया लिमिटेड

(पावर ग्रिड कॉर्पोरेशन ऑफ इंडिया लिमिटेड के स्वामित्व में)

(भारत सरकार का उद्यम)

CENTRAL TRANSMISSION UTILITY OF INDIA LTD.

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

(A Government of India Enterprise)

संदर्भ/Ref: CTU/E/00/6th CMETS-ER

दिनांक/Date: 25-05-2022

वितरण सूची के अनुसार/ As per Distribution List

विषय/ Subject: पूर्वी क्षेत्र में पारेषण योजनाओं के विकास के लिए 6वी परामर्श बैठक के कार्यवृत्त (सीएमईटीएस-ईआर) / Minutes of 6th Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER)

महोदय/महोदया/ Sir/ Ma'am,

पूर्वी क्षेत्र में पारेषण योजनाओं के विकास के लिए **6वी** परामर्श बैठक **29th अप्रैल, 2022** को वीडियो कॉन्फ्रेंस के माध्यम से आयोजित की गई थी। इस संबंध में बैठक के कार्यवृत्त संलग्न है। यही CTUIL की वेबसाइट (*www.ctuil.in >> ISTS Planning and Coordination >> Consultation Meeting for ISTS >> Eastern Region*) पर भी उपलब्ध है।

The 6th Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER) was held on **29th April, 2022** through video conferencing. In this regard, please find enclosed minutes of the meeting. The same is available on CTUIL website (*www.ctuil.in >> ISTS Planning and Coordination >> Consultation Meeting for ISTS >> Eastern Region*)

धन्यवाद/ Thanking you,

भवदीय / Yours faithfully,

राजेश कुमार 25/05/2022

(राजेश कुमार) / (Rajesh Kumar)

महाप्रबंधक/ General Manager

A. वितरण सूची / Distribution List:

1.	**Chief Engineer (PSP&A-II)** Central Electricity Authority Sewa Bhawan, R.K.Puram New Delhi-110066	**2.**	**Director (SO)** Power System Operation Corporation Ltd. 9th Floor, IFCI Towers, 61, Nehru Place, New Delhi-110 016
3.	**Member Secretary** Eastern Regional Power Committee 14, Golf Club Road, Tollygunge Kolkata-700033	**4.**	**Executive Director** Eastern Regional Load Despatch Centre 14, Golf Club Road, Jubilee Park, Golf Gardens, Tollygunge, Kolkata, West Bengal - 700095
5.	**CMD** Damodar Valley Corporation DVC Towers, VIP Road Kolkata-700054	**6.**	**CMD** Odisha Power Transmission Corporation Ltd. (OPTCL) Bhoinagar Post Office, Jan path Bhubaneshwar-751022
7.	**CMD** Bihar State Power Transmission Company Ltd. (BSPTCL) Vidyut Bhavan, 4th floor, Bailey Road Patna-800021	**8.**	**CMD** Jharkhand Urja Sancharan Nigam Limited (JUSNL) Engineering Building, HEC, Dhurwa Ranchi -834004
9.	**Principal Chief Engineer cum Secretary** Power Department Government of Sikkim Gangtok, Sikkim	**10.**	**Managing Director** West Bengal State Electricity Transmission Company Ltd. (WBSETCL) Vidyut Bhavan, 8th Floor, A-Block Salt Lake City, Kolkata-700091

B. विशेष आमंत्रित / Special invitee:

Director (Projects)
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Minutes of 6th Consultation Meeting for Evolving Transmission Schemes in Eastern Region (CMETS-ER)

GM (CTU) welcomed the participants in the meeting. List of the participants is enclosed at **Annexure-I.**

BSPTCL and OPTCL gave a presentation (copy enclosed at **Annexure-IV and Annexure-V**) regarding the future load generation of Bihar grid and Odisha grid respectively. Further, details regarding upcoming strengthening in their respective state grid in order to meet future demand was also presented. Expected timeline of commissioning of under construction intra-state schemes was also updated by the state.

All the stakeholders appreciated the initiative of sharing of future plan details of ISTS and intra-state schemes in CMETS as the same shall help in better transmission system planning due to availability of updated data and coordination among states, CTU, ERPC, ERLDC & other stakeholders. It was agreed that this shall be a continuous practice. Accordingly, it was agreed that JUSNL would present regarding load-generation balance and upcoming intra-state schemes of Jharkhand for 2026-27 time-frame in the next CMETS-ER.

Agenda wise deliberations and decisions are given below:

1. Confirmation of minutes of the previous meeting

CTU informed that the minutes of the 5th meeting of CMETS-ER held on 30-03-2022 were issued vide letter dated 22-04-2022. As no comments have been received, the minutes were confirmed as circulated.

A. Application related matters in Eastern Region (ER)

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

B. ISTS expansion schemes in Eastern Region

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

2.1. CTU mentioned that DVC has informed following in regard to the subject proposal:

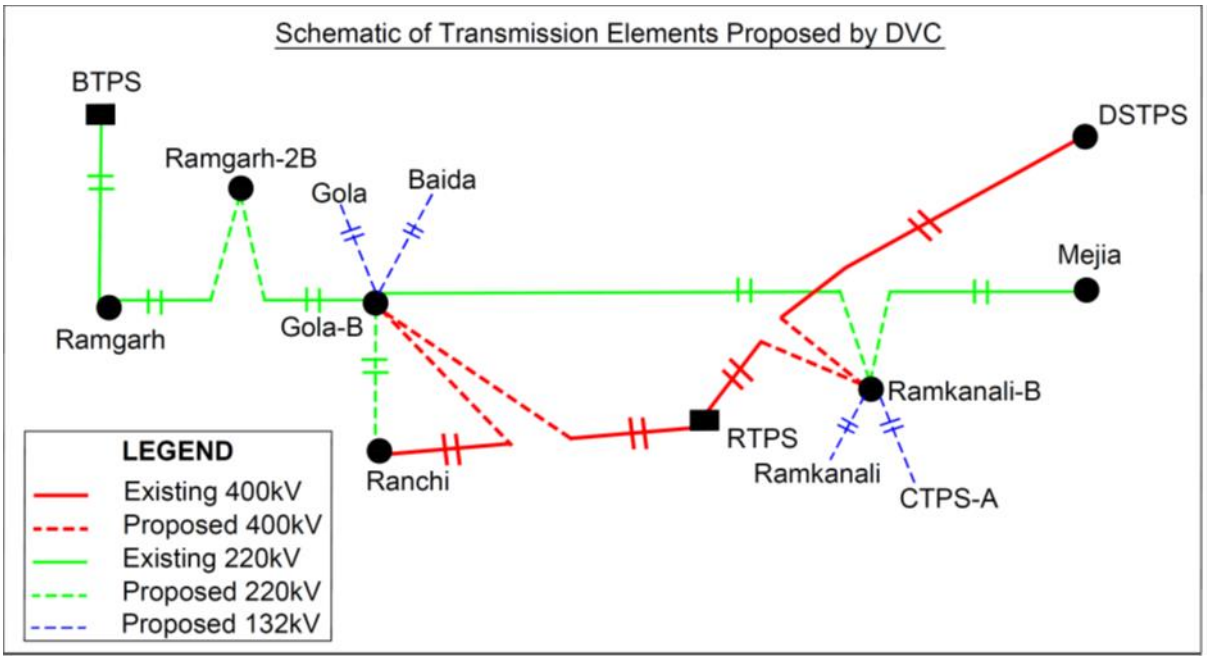
i) The studies have been carried out for 2026-27 timeframe. DVC has informed that the peak load is expected to increase to about 5700MW by this time-frame. Further, 4x210MW generation at Mejia and 1x210MW generation at Waria, which are connected at 220kV level are expected to be decommissioned in phased manner in next 4-5 years. To compensate for the decommissioning of these generations and to feed the increasing load, DVC is planning to augment 2x660MW generation capacity at Raghunathpur TPS. The old generation units of DVC were connected at 220kV and 132kV level, however, the new units at Bokaro, DSTPS, Mejia and Raghunathpur having unit sizes of 500MW and more capacity are

connected at 400kV level. With phased decommissioning of older generation units connected at 220kV and 132kV level, new transformation capacity needs to be created at 400kV level so as transfer power to 220kV and 132kV level from 400kV.

ii) In view of the above, DVC has proposed establishment of 2 nos. of new 400kV substations viz. Gola-B and Ramkanali-B as the new generations are coming up at 400kV whereas old generations are retiring at 220kV. Further, strengthening at 220kV and 132kV at various places have also been proposed. Two new 220kV substations, one each at Ramgarh-2B and Panagarh have also been proposed to meet growing demands in these areas.

