AGENDA

FOR

215TH OCC MEETING

Date: 22.05.2024

Eastern Regional Power Committee

14, Golf Club Road, Tollygunge

Kolkata: 700033

Contents

EASTERN REGIONAL POWER COMMITTEE

AGENDA FOR 215TH OCC MEETING TO BE HELD ON 22.05.2024 (WEDNESSAY) AT 10:30 HRS

1. PART-A: CONFIRMATION OF MINUTES

1.1. Confirmation of Minutes of 214th OCC Meeting held on 23rd April 2024 physically at ERPC Secretariat, Kolkata

The minutes of 214th Operation Coordination Sub-Committee meeting held on 23.04.2024 was circulated vide letter dated 01.05.2024.

Members may confirm the minutes of 214th OCC meeting.

2. PART-B: ITEMS FOR DISCUSSION

2.1 Maintaining Adequate Generation Capacity to Ensure Zero Load Shedding: ERPC

India's electricity demand, driven by robust economic growth, is showing a rapidly rising trend and the summer months are particularly challenging in this regard. The Indian Meteorological Department (IMD) has also predicted above-normal maximum temperatures over most parts of the country during the current summer season. It is anticipated that the country may witness a peak demand of around **260 GW**, as against the highest ever peak demand of **243 GW** during 2023-24.

Hon'ble Minister for Power and NRE has held several meetings in the recent past with all the stakeholders to review the preparedness for meeting the summer power demand in the country. Accordingly, Ministry of Power has taken the following steps:

- All thermal generating stations have been instructed to be on bar and **mandatorily offer their surplus power in power exchange** in line with the recently amended LPS rules.
- Planned maintenance of the thermal power plants have been rescheduled to the monsoon season.
- Around 860 MW additional gas-based capacity (non-NTPC) has been tied up through competitive bidding, especially for the summer months. Moreover, around 5000 MW of gas based capacity of NTPC have also been instructed to be kept in ready mode, for operationalization on short notice.
- Directions under Section-11 of Electricity Act, 2003, for mandatory operationalization of Imported Coal Based plants (ICBs), has been extended till 15th October'24. Further, Directions under Section-11 of Electricity Act, 2003 has also been issued to Gas Based Generating Stations to ensure availability of these plants, as per the schedule given by Grid-India.
- Instructions have been issued to all the **domestic coal based** (DCBs) plants to blend imported coal, as per requirements, with domestic coal and maintain adequate stocks.
- Regular monitoring of coal stocks at DCB plants is being done through Inter-Ministerial Committee comprising representative of MoP, MoC and Railways.

While measures are being put in place to ensure adequate availability of power, it is imperative that proactive steps should also be taken by all the States to ensure Zero load shedding during the ongoing summer season. To achieve this objective, **all State Governments, State Generating Companies (GENCOs) and Distribution licensees** are advised to take the following steps:

(i) **Tariff Policy, 2016** mandates that all the power stations are required to be available and ready to dispatch at all times. Also, as per the recently amended, Section 9 (5) of the Electricity (**Late Payment Surcharge and Related Matters) Rules** of 2022 provides for sale of surplus power, by the generating station, which is within its declared generation capacity but is not requisitioned by the distribution companies. Hence, the **Un-requisitioned/surplus power from all the generation stations: Thermal/Gas/Hydro power plants should be promptly offered in power exchanges to augment overall power availability in the country**.

(ii) All the **Thermal/Gas power plants** under states' jurisdiction must operate at their **full capacity**.

(iii) Planned maintenance/overhauling activities should be deferred to prevent any disruptions. All efforts should be made, through adequate preventive maintenance activities, to **minimize partial outages** and **forced outages** of thermal stations.

(iv) Hydro generation optimization may be carried out to ensure **maximum generation availability in the non-solar hours** while **minimizing the hydro generation during solar hours**.