2.2. CTU mentioned that a Comprehensive Studies for transmission system strengthening have been carried out for 2026-27 timeframe on All India file including all the ISTS and In-STS systems. The study results were discussed in the joint study meeting held on 22-04-2022 among CTU, ERPC, ERLDC, DVC and OPTCL, wherein the schemes involving connection with existing ISTS were in principally agreed. For further detailed deliberation on other schemes at 220kV and 132kV level, it was decided that the same would be taken up by DVC at ERPC level.

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



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

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

(i) Bokaro TPS: 2x315MVA ICTs to be replaced with 2x500MW. Replaced ICTs would be shifted to Mejia (2nd ICT) and RTPS / Ramkanali-B (3rd ICT).

(ii) Durgapur STPS: 2x315MVA ICTs to be replaced with 2x500MW. Replaced ICTs would be shifted to Ramkanali-B (1st and 2nd ICT) for its establishment.

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

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

(i) 400kV: 63kA

(ii) 220kV: 50kA

(iii) 132kV: 40kA or higher

(d) All ACSR lines may be implemented with maximum conductor temperature of 85°C or more, considering ambient temperature of 45°C.

(e) Establishment of Gola-B 400/220/132kV S/s:

(i) 400/220kV, 2x500MVA + 220/132kV, 2x200MVA

(ii) LILO of Raghunathpur TPS – Ranchi 400kV D/c line at Gola-B

(iii) LILO of Ramgarh-2B (newly proposed) – Ranchi 220kV S/c line (presently Ramgarh – Ranchi line) at Gola-B

(iv) LILO of Ramkanali-B (newly proposed) – Ramgarh-2B 220kV S/c line (presently MTPS – Ramgarh line) at Gola-B

(v) LILO of Ranchi – Ramkanali-B (newly proposed) 220kV S/c line (presently Ranchi – MTPS line) at Gola-B

(vi) LILO of CTPS – Gola 132kV D/c line at Gola-B

(vii) 420kV, 2x125MVAr bus reactor

(viii) Adequate space for future expansion at 400kV, 220kV and 132kV levels including space for installation of new ICTs, bus/line reactors, and lines.

(f) Establishment of Ramkanali-B 400/220/132kV S/s:

(i) 400/220kV, 2x315MVA (shifted from DSTPS) + 220/132kV, 3x200MVA (3rd 220/132kV ICT may be installed progressively with load growth)

(ii) LILO of Durgapur STPS – Raghunathpur TPS 400kV D/c line at Ramkanali-B

(iii) LILO of MTPS – Gola-B (newly proposed) 220kV S/c line (presently MTPS – Ranchi line) at Ramkanali-B

(iv) LILO of MTPS – Gola-B (newly proposed) 220kV S/c line (presently MTPS – Ramgarh line) at Ramkanali-B

(v) LILO of Ramkanali – CTPS 132kV D/c line at Ramkanali-B

(vi) 420kV, 2x125MVAr bus reactor

(vii) Adequate space for future expansion at 400kV, 220kV and 132kV levels including space for installation of new ICTs, bus/line reactors, and lines.

(g) A new 220kV substation may be planned in Putki/Patherdih/adjoining area with 220kV D/c line from ISTS substation at Dhanbad in order to provide additional feed apart from 132kV feed from CTPS. This shall improve reliability of power supply in the area.

(h) Depending upon load growth, reconductoring of Ramgarh-2B – Gola-B 220kV D/c line may be taken up in future.

(i) Under N-1-1 of Raghunathpur TPS – Ramkanali-B 400kV D/c line, Raghunathpur TPS – Maithon 400kV line was found to be critically loaded. Depending upon progressive commissioning of new units at Raghunathpur TPS and loading on lines emanating from Raghunathpur TPS, suitable protection scheme as per requirement may be planned in future.

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

2.5. After detailed deliberations, DVC agreed to incorporate all of the suggestions at Para 2.4 above. It was also confirmed by DVC that they will keep adequate space at all new substations for installation of additional ICTs, lines, reactors etc.

2.6. JUSNL stated that the peak demand proposed by DVC at Ramgarh/Gola and nearby areas are on higher side and JUSNL is also supplying power to these areas. This would lead to duplication of transmission system in these areas by DVC and JUSNL as both entities are supplying to customers. DVC stated that the demand projections have been made keeping in view the load growth of existing customers as well as load growth due to addition of new anticipated customers in the DVC distribution system. After discussion, it was decided that the transmission system mentioned above has been planned keeping in view the load growth projections by DVC. If JUSNL feels that they would also experience load growth in these areas for their consumers, and they require interconnection with ISTS grid in these areas, they may also send their proposal to CTU for studies.

2.7. After detailed deliberation the works mentioned at Para 2.4 above including LILO of existing ISTS lines viz. LILO of Raghunathpur TPS – Ranchi 400kV D/c line at Gola-B and LILO of Durgapur STPS – Raghunathpur TPS 400kV D/c line at Ramkanali-B were agreed to be implemented by DVC.

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

3.1. CTU informed that the in the 5th CMETS-ER held on 30-03-2022, LILO of Rourkela (POWERGRID) – Talcher (NTPC) 400kV D/c line at proposed Joda New substation of OPTCL was discussed to feed the upcoming industrial load

in Joda and nearby areas. The matter was referred to joint study considering the observations of ERLDC and DVC.

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

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

(i) Base case

(ii) Outage of both poles of Talchar – Kolar HVDC link

(iii) Outage of 4 units of Talcher (6x500MW)

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

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

(d) Joda – Jindal 220kV S/c line was observed to be critically loaded under off-peak load condition with outage of Talcher – Kolar HVDC Bipole. Accordingly, it was agreed to reconductor this line.

3.3. In view the above, following system was agreed in the joint study for establishment of Joda New substation and necessary augmentation in ISTS:

(i) <u>Under Intra-state by OPTCL</u>

a) Establishment of 400/220kV, 3x500MVA Joda New S/s: ICTs to be installed progressively with demand growth

b) LILO of Rourkela (POWERGRID) – Talcher (NTPC) 400kV D/c line at Joda New

c) 400kV, 2x125MVAr bus reactor at Joda New

d) Adequate space for future expansion at 400kV, 220kV and 132kV levels including space for installation of new ICTs, bus/line reactors, and lines.

e) Reconductoring of Joda (OPTCL) – Jindal 220kV S/c line with Single HTLS of 1179A (at 120°C – ACCC Drake) along with necessary upgradation in bay equipment at both ends.

(ii) Under ISTS

a) Reconductoring of Jharsuguda – Rourkela 400kV 2xD/c Twin Moose line with Twin HTLS conductor (with ampacity Single HTLS as 1600A at nominal voltage)

b) Necessary bay upgradation at Jharsuguda and Rourkela end for all the above 4 lines matching with the rating of reconductored line.

3.4. ERLDC suggested to reconductor TSTPP – Talcher 220kV S/c line in view of critical power flow observed during contingency of Talcher-Kolar HVDC Bipole. CTU stated that the loading on TSTPP – Talcher 220kV S/c line can be controlled by changing the despatch of Talcher generation at 220kV level. After detailed discussion with SLDC Odisha, ERLDC and OPTCL, it emerged that reconductoring of TSTPP – Talcher 220kV S/c line is not required and critical loading can be managed by changing the despatch of Talcher generation at 220kV level. Even then, if critical loading is observed the line could be tripped on over loading, and it was observed that the same would not have any adverse effect in meeting the power requirement of the area.

3.5. With regard to reconductoring of Jharsuguda – Rourkela 400kV 2xD/c Twin Moose line with Twin HTLS conductor, the proposal was in-principally agreed. It was further decided that rating of HTLS that can be used for reconductoring and necessity of upgradation of associated bay equipment may be confirmed from POWERGRID. Therefore it was decided that, based on inputs from POWERGRID the final scope of works with regard to reconductoring of Jharsuguda – Rourkela 400kV 2xD/c Twin Moose line may be brought out in agenda of the next meeting.

3.6. After detailed deliberation, following was agreed:

(a) Under Intra-state by OPTCL

a) Establishment of 400/220kV, 3x500MVA Joda New S/s (3rd ICT to be installed progressively with demand growth)

b) LILO of existing ISTS Rourkela (POWERGRID) – Talcher (NTPC) 400kV D/c line at Joda New by OPTCL

c) 400kV, 2x125MVAr bus reactor at Joda New

d) Adequate space for future expansion at 400kV, 220kV and 132kV levels including space for installation of new ICTs, bus/line reactors, and lines.

e) Reconductoring of Joda (OPTCL) – Jindal 220kV S/c line with Single HTLS of 1179A (at 120°C – ACCC Drake) along with necessary upgradation in bay equipment at both ends.

(b) Implementation of ISTS scheme viz. Reconductoring of Jharsuguda – Rourkela 400kV 2xD/c Twin Moose line with Twin HTLS conductor along with necessary bay upgradations at Jharsuguda and Rourkela ends for all of the above four lines matching with the rating of reconductored line. Exact scope of works to be finalised in the next meeting, after inputs from POWERGRID.

4. Requirement of 420kV, 2x50MVAr (two banks of 3x16.67MVAr 1-Ph units) switchable line reactor installed at Biharsharif end in Biharsharif – Lakhisarai 400kV ckt-2 and Biharsharif – Sasaram ckt-1 – Agenda by POWERGRID

4.1. CTU informed that POWERGRID vide in its letter dated 31-03-2021 has informed that after serving the transmission system for about 32 years, the line reactors are giving frequent trouble in O&M and the service support is also not easily available since the design has now become obsolete. Accordingly, it is proposed by POWERGRID to decommission the said 50MVAr single phase switchable line reactors installed in Biharsharif – Sasaram ckt-1 and other 50MVAr installed in Biharsharif – Lakhisarai ckt-2.

4.2. After detailed study, CTU informed that Biharsharif – Lakhisarai 400kV line is 89km with 50MVAr line reactor at Biharsharif end. Biharsharif – Sasaram 400kV line is 210km with 63MVAr line reactor at Sasaram end and 50MVAr line reactor at Biharsharif end. Charging studies have been carried out without 50MVAr line reactors at Biharsharif end in both of the lines. The study results are given in the table below.

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

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

4.3. CTU also mentioned that as per data from ERDLC, during winter season the voltage at Biharsharif reached upto 422kV. Biharsharif substation is being operated in split mode from Mar 2021 onwards. Section-A comprises of 80MVAr bus reactor and Section-B comprises of 50MVAr+2x125MVAr bus reactors. POWERGRID has informed that space is available for installation of new 125MVAr bus reactor at Section-A side. It was informed that as per the study, with switching of 125MVAr bus reactor at Biharsharif Section-A, the bus voltage changes by about 2kV. Therefore, CTU proposed to be install new 420kV, 125MVAr bus reactor along with associated bay in the Section-A of Biharsharif substation in order to limit voltage rise and also to meet contingency of only one 80MVAr bus reactor in that section.

4.4. After detailed deliberation, following was agreed:

(a) As long as the 50MVAr line reactors are serviceable in the Biharsharif – Sasaram ckt-1 and Biharsharif – Lakhisarai ckt-2, the same may be operated and thereafter new line reactors are not required at Biharsharif end in these lines.

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

- Installation of 420kV, 1x125MVAr bus reactor along with associated bay at Biharsharif (POWERGRID) S/s in the bus section having 1x80MVAr existing bus reactor

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

5.1. CTU informed that numbers of ISTS sub-stations have been commissioned and some are under construction for which the downstream system is being implemented by the STUs.

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

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

6.1. CTU informed that various 400kV substations have been approved in the intra-state strengthening schemes in ER having interconnection with ISTS grid involving LILO of ISTS lines or direct connection to ISTS substations.

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

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Annexure-I

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

Sl. No.	Name	Designation	Organization	Email id
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Sl. No.	Name	Designation	Organization	Email id
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23.	Sh. R L Panda	Director (Projects)	OPTCL	
24.	Sh. Ajit Kumar Bhagat	Sr Manager	JUSNL	cetjusnl@gmail.com
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Annexure-II

Status of Downstream Transmission Network in ER

Sl. No.	ISTS S/s	State	Voltage ratio, Trans. Cap	Downstream Voltage level (kV)	Unutilised bays	Status of ISTS bay	STU lines for unutilised bays	Status of Lines	
								Date of Award	Completion schedule
1.	Chaibasa	Jharkhand	400/220kV, 2x315MVA	220	2	Existing bay	Chaibasa (POWERGRID) – Jadugoda (JUSNL) 220kV D/c		Will be taken up in future. No firm plan as of now.
2.	Daltonganj	Jharkhand	400/220/132kV, 2x315MVA+ 2x160MVA	132	2	Existing bay	Daltonganj (POWERGRID) – Chatarpur 132kV D/c	22-10-2019	Expected by 31-03-2023.
3.	Dhanbad	Jharkhand	400/220kV	220	4	Existing bay	LILO of 1st circuit of 220kV Dumka – Govindpur D/c line at Dhanbad (23km)	Bid has been opened.	Dec 2023
							LILO of 2nd circuit of 220kV Dumka – Govindpur D/c line at Dhanbad	Survey and estimation are being taken up. Thereafter, funding will be tied up.	
4.	Bolangir	Odisha	400/220kV, 2x315MVA	220	2	Existing bay	LILO of one ckt. of Sadeipalli – Kesinga 220kV D/c at Bolangir		Charged on 5th Mar'22.
5.	Keonjhar	Odisha	400/220kV, 2x315MVA	220	2	Existing bay	Keonjhar (POWERGRID) – Turumunga (OPTCL) 220kV D/c		Expected by Dec'22.
6.	Pandiabil	Odisha	400/220kV, 2x500MVA	220	2	Existing bay	Pratapsasan (OPTCL) – Pandiabil (POWERGRID) 220kV D/c		Expected by 1st week of may'22.
7.	Subashgram	West Bengal	400/220kV, 3x315MVA	220	2	Existing bay	Subashgram (POWERGRID) – Baraipur 220kV D/c line		Testing is going on. Expected by 10th may'22.
8.	Rajarhat	West Bengal	400/220kV, 2x500MVA	220	4	Existing bay	Rajarhat (POWERGRID) – New Town AA2C 220kV D/c		Severe ROW (12km) in cable laying. Expected by Oct 2022.
							Rajarhat (POWERGRID) – Barasat/Jeerat 220kV D/c		Charged from Barasat end
9.	Sitamarhi (New)	Bihar	400/220/132kV, 2x500MVA + 2x200MVA	132	2	Existing bay	LILO of Benipatti - Pupri 132kV S/c at Sitamarhi (New)		Expected by june'22.

Sl. No.	ISTS S/s	State	Voltage ratio, Trans. Cap	Downstream Voltage level (kV)	Unuti-lised bays	Status of ISTS bay	STU lines for unutilised bays	Status of Lines	
								Date of Award	Completion schedule
10.	Saharsa (New)	Bihar	400/220/132kV, 2x500MVA + 2x200MVA	220	4	Existing bay	Saharsa (New) - Khagaria 220kV D/c line		Charged on 11th april'22
							Saharsa (New) - Begusarai 220kV D/c line		Expected by May'22.
				132	2-ISTS (addln.4 by state)		Saharsa (New) - Saharsa 132kV D/c line formed by LILO of Saharsa - Banmankhi and Saharsa - Uda Kishanganj 132kV S/c line		04 nos. of bays are under construction by BSPTCL at Saharsa (New). Expected by Aug'22.
11.	Banka	Bihar	400/220/132kV, 2x500MVA + 2x200 & 1x315MVA	220	2	Under Bidding	Banka (POWERGRID) – Goradih (Sabour New) 220kV D/c line	Funds tied up. Tendering is expected shortly.	18 months from award.

Annexure-III

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

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
A	**Bihar (to be implemented by BSPTCL/BGCL)**			
I	**Naubatpur GIS**	400/220/132/33kV, 2x500MVA + 2x160MVA + 2x80MVA	26.04.2018	Charged on 17th Mar 2022.
a)	LILO of circuits 3 & 4 of Patna (PG)-Balia 400 kV D/c (Quad) line at Naubatpur 400 kV 2x D/C	400kV 2x D/C	26.04.2018	Charged on 17th Mar 2022.
b)	LILO of both circuits of Ara (PG) – Khagaul (BSPTCL) line at Naubatpur (New) 220 kV 2xD/C	220kV 2xD/C	26.04.2018	Expected in May'22.
II	**Bakhtiyarpur GIS**	400/220/132kV, 2x500MVA + 2x160MVA	26.11.2019	Progressively from Aug'22 to Dec'22.
a)	LILO of both circuits of Barh – Patna (PG) 400kV D/c (Quad) line-1 at Bakhtiyarpur 400 kV 2xD/C	400kV 2xD/c	26.11.2019	Line ready to be charged matching with Bakhtiyarpur S/s.
III	**Jakkanpur GIS**	400/220/132/33kV, 2x500MVA + 3x160MVA + 4x80MVA	26.04.2018	Expected in May'22.
a)	LILO of both circuits of Nabinagar-II – Patna (PG) 400kV D/c at Jakkanpur	400kV 2xD/c	26.04.2018	Charged
IV	**Chappra (New)**	400/220/132kV, 2x500MVA + 2x200MVA	Funds not yet tied up	State Govt approval under process.
a)	LILO of 400 kV Barh (NTPC) - Motihari (DMTCL) D/C (Quad) transmission line at Chappra	400kV 2xD/c	Funds not yet tied up	State Govt approval under process.
B	**Odisha (to be implemented by OPTCL)**			
I	**Meramundali-B**	400/220kV, 2x500MVA	-	ICT-1 charged & ICT-2 on 23rd Mar'22.
II	**Digapahandi**	400/220kV, 2x500MVA	Survey in progress	2025-26
a)	Digapahandi – Therubali – Jeypore 400kV D/c line	400kV D/c	Survey in progress	2025-26
III	**Therubali**	400kV switching station along with 420kV, 1x125MVAr bus reactor	Survey in progress	2025-26
IV	**Bhadrak**	400/220kV, 2x500MVA	Tendering in progress	2024-25
a)	LILO of Baripada – Duburi and Baripada – Pandiabili 400kV line sections at Bhadrak	400kV D/c	Tendering in progress	2024-25