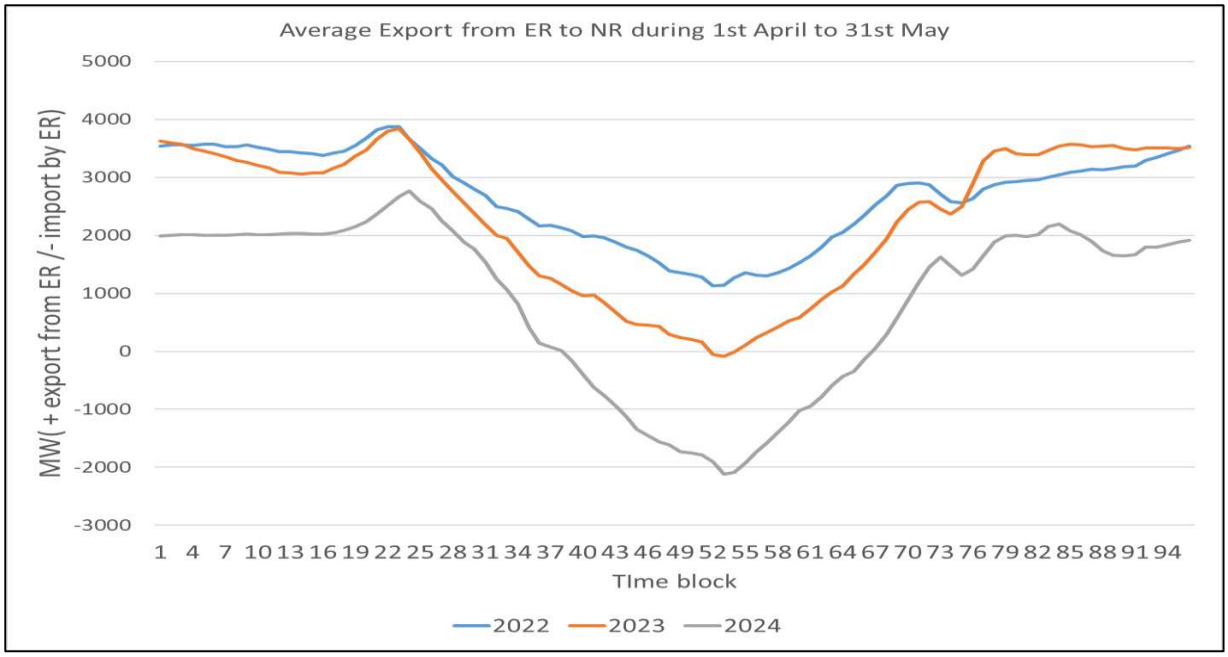
Relevant communication in this regard has been circulated by MOP to **Principal Secretaries (Energy)** of all States.

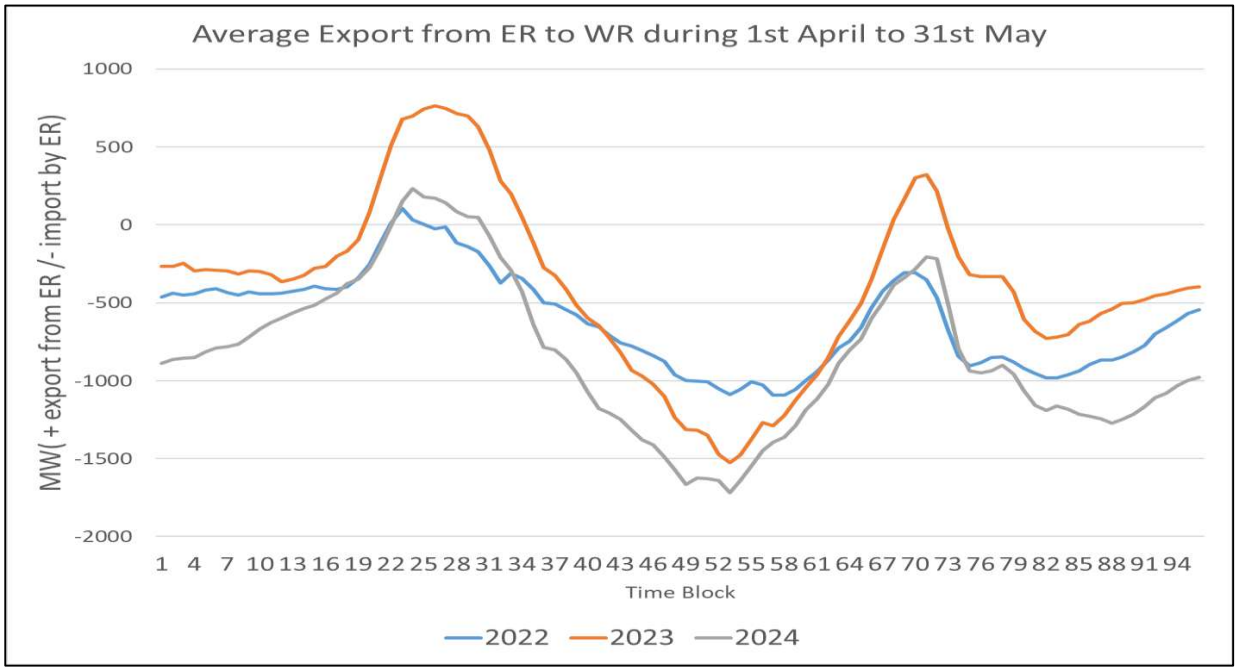
All states are requested to **ensure compliance to these directives** to **reduce** the r**isk of power shortages, within their jurisdiction** and to also **help other States** in meeting their **power requirements** during these crucial high demand months.