Sl. No.	Substation/Location	Transformation Capacity/ Element	Date of Award	Completion Schedule
V	**Paradeep***			
a)	Paradeep	400kV	Line package awarded and substation awarded in May'22	24 months
b)	Paradeep	765kV		2025-26
c)	Angul (POWERGRID) – Paradeep (OPTCL) 765kV D/c line	765kV D/c	Survey in progress	2025-26
VI	**Begunia**	765/400kV, 2x1500MVA	Kept in abeyance	Kept in abeyance
a)	Angul – Begunia 765kV D/c line	765kV D/c	Kept in abeyance	Kept in abeyance
b)	LILO of Pandiabil – Digapahandi 400kV D/c line at Begunia	400kV D/c	Kept in abeyance	Kept in abeyance
C	**Jharkhand (to be implemented by JUSNL)**			
I	**Jasidih**	400/220kV, 2x500MVA	-	No firm plan now. To be taken up in future.
II	**Chandil (New)**	400/220kV, 2x500MVA	NIT has been floated on 05-03-2022. Bid opening in 5th may'22.	24 months
a)	Chandil – Chaibasa (POWERGRID) 400kV D/c line	400kV D/c		
III	**Koderma**	400/220/132/33kV, 2x500MVA + 2x200MVA + 2x80MVA		
IV	**Mander**	400/220kV, 2x500MVA	-	No firm plan now. To be taken up in future.
a)	LILO of Patratu – Ranchi (New) 400kV D/c line at Mander	400kV 2xD/c	-	No firm plan now. To be taken up in future.
V	**Dumka (New)**	400/220kV, 2x500MVA	-	No firm plan now. To be taken up in future.
a)	Dumka (New) – Dhanbad (ISTS) 400kV D/c line	400kV D/c	-	No firm plan now. To be taken up in future.
D	**West Bengal (to be implemented by WBSETCL)**			
I	**Laxmikantpur GIS#**	400/132kV, 2x315MVA	Land identified. In process of acquisition. Expected by Dec 2024	
a)	LILO of Haldia – Subhasgram 400kV D/c line at Laxmikantpur	400kV D/c	-	Expected by Dec 2024

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

#*The proposal of creation of Laxmikantpur 400/132kV substation is under review by WBSETCL and a revised proposal for the same would be discussed in the next CMETS meeting.*

Annexure-IV

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

400/220/132/33kV Sub-Station

Sl no.	District	Voltage Level(kV)	Name of Grid Substation	Capacity of Transformer(MVA)	Target Year
1	Patna	400/220/132	Bakhtiyarpur(New)	2x500+2x160	2022-2023
2		400/220/132/33	Jakkanpur (New), BGCL	2x500+3x160+4x80	2022-2023
3		400/220/132/33	Naubatpur (New),BGCL	2x500+2x160+2x80	2021-2022, Charged

220/132/33 kV Sub-Station

Sl no.	District	Voltage Level(kV)	Name of Grid Substation	Capacity of Transformer(MVA)	Target Year
1	Patna	220/132/33	Digha(New) (GIS)	2x200+2x80	2022-2023
2	Patna	220/33	Bhusaula(New), BGCL	2x100	2023-2024
3	East Champaran	220/132/33	Raxaul(new)	2x200+3x50	2022-2023
4	Katihar	220/132/33	Korha	2x100+3x50	**2023-2024**
5	Kishanganj	220/132/33	Thakurganj	2x160+3x50	**2023-2024**
6	Samastipur	220/132/33	Tajpur	2x160+3x50	**2023-2024**
7	Vaishali	220/132/33	Garaul	2x160+3x50	2022-2023

132/33 kV Sub-Station

Sl no.	District	Voltage Level(kV)	Name of Grid Substation	Capacity of Transformer(MVA)	Target Year
1	Bhagalpur	132/33	Barari	2x50	2022-2023
2	Gaya	132/33	Barahchatti	2x50	2022-2023
3	Gaya	132/33	Bhore	2x50	2022-2023
4	Aurangabad	132/33	Nabinagar	3x50	2022-2023
5	Aurangabad	132/33	Daudnagar	2x50	2022-2023
6	Madhepura	132/33	Murliganj	2x50	2022-2023
7	West Champaran	132/33	Bagha	2x50	2022-2023
8	Patna	132/33	Board Colony (GIS)	2x80	2022-2023
9	Saran	132/33	Ekma(Ext)	3x50	2022-2023
10	Araria	132/33	Palasi	2x50	2022-2023

132/33 kV Sub-Station

Sl no.	District	Voltage Level(kV)	Name of Grid Substation	Capacity of Transformer(MVA)	Target Year
1	Bhagalpur	132/33	Barari	2x50	2022-2023
2	Gaya	132/33	Barahchatti	2x50	2022-2023
3	Gaya	132/33	Bhore	2x50	2022-2023
4	Aurangabad	132/33	Nabinagar	3x50	2022-2023
5	Aurangabad	132/33	Daudnagar	2x50	2022-2023
6	Madhepura	132/33	Murliganj	2x50	2022-2023
7	West Champaran	132/33	Bagha	2x50	2022-2023
8	Patna	132/33	Board Colony (GIS)	2x80	2022-2023
9	Saran	132/33	Ekma(Ext)	3x50	2022-2023
10	Araria	132/33	Palasi	2x50	2022-2023

Approved in Standing Committee Meeting of CEA

Sl no.	Segment	Requirement	Associated lines
1	Creation of 220 kV Bus System and associated 220 kV transmission lines	220kV Banka (PGCIL) - Goradih (Sabour New) D/C line along with associated bays at Goradih (Sabour New) end.	220kV Banka (PGCIL) - Goradih (Sabour New) D/C
2	2nd Source connectivity at 132 kV level	2nd Source Connectivity to 7 new 132KV GSS: Bagha, Bhore, Barachatti, Nabinagar, Daudnagar, Barari, Murliganj	1. 132 kV Sabour (New) – Barari transmission line DCDS 2. LILO of 132 kV Sonenagar -Chandauti D/C 3. 132 kV Chandauti (New) - Barachatti transmission line DCDS 4. LILO of 132 kV Barhi – Rajgir S/C (L28) 5. 132 kV Murliganj – Raghopur transmission line DCDS 6. 132 kV Murliganj - UdaKishanganj transmission line DCDS 7. 132 kV Gaya (BGCL) – Bhore transmission line DCDS 8. LILO of 132 kV Barhi – Nalanda S/C (L29) 9. LILO of 132 kV Gaya (BGCL) - Bodhgaya S/C
3	Technically approved but fund not tie up	400/220/132 kV substation at Chapra (2 X 500 MVA+2 X 200 MVA) has been technically approved	220 kV connectivity has been proposed at the following: 1. 220 kV Chhapra(New)-Amnour D/C 2. 220 kV Chhapra(New)-Gopalganj D/C

Evacuation of Power from Solar Power Plant

Sl no.	District	Power Evacuation	Name of Solar Power Plant	Target Year
1	Lakhisarai	220 kV Kajra – Shehkhopursarai DCDS	Kajra SPP	2024-2025
2	Bhagalpur	220 kV Pirpainti - Gauradih DCDS	Pirpainti SPP	2024-2025

Evacuation of Power from Thermal Power Plant

Sl no.	Power Evacuation	Name of Thermal Power Plant	Target Year
1	i. Buxar TPS- Naubatpur 400 kV double circuit (Twin Moose) ii. Buxar TPS- Dumraon (New) 220 kV double circuit (Twin Moose) iii. Buxar TPS- Karmnasa (New) 220 kV double circuit (Twin Moose) iv. Buxar TPS- Dehri on Sone 220 kV double circuit (Single Zebra)	Buxar TPP	2023-2024

Consultation Meeting

Evolving Transmission Schemes

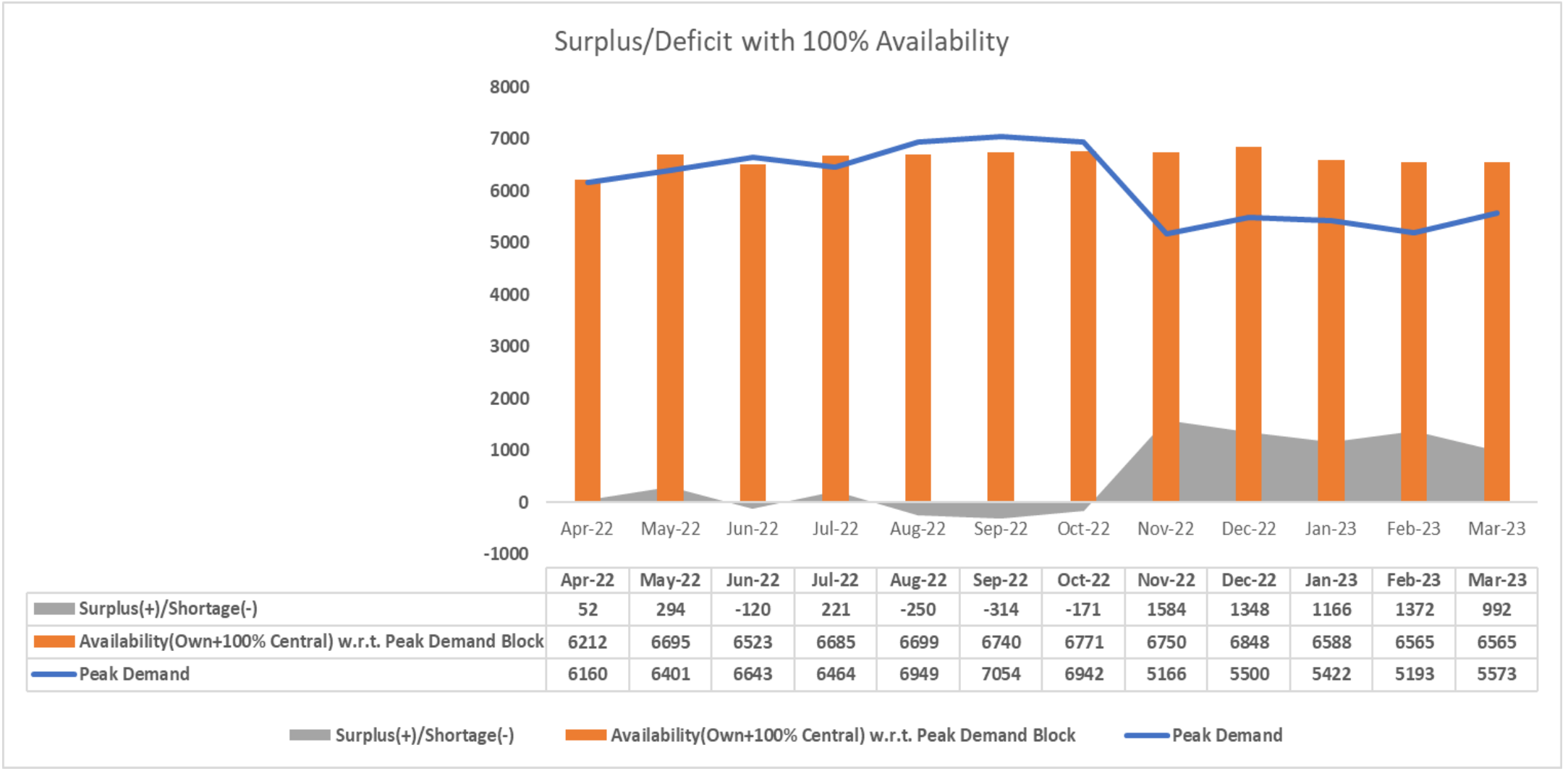
Contents

Present Load Generation Balance

Month	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Peak Demand	6160	6401	6643	6464	6949	7054	6942	5166	5500	5422	5193	5573
Availability(Own+100% Central) w.r.t. Peak Demand Block	6212	6695	6523	6685	6699	6740	6771	6750	6848	6588	6565	6565
Surplus(+)/Shortage(-)	52	294	-120	221	-250	-314	-171	1584	1348	1166	1372	992

BSPHCL

Present Load Generation Balance : Graphical Representation



	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23
Surplus(+)/Shortage(-)	52	294	-120	221	-250	-314	-171	1584	1348	1166	1372	992
Availability(Own+100% Central) w.r.t. Peak Demand Block	6212	6695	6523	6685	6699	6740	6771	6750	6848	6588	6565	6565
Peak Demand	6160	6401	6643	6464	6949	7054	6942	5166	5500	5422	5193	5573

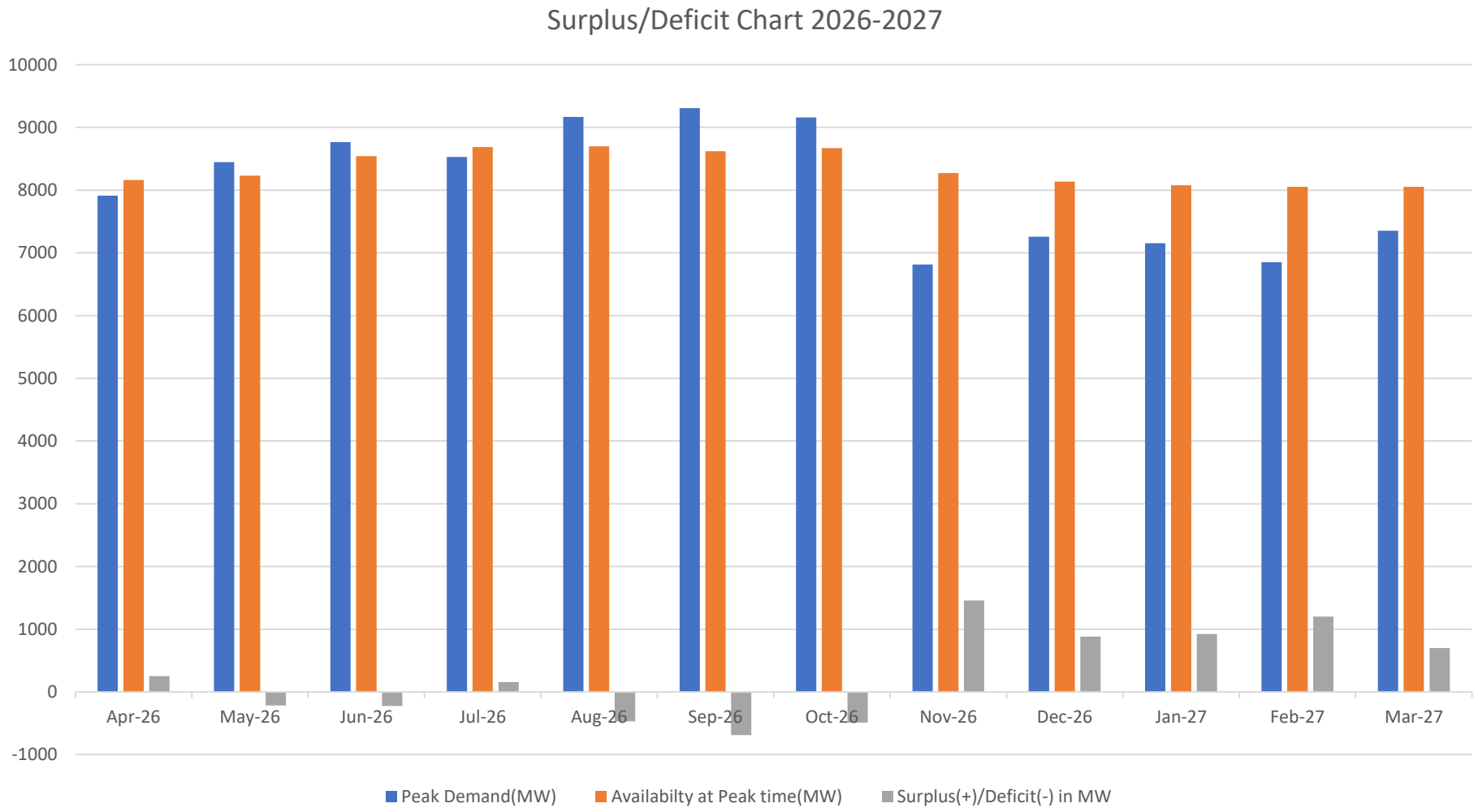
BSPHCL

Load Generation Balance : 2026-2027

Month	Peak Demand(MW)	Availabilty at Peak time(MW)	Surplus(+)/Deficit(-)	
			in MW	in %
Apr-26	7911	8363	452	3.08%
May-26	8447	8432	-15	-2.61%
Jun-26	8766	8543	-223	-2.61%
Jul-26	8529	8687	158	1.82%
Aug-26	9169	8701	-468	-5.38%
Sep-26	9308	8621	-687	-7.97%
Oct-26	9161	8672	-488	-5.63%
Nov-26	6816	8274	1457	17.62%
Dec-26	7257	8138	881	10.82%
Jan-27	7154	8076	922	11.41%
Feb-27	6853	8054	1202	14.92%
Mar-27	7353	8055	701	8.71%