Members may discuss.

2.2 Operational Constraint in Eastern Region with Increasing Power flow from Northern and Western Region and rapid demand growth in ER: ERLDC

Historically, the Eastern Region in the Indian grid has been a net exporter of electrical power to all the connected regions i.e. Northern, Western, Southern and North-eastern region. The generation capacity of the eastern region mostly consists of coal based thermal plants and hydro power plants. The installed capacity of the Eastern Region as on March 2024 is around 35 GW which comprises of almost 28 GW (80%) of coal-based generation plants. However, with rapid increase in the renewable capacity addition in other regions, particularly Northern & Western Region, a shift in the power flow pattern has been observed in the recent years. These unforeseeable power flow patterns coupled with some of the thermal generation back down & outage of power plants, rapid demand growth in post COVID time have resulted in a number of transmission constraints.





Most critical constraints that are being present are as follows:

1. 400 kV Kahalgaon-Farakka D/C
2. 400 kV 400 kV New Ranchi –NPPSP DC
3. 400 kV Farakka-Sagardighi DC
4. 400 kV Talcher -Meramundali DC
5. 400 kV OPGC-Lapanga DC

Few of the above constraints even have a high degree of cascading effect in case N-2 tripping.

Already the matter has been **highlighted to CTU** for comprehensive planning, however implementation of new transmission system may take some time. While ERLDC in consultation with NLDC trying to optimize the reliability margin in the grid, at the same time

collective effort by all the stake holders will be required for ensuring reliability of the grid.

ERLDC may explain. Member may discuss.

2.3 Restriction of Talcher-Kolar HVDC Bi-pole and Frequent Outages of Bi-pole: ERLDC

On 20th March'24, ERLDC received one mail from HVDC Talcher stating the requirement of replacement of the R-phase converter transformer necessitating restriction of the power order of HVDC Talcher bi-pole to 1500MW till the replacement. It was also informed that the spare Converter Transformer of HVDC Kolar is being diverted from HVDC Kolar to HVDC Talcher and is expected to reach HVDC Talcher by 31st May 2024.

Since April'24, either pole of HVDC blocked 5 times out of which, in 4 times the other pole went to ground return mode instead of metallic return mode resulting in overloading of 400kV Talcher-Meeramundali D/C and generation backdown was done either manually or through operation of SPS.

Further, while availing the planned shutdown of Pole-2 on 28.04.2024, the other pole didn't go to metallic return mode as the automatic changeover sequence failed and remained in Ground return mode for around 15 minutes.