BSPHCL

Graphical Representation



BSPHCL

Expected Generation Addition by 2026-2027

Name of Unit	Expected COD	Allocated CapacityMW)
NPGC U3	May-22	559
BTPS U6	Jun-22	110
Barh U2	Nov-22	402
North K'Pura U1	Dec-22	229
North K'Pura U2	Apr-23	229
Greenko Solar	Jun-23	210
Buxar TPP U1	Jul-23	561
Barh U3	Sep-23	402
Buxar TPP U2	Jan-24	561
Kajra & Pirpainti Solar	Mar-24	400
North K'Pura U3	Sep-24	229
Total		3893

BSPHCL

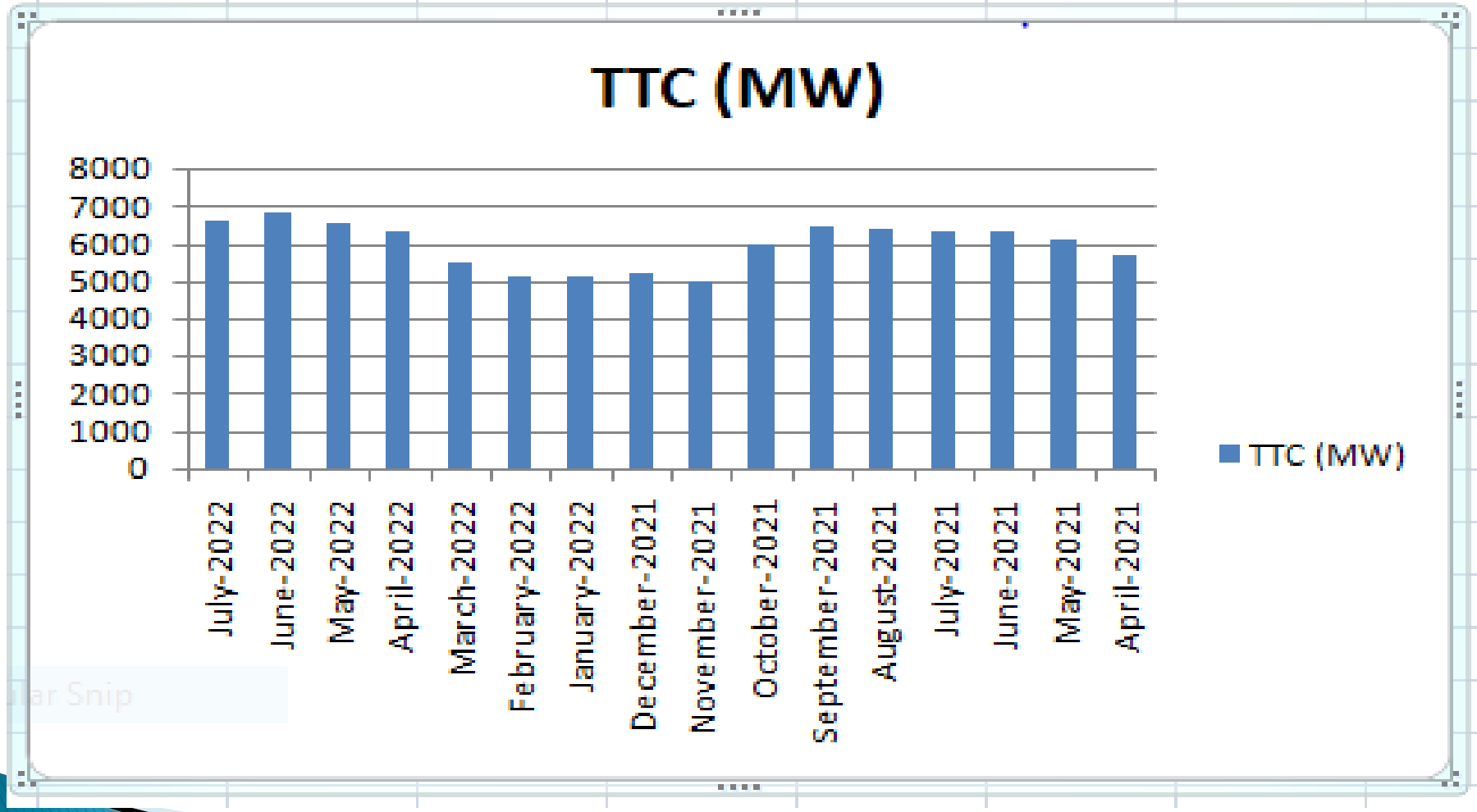
THANK YOU

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

ATC/TTC of BSPTCL System

- **Total Transfer Capability (TTC) as defined in the IEGC and Congestion charge Regulations** means the amount of electric power that can be transferred reliably over the inter-control area transmission system under a given set of operating conditions considering the effect of occurrence of the worst credible contingency.
- **Available Transfer Capability (ATC) as defined in the IEGC and Congestion charge regulations** means the transfer capability of the inter-control area transmission system available for scheduling commercial transactions (through long term access, medium term open access and short term open access) in a specific direction, taking into account the network security. Mathematically ATC is the Total Transfer Capability less Transmission Reliability Margin.
- **Reliability Margin (RM**): 2% of peak demand or maximum generation in the state.
- **ATC=TTC-RM**
- Currently, ATC/TTC of BSPTCL System is being calculated from PSSE 35.2 Software developed by M/s Siemens.
- ATC/TTC is being calculated based on N-1 Contingency of ISTS Lines, Historical load data & LGBR Report.

TTC of BSPTCL System



ATC Calculation for the month of July 2022

Month	TTC (MW)	ATC(TTC-RM)(MW)	RM(MW) (2% of peak demand)
July-2022	6600	6468	6600*0.02 = 132 MW

Assumptions & constraints

- Total LTA of BSPHCL with Central Sector & State generators is of 8078 MW but among the state generators one unit of NTPC Barauni Stage-1(1*110MW) generally remain out of service. Hence total generation remains 7968MW.
- **Constraints in Trans. Lines:**

1. 132kv Saharsa New-Sonebarsa
2. 123kv Saharsa New-Madhepura
3. 220KV Muzaffarpur-Hazipur

- On compliance of N-1 contingency, tripping of Transmission Line/Tie Lines may be avoided by load restriction of approx. 150-200 MW.

Annexure-V

PRESENTATION
BY
OPTCL ON PLANNING FOR MITIGATION OF SYSTEM CONSTRAINTS

Date: 29.04.22

How we operate (Our assets …)

Voltage Level	Transformation Capacity (MVA)	Transmission Lines (Ckt km)	No. of Grids
400kV	3835	1196.872	5
220kV	9640	6471.924	40
132kV	10381	8004.58	132
TOTAL	**23856**	**15673.38**	**177**

Upcoming GSS with line in next 3 years

Voltage Level	Transformation Capacity (MVA)	Transmission Lines (Ckt km)	No. of Grids
400Kv	5500	990	5
220kV	4480	2249	15
132kV	1230	919	14
TOTAL	**11210**	**3330**	**34**

PROJECTS TO COME UP BY 2026-27

Sl. No.	Ongoing Projects	Upcoming Projects	
		400kV S/s- 5 nos.	220kV S/s- 3 nos.
	Godisahi, Kiakata, Turumunga, Dhamra, Baliguda, Daspalla, Kantabada, Kuanramunda, Bamra, Balianta, Kalimela, Balichandrapur, Bahugram, R Udayagiri, Hinjili, Birmaharajpur, Lakhanpur, Bhatli, Nayapalli, Chandipur, Boriguma, Lamtaput, Satyanagar, Badagada, Brundabahal, Tarbha	Khuntuni , Digapahandi , Bhadrak , Paradeep , Joda,	Tikarpara, Kuakhia , Dhenkanal B

SYSTEM CONSTRAINTS IN PRESENT ODISHA SYSTEM

Sl. No	Description	constraints	Action	Target
1	400kV Mendhasal ICT:	n-1 transmission planning criteria	After Commissioning of Pandiabil-Pratapsasan line the load of Puri and Chandaka will be shared by Pandiabil 400kV S/s	April 22
2	400kV Duburi:	n-1 transmission planning criteria	After commissioning of 3rd 500 MVA at Duburi S/s	Dec 23
3	220kV Duburi-Paradeep line:	n-1 transmission planning criteria	To be met after commissioning of 400/220kV S/s at Paradeep	Sept 24
4	220kV Joda-Ramchandrapur line	Overloading of the line	The line loading varies from 160 to 180 MW. As an interim plan the issue will be partly resolve after completion of LILO of 220kV TTPS-Joda at Keonjhar. Finally after commissioning of proposed 400kV Joda S/s this will be resolved.	Dec 22

SYSTEM CONSTRAINTS IN PRESENT ODISHA SYSTEM

Sl.	Description	Constraints	Action	Target
5	220kV Lapanga-Katapalli line:	n-1 constraint during summer peak	The line loading is 130 MW in each Ckt. SPS will be implemented	
6	220kV Budhipadar-Lapanga:	n-1 constraint during summer peak	The line loading is 120 MW in each Ckt. SPS will be implemented	
7	220kV Bisra-Tarkera line: : n-1 constraint	n-1 constraint during summer peak	SPS already implemented. OPTCL as a short term plan will convert to HTLS conductor.	Dec 23
8	Fault level at Budhipadar and Meramundali	Higher fault level	Budhipadar: M/s Vedanta, M/s Aditya Aluminium and M/s Bhusan will be shfting their system from 220kV ant Budhipadar to 400kV at Lapanga Meramundali: 1. Commissioning of Meramundali B and NALCO shifting at 400kV to Meramundali B	
9	220kV Joda_Jamshedpur line LILO at JSPL	Loading of the line	Convert to HTLS Conductor from Joda to JSPL	

LGBR IN ODISHA SYSTEM Data

Prevailing Power Scenario

SL. NO.	NAME OF THE POWER STATION	RTC	Peak
1	**TOTAL HYDRO**	**520**	**1100**
2	IB T.P.S	325	325
3	IB T.P.S Expansion (U#3 & #4)*	530	530
4	VEDANTA (IPP)**	250	250
5	JITPL	0	0
6	I.P.P GMR	246	246
7	NBVL	6	6
8	**TOTAL THERMAL (2+3+4+5+6+7)**	**1357**	**1357**
9	**RE inside & outside the State**	**350**	**125**
10	**CGP injection for intra state open Access+infirm power**	**220**	**220**
11	**C.S SUPPORT incl. Darlipali U#2**	**1600**	**1625**
12	***Barh - I (U#1)******	**0**	**0**
13	***North Karan Pura***	**0**	**0**
14	**BANKING ARRANGEMENT[#]**	**113**	**38**
15	**TOTAL AVAILABILITY FROM ALL SOURCES (1+8+9+10+11+12+13+14)**	**4160**	**4465**
16	**GRID DEMAND INCLUDING INTRA STATE OPEN ACCESS & SYSTEM LOSS**	**4250**	**4600**
17	**SURPLUS(+)/DEFICIT(-) (15-16)**	**-91**	**-136**

* IBTPS Unit #4 is under AOH for 35 days from 26th March'22

** As per present declared capacity

*** De-allocation of 154 MW (Ex-bus) from Barh -I till 30.06.2022

N.B.:

[#] Following arrangement of power through banking has been made to meet the exigency power supply to the consumers of the State:
- 150 MW & 100 MW power has been availed in power banking arrangement from MPPMCL for the months of Apr'22 & May'22 respectively during the hours 02:00 to 20:00 hrs

In addition to the above, depending on the real time requirement, GRIDCO is procuring power through power exchange to meet any additional demand of the State.

Un-Requisitioned Surplus power may be availed on as and when available and required basis.

Upcoming generating stations

Sl. No.	Name of the station	Installed Cap. MW	Share%	Contract Cap. MW	Auxiliary %	Ex-Bus Entitlement MW	Expected CoD
1	NTPC Barh I (Unit II & III)	1320	21.11	278.65	6.25	261.24	Unit II - by Jul'22; Unit III - by Aug'23
2	NTPC, North Karanpura	1980	20	396.00	6.25	371.25	Unit I - by Jul'22 Unit II - by Dec'22 Unit III - by Dec'23
3	Teesta IV HEP	520	19.96	103.79	1.2	102.55	by FY 2025-26
4	NLC Talabira Phase I	2400	16.67	400.00	6.25	375.00	by FY 2027-28
5	NLC Talabira Phase II	800	50.00	400.00	6.25	375.00	-
6	**Total**					**1485.03**	

Ex-Bus Entitlement of Inter-State Generation Stations Expected by 2026-27

Name of the station	Installed Cap. MW	Share%	Contract Cap. MW	Auxiliary %	Ex-Bus Entitlement MW*
Central Sector Hydro Power Stations:					
Tala HEP	1020	4.25	43.35	1	42.92
Chukha HEP	270	15.19	41.01	1	40.60
Teesta V HEP	510	20.59	105.01	1.20	103.75
Mangdechu HEP	720	10.97	78.98	1	78.19
Teesta IV HEP	520	19.96	103.79	1.20	102.55
Sub-Total			**372**		**368**
Central Sector Thermal Power Stations:					
Talcher Super TPP I	1000	32.34	323.44	7.05	300.64
Talcher Super TPP II	2000	10	200.00	6.25	187.50
Farraka STPS I&II	1600	0.55	8.80	6.78	8.20
Farraka STPS III	500	17.15	85.75	6.25	80.39
Kahalgaon STPS I	840	0.53	4.45	9.00	4.05
Kahalgaon STPS II	1500	2.62	39.30	6.25	36.84
Darliparli (Unit I&II)	1600	58.82	941.12	6.25	882.30
NTPC Barh I (Unit I)	660	24.84	163.94	6.25	153.70
NTPC Barh I (Unit II & III)	1320	21.11	278.65	6.25	261.24
NTPC, North Karanpura	1980	20	396.00	6.25	371.25
Sub-Total			**2441.46**		**2286.11**
Total			**2813.61**		**2654.12**

***The ISTS Drawl may be equal to the Ex-bus entitlement of the inter-state generating stations**

Revised Provisional Annual Average Power Supply Demand Projection till FY 2029-30

Sl. No.	Description	Ex-bus	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	Remarks
1	Burla	280	75	75	75	75	75	75	75	75	As per saleable design energy approved by OERC for FY 2022-23
2	Chiplima	71	55	55	55	55	55	55	55	55	
3	Rengali	248	59	59	59	59	59	59	59	59	
4	Balimela	505	134	134	134	134	134	134	134	134	
5	U.Kolab	317	94	94	94	94	94	94	94	94	
6	Indravati	594	222	222	222	222	222	222	222	222	
7	Machh-kund	59	30	30	30	30	30	30	30	30	
8	**State Hydro (1+2+3+4+5+6+7)**	**2074**	**669**	**669**	**669**	**669**	**669**	**669**	**669**	**669**	
9	OPGC Stg I	380	260	260	260	260	260	323	323	323	Normative, i.e. @68.49% of Ex-bus entitlement till FY 2026-27; R&M proposed in FY 2026-27 thus normative is increased to 85% from FY 2027-28
10	OPGC Stg II	928/1240	789	1054	1054	1054	1054	1054	1054	1054	Availability taken as 85% from 21-22; 75% allocation till FY 22-23 and 100% thereafter
11	**State Thermal (9+10)**	**1308/1620**	**1049**	**1314**	**1314**	**1314**	**1314**	**1377**	**1377**	**1377**	
12	VEDANTA	564	300	300	300	300	300	300	300	300	Availability based on the energy approved in GRIDCO's ARR for FY 2022-23 (approved 2628.70 MU); Availability from Vedanta IPP may further increase as linkage coal issue is subjudice before OERC.
13	GKEL	246	209	0	0	0	0	0	0	0	Normative, i.e. @85% of Ex-bus entitlement & considering its availability beyond FY 22-23
14	JITPL	135	0	115	115	115	115	115	115	115	Normative, i.e. @85% of Ex-bus entitlement & considering its availability beyond FY 23-24 instead of FY 22-23 as the matter in subjudice
15	NBVL	6.48	6	6	6	6	6	6	6	6	Normative, i.e. @85% of Ex-bus entitlement
16	NLC, Talabira	375	0	0	0	0	0	263	319	319	CoD from FY 2027-28, availability @70% for FY 27-28 & @85% thereon.
15	**IPPs (12+13+14)**	**1326.48**	**515**	**421**	**421**	**421**	**421**	**683**	**739**	**739**	
16	Tala HEP	43	17	17	17	17	17	17	17	17	Availability considered @40% of the Ex-bus entitlement
17	Chukha HEP	41	16	16	16	16	16	16	16	16	
18	Teesta IV HEP	103				41	41	41	41	41	
19	Teesta V HEP	104	42	42	42	42	42	42	42	42	
20	Mangdechu HEP	78	31	31	31	31	31	31	31	31	
21	**Central Hydro (16+17+18+19+20)**	**369**	**106**	**106**	**106**	**148**	**148**	**148**	**148**	**148**	
22	TTPS	412									Normative, i.e. @85% of Ex-bus entitlement; Phase out from Apr'21
23	TSTPP - I	300	255	255	255	255	255	255	255	255	Normative, i.e. @85% of Ex-bus entitlement
24	TSTPP - II	188	160	160	160	160	160	160	160	160	Normative, i.e. @85% of Ex-bus entitlement
25	Farraka I&II	211	7	7	7	7	7	7	7	7	Nomative. i.e. @ 85% of Ex-bus entitlement; Phased out from FY 21-22 and only bundled power considered thereafter
26	Farraka-III	80	68	68	68	68	68	68	68	68	Normative, i.e. @85% of Ex-bus entitlement
27	Kahalgaon-I	121	3	3	3	3	3	3	3	3	Nomative. i.e. @ 85% of Ex-bus entitlement; Phased out from FY 21-22 and only bundled power considered thereafter
28	Kahalgaon-II	37	31	31	31	31	31	31	31	31	Normative, i.e. @85% of Ex-bus entitlement
29	Barh-I	154/307/461	162	311	370	393	393	393	393	393	Unit 1 from Nov'21 and @70% till 22-23 & 85% thereon; Unit 2 from Jul'22 and @ 70% till 23-24 & 85% thereon; Unit 3 from Aug'23 and @70% till 24-25 & 85% thereon; Unit 1 has not been considered for the period from Apr'22 to Jun'22 due to de- allocation
30	Darliparli-I	441/ 882	684	750	750	750	750	750	750	750	Unit 1 @70% till 21-22 & 85% thereon; Unit 2 from Sept'21 @70% till 22-23 & 85% thereon
31	North Karanpura	124/248/371	94	221	298	316	316	316	316	316	Unit 1 from July'22 and @70% till 22-23 & 85% thereon; Unit 2 from Dec'22 and @ 70% till 23-24 & 85% thereon; Unit 3 from Dec'23 and @70% till 24-25 & 85% thereon
32	**Central Thermal (22+23+24+25+ 26+27+28+29+30+31)**		**1464**	**1806**	**1942**	**1983**	**1983**	**1983**	**1983**	**1983**	
33	Solar RE		206	243	289	311	466	545	608	791	RE availability has been estimated considering a RPO target of 30%;
34	Other Non-Solar RE		158	183	212	265	393	455	499	642	
35	**Renewable (33+34)**		**364**	**426**	**501**	**577**	**859**	**1001**	**1106**	**1433**	
36	**Power towards HPO**		**9**	**18**	**32**	**46**	**73**	**90**	**109**	**149**	As per HPO%;
37	**Total Availability (8+11+15+21+ 32+35+36)**		**4177**	**4761**	**4985**	**5158**	**5467**	**5951**	**6132**	**6499**	
38	**Demand***		**3351**	**3554**	**3735**	**3890**	**4828**	**4971**	**5116**	**6050**	
39	**Cushion towards contingency**		**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	
40	**Surplus (+)/ Deficit (-) (37-38-39)**		**426**	**807**	**850**	**868**	**239**	**580**	**616**	**48**	