Powergrid Odisha may:

1. **Update the present status of the Converter Transformer.**
2. **Share the reason of the frequent tripping of either pole.**
3. **Share action taken to prevent failure of automatic changeover sequence in the future.**

ERLDC and Powergrid Odisha may update. Members may discuss

2.4 Proposal for installation of 5th 400/220 KV 315 MVA ICT in place of existing age old 50 MVAR (3x16.6 MVAR single phase units) ISTS Reactor at Jeerat 400 KV SS of WBSETCL to maintain N-1 criteria. : WBSETCL

- At present the total installed capacity of 400/220 KV ICTs at Jeerat 400 KV SS of WBSETCL is 4X315 MVA. The defective 4th 315 MVA ICT which was out of system for over 2 years has been replaced with a Regional pool spare 315 MVA ICT & put into service on 14th March-2024.
- Peak demand of Jeerat 400 KV SS in 2023-24 was 971 MVA (Jun-2023) i.e. more than full load capacity of the ICTs in service at that time i.e. 3X315 MVA.
- After recommissioning of the 4th ICT, it is evident from the load flow studies that the load shared by Jeerat SS with 4 nos of ICTs will increase considerably as compared to earlier load sharing with 3 nos of ICTs. The anticipated load during 2024-25 will increase further & may approach the full load capacity of all the four ICTs thus violating (N-1) criterion.
- So to cater the load growth at Jeerat 400 KV SS at 400/220 KV level maintaining (N-1) condition, augmentation of 400/220 KV ICT capacity from 4X315 MVA to 5X315 MVA is necessary at an early date.
- Clear space for construction of 220 KV bay for 5th ICT is available at Jeerat SS but there is no space for construction of new 400 KV bay & installation of 5th ICT.
- Due to space constraint, it is hereby proposed to use the 400 KV bay & equipment space of existing 50 MVAR (3X16.6 MVAR single phase units) Bus reactor which is at present

operating with another 3-Ph 50 MVAR reactor in group control, both of which were installed under ISTS scheme a long time ago.

- Feasibility for keeping the 3-Ph 50 MVAR reactor in service by alternative arrangement is being explored by WBSETCL. WBSETCL is also considering the possibility for installation of a 3-Ph 125 MVAR Bus Reactor in place of the age old 50 MVAR 3-Ph Reactor depending on VAR compensation requirement as per system study.
- Considering the above facts proposal for installation of 5th ICT at Jeerat 400 KV SS was placed in the **29th CMETS-ER** on **27.03.2024** Region for consideration and approval. It was decided that since the existing ISTS bus reactors (50MVAr (3x16.67MVAr single phase units) & 50MVAr 3-Ph) are to be disconnected and the vacated ISTS bay and space is to be used for installation of 5th ICT, the matter needs stakeholder's consultation & needs to be placed before ERPC forum for further discussion.
- Accordingly the matter was deliberated in the **214th OCC** Meeting of ERPC on **23.04.2024**.
- WBSETCL submitted that after exploring all feasible avenues, disconnecting the existing ISTS bus reactors (50MVAr• (3x16.67MVAr single phase units) & 50MVAr 3-Ph) and vacating 400 kV ISTS bay stands out as the only option for 5th ICT installation at Jeerat (WB) S/S.
- OCC opined in favour of technical requirement of the 5th ICT at 400 kV Jeerat S/S and suggested WBSETCL to commence procurement of the ICT. OCC also opined that the existing bus reactors (3*16.67 MVAR and 3-ph 50 MVAR) being ISTS assets , consent from Powergrid is essential prior to granting approval to the proposal of WBSETCL.
- In absence of Powergrid representative , the proposed scheme couldn't be acceded to by the forum for execution. OCC decided to convene a special meeting comprising Powergrid ER-II, WBSETCL,WB SLDC, ERLDC and ERPC to forge a consensus on execution plan for accommodating the 5 th ICT(315 MVA) at Jeerat(WB) S/S as well as future applicability / utilisation of ISTS bus reactors.
- The issue was thereafter deliberated in **30th CMETS-ER** meeting dated **26.04.2024.**

- **Deliberation in 30th CMETS-ER:**

Modifications suggested by WBSETCL vide email dated 22-04-2024 were deliberated in the **30th CMETS-ER** meeting and agreed modifications are as under:

Agreed Modifications in 30th CMETS-ER meeting as per proposal of WBSETCL
6.4 WBSETCL informed that installation of 5th ICT has been planned **for compliance of (N-1) considering** anticipated load growth. 315MVA ICT has been planned for installation as 5th ICT, as all the existing ICTs are 315MVA & in case of outage of 500MVA ICT the available capacity wouldremain same i.e. 4x315MVA. CTU mentioned that progressivelyWBSETCL can plan for replacement of 315MVA ICTs with load growth, thus, keeping same in view, 5th ICT may be installed as 500MVA. **WBSETCL stated that the augmentation program of 315MVA ICTs with 500MVA ICTs, if necessary, will be considered in due course.**

6.8 CTU mentioned that as there are issues of space constraints at Jeerat (WBSETCL) S/s, a joint visit of WBSETCL and POWERGRID can be carried out to work out feasibility for installation of 5th ICT, re-arrangementfor reinstallation of 2x50MVAr bus reactor and new 125MVAr bus reactor.WBSETCL mentioned that **Jeerat S/s being an intra-State S/s they have already carried out the feasibility study considering the issue of space constraint & finalized the scheme for installation of 5th ICT** after removing2x50MVAr (3x16.67MVAr single phase units & 50MVAr 3-Ph) bus reactors installed in parallel.
6.9 CTU mentioned that in past for termination of new lines at Jeerat (WBSETCL) S/s space constraints were observed and after joint site visitsome arrangements were finalised including implementation of GIL in 4 no. 400kV lines. Accordingly, CTU once again suggested for a joint site inspection of Jeerat (WBSETCL) S/s by officials of CTU, WBSETCL, and POWERGRID. **In response WBSETCL stated that it appears that since the mentioned issue was one of new ISTS connectivity at Jeerat S/s, the joint site inspection might have been required.** **But in the present case since scheme for installation of 5th ICT has already been finalized & detailed engineering will be taken up soon, joint site inspection is not considered essential. CTU further mentioned that, if space is not provided by WBSETCL for re-installation of ISTS reactors (2x50MVAr) along with associated bay(s) at Jeerat S/S, then a joint site visit would be essentially required.**

- Considering the extreme urgency for installation of the 5th ICT at Jeerat 400 kV SS the matter is again placed before the OCC Forum of ERPC for further deliberation & necessary approval.

Single line diagram (SLD) of 400 KV Jeerat S/S (WBSETCL) and power map of West Bengal attached at **Annexure B.2.4**

WBSETCL may update. Members may discuss.

2.5 Establishment of CPRI Regional Research & Testing Laboratory at Bhubaneswar, Odisha: GRIDCO

State of Odisha has ~1 crore electricity consumers and its grid demand hovers around 4800 - 5100 MW. Installed CGP capacity in the State is around 10 GW. Future electricity demand is likely to grow at a CAGR of 5-6% over the next 10-15 years.

Industrial clusters like Paradeep (Jagatsinghpur), Kalingnagar (Jajpur), Dhamra (Bhadrak), Angul and Badbil (Keonjhar) are developing rapidly, which provides opportunities for further downstream & ancillary industries. Apart from Mining and Metal sectors, industry interests in the State range from Chemicals, Petrochemicals & Plastics to Biotech, IT, Food processing, Textile & Apparel etc., which are attracting good investments in the State.

The network expansion & up-gradation are planned to meet the demand growth. The Power Distribution utilities in the State have plans for investment of more than Rs.5,600 crore by FY 2025-26 in the categories of PTR, DTR, Cable & Conductor, Switchgears, Poles, Meters, Battery and SCADA & Automation equipment.

To meet the huge supply requirement of the above electrical equipment and many MSMEs & other equipment manufacturers are expanding their manufacturing facility & new OEMs are also coming up. Equipment being procured are required to meet global quality standards to avoid any premature failure; therefore all such equipment are to be tested at reputed lab like

CPRI before being accepted. The scope of electrical equipment testing including electricity meter is going to be huge.

Proposal of Odisha for establishment of regional research & testing laboratory of CPRI has been submitted to CPRI & CEA vide letter dated 13.12.2022 & 18.07.2023 respectively. CEA has recommended matter to ERPC for recommendation. Copies of above letters along with relevant details is enclosed at **Annexure B.2.5** for reference.

The proposal was also deliberated in **51st TCC** meeting dated 11.01.2024:

“TCC welcomed the proposal of Odisha for establishment of Regional Research & Testing Laboratory unit of CPRI at Bhubaneshwar and further advised all the utilities to submit the information as mentioned above to ERPC Secretariat within 15 days for onward submission to CEA.”

GRIDCO may update. Members may deliberate.

2.6 Shutdown request of U#1 : GMR

As per earlier submitted LGBR , it is herewith informed you that we are taking shutdown on Unit #1 from **06.07.2024** to **13.08.2024** for executing its **capital overhauling** . As per approved LGBR 2024-25 , GMR Unit #1 was scheduled from **12.07.2024** to **20.08.2024**

This message has already been communicated to our stake holders .

So it is requested to allow us availing shut down on **Unit #1** for executing its **capital overhauling** from **06.07.2024** to **13.08.2024**.

GMR may update. Members may discuss

2.7 Provision for construction of power supply for FGD and New Nabinagar 3 X 800 MW project from existing commercialized units of Nabinagar (3 X 660 MW): NTPC ER-I

The construction power will be required for upcoming Stage-II (3X800MW). As all the units of NSTPS are commercialised and operational, the provision for construction power shall be made from existing units of NSTPS by incorporating power drawn for construction activities in to Metering system.

Considering above, OCC may kindly approve drawl of construction power from existing units by providing appropriate meters by SBPDCL and ERLDC.

Accordingly metering logic may be incorporated for the same.

The matter was also put up in 214th OCC meeting but in absence of NTPC ER-I representative no decision could be reached. In absence of NTPC ER-I representative OCC opined this agenda may be resubmitted in the next or subsequent OCC meetings for deliberation.

NTPC ER-I may update. Members may discuss.

2.8 Forced outage of NTPC Darlipalli Unit-1: ERLDC

On **April 24, 2024**, Darlipalli informed the ERLDC that **Unit-1** would be taken out of bar as an emergency measure on April 26th due to "**Low LP turbine differential expansion**". The unit finally went out of bar at 00:23hrs on **April 27th,** followed by an email stating a **60-day outage** for repairs.

ERLDC immediately raised concerns about the significant deviation of the outage period from the initial notification. Subsequently, Darlipalli revised the estimated restoration time to 7 days. Further, on **07.05.2024**, Unit-1 LPT-B preliminary inspection was done, and OEM/OES has suggested to do the complete inspection and overhauling of the TG and do the corrections similar to Unit-2. Accordingly, Darlipalli plant declared TG overhauling period 60 days tentatively from the date of outage.

All communications are attached as **Annexure B.2.8**

ERLDC and NTPC Darlipalli may please update. Members may discuss.

2.9 Incurring DSM loss due to scheduled generation exceeding normative DC: NTPC Darlipali

NTPC Darlipali station received SG more than normative DC on 3rd & 8th Apr -24. SG for 3rd April has been corrected. SG correction still pending for 8th Apr. On **8th Apr-24**, rev no. 34 there is no URS power. In rev no. 35 SG has been revised to be more than normative DC. As a result the generating station has **incurred DSM loss** of around **46 lacs**. Due to introduction of TGNA and changes in WBES site , URS power was visible in WBES site and same was sold in DAM. As one time measure it is requested to **waive off DSM by considering ECR** as **DSM rate**.

NTPC Darlipali and ERLDC may update. Members may discuss.

2.10 Modalities for compliance to DSM between India and Bhutan: ERLDC

CEA has issued detailed modalities for compliance to DSM between India and Bhutan on **25th April 2024** and the same has been implemented from **1st May 2024**. Detailed modalities are attached in **Annexure B.2.10**

Following are some of the salient features of the modalities.

- The delivery point for the import/export of power by Bhutan shall be at the India-Bhutan border **after accounting for the transmission line losses**.
- All Scheduling shall be through the **Settlement Nodal Agency (SNA)** to **NLDC,** India on 15-minute time block basis as per IEGC.
- **SNA** shall provide DC/schedule of generating stations for export to India at the delivery point after deducting applicable transmission losses.

Further, as per clause