Demand has been estimated based on the following assumptions:

i. Base year - FY 2019-20; Base Demand - 2949 MW (after FANI Adjustment)

ii. Growth (CAGR) of non industrial demand from FY 2020-21 onwards is considered @ 2% as per past trend

iii. Grid power requirement of upcoming industries has been considered as per IPICOL data and OPTCL transmission planning as on date except PCPIR demand.

Revised Provisional Peak Power Supply Demand Projection till FY 2029-30 (R&M OPGC STAGE 1)

Sl. No.	Description	Ex-bus	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	Remarks
1	**State Hydro**	**2062**	**1500**	**1500**	**1500**	**1500**	**1500**	**1500**	**1500**	**1500**	
2	OPGC Stg I	380	260	260	260	260	260	323	323	323	Normative, i.e. @68.49% of Ex-bus entitlement till FY 2026-27; R&M proposed in FY 2026-27 thus normative is increased to 85% from FY 2027-28
3	OPGC Stg II	928/1240	789	1054	1054	1054	1054	1054	1054	1054	Availability taken as 85% from 21-22; 75% allocation till FY 22-23 and 100% thereafter
4	**State Thermal (2+3)**	**1308/1620**	**1049**	**1314**	**1314**	**1314**	**1314**	**1377**	**1377**	**1377**	
5	VEDANTA	564	300	300	300	300	300	300	300	300	Availability based on the energy approved in GRIDCO's ARR for FY 2022-23 (approved 2628.70 MU); Availability from Vedanta IPP may further increase as linkage coal issue is subjudice before OERC.
6	GMR	246	209	0	0	0	0	0	0	0	Normative, i.e. @85% of Ex-bus entitlement & considering its availability as zero beyond FY 22-23 as contract is yet to be renewed
7	JITPL	135	0	115	115	115	115	115	115	115	Normative, i.e. @85% of Ex-bus entitlement & considering its availability beyond FY 23-24 instead of FY 22-23 as the matter in subjudice
8	NBVL	6.48	6	6	6	6	6	6	6	6	Normative, i.e. @85% of Ex-bus entitlement
9	NLC, Talabira	375	0	0	0	0	0	263	319	319	CoD from FY 2027-28, availability @70% for FY 27-28 & @85% thereon.
10	**IPPs (5+6+7+8+9)**	**1326.48**	**515**	**421**	**421**	**421**	**421**	**683**	**739**	**739**	
11	Tala HEP	43	43	43	43	43	43	43	43	43	Peak Support power plants so Ex-bus entitlement considered as availability from such plants
12	Chukha HEP	41	41	41	41	41	41	41	41	41	
13	Teesta IV HEP	103				103	103	103	103	103	
14	Teesta V HEP	104	104	104	104	104	104	104	104	104	
15	Mangdechu HEP	78	78	78	78	78	78	78	78	78	
16	**Central Hydro (11+12+13+14+15)**	**369**	**266**	**266**	**266**	**369**	**369**	**369**	**369**	**369**	
16	TTPS	412									Normative, i.e. @85% of Ex-bus entitlement; Phase out from Apr'21
17	TSTPP - I	300	255	255	255	255	255	255	255	255	Normative, i.e. @85% of Ex-bus entitlement
18	TSTPP - II	188	160	160	160	160	160	160	160	160	Normative, i.e. @85% of Ex-bus entitlement
19	Farraka I&II	211	7	7	7	7	7	7	7	7	Nomative. i.e. @ 85% of Ex-bus entitlement; Phased out from FY 21-22 and only bundled power considered thereafter
20	Farraka-III	80	68	68	68	68	68	68	68	68	Normative, i.e. @85% of Ex-bus entitlement
21	Kahalgaon-I	121	3	3	3	3	3	3	3	3	Nomative. i.e. @ 85% of Ex-bus entitlement; Phased out from FY 21-22 and only bundled power considered thereafter
22	Kahalgaon-II	37	31	31	31	31	31	31	31	31	Normative, i.e. @85% of Ex-bus entitlement
23	Barh-I	154/307/461	0	262	393	393	393	393	393	393	Unit 1 from Nov'21 and @85% from 22-23; Unit 2 from Jul'22 and @ 70% for 22-23 & 85% thereon; Unit 3 from Aug'23 and @70% for 23-24 & 85% thereon; Unit 1 has not been considered for the period from Apr'22 to Jun'22 due to de- allocation
24	Darliparli-I	441/ 882	684	750	750	750	750	750	750	750	Unit 1 @70% till 21-22 & 85% thereon; Unit 2 from Sept'21 @70% till 22-23 & 85% thereon
25	North Karanpura	124/248/371	0	211	316	316	316	316	316	316	Unit 1 from July'22 and @70% for 22-23 & 85% thereon; Unit 2 from Dec'22 and @ 70% for 22-23 & 85% thereon; Unit 3 from Dec'23 and @70% for 23-24 & 85% thereon
26	**Central Thermal (16+17+18+19 +20+21+22+23+24+25)**		**1208**	**1747**	**1983**	**1983**	**1983**	**1983**	**1983**	**1983**	
27	Solar RE		0	0	0	0	0	0	0	0	RE availability has been estimated considering a RPO target of 30%;
28	Other Non-Solar RE		158	183	212	265	393	455	499	642	
29	**Renewable (27+28)**		**158**	**183**	**212**	**265**	**393**	**455**	**499**	**642**	
30	**Power towards HPO**		**18**	**37**	**64**	**92**	**146**	**180**	**218**	**298**	As per HPO%
31	**Total Availability (1+4+10+16+26+29+30)**		**4715**	**5468**	**5760**	**5945**	**6126**	**6548**	**6685**	**6909**	
32	**Demand***		**4795**	**5094**	**5342**	**5565**	**6575**	**6793**	**7014**	**8028**	
33	**Cushion towards contingency**		**400**	**400**	**400**	**400**	**400**	**400**	**400**	**400**	
34	**Surplus (+)/ Deficit (-) (31-32-33)**		**-480**	**-26**	**19**	**-21**	**-849**	**-645**	**-729**	**-1520**	

Demand has been estimated based on the following assumptions:

i. Base year - FY 2019-20; Base Demand - 4244 MW

ii. Growth (CAGR) of non industrial demand from FY 2020-21 onwards is considered @ 3% as per past trend

iii. Grid power requirement of upcoming industries has been considered as per IPICOL data and OPTCL transmission planning as on date except PCPIR demand.

iv. In this case, the summer peak demand has been considered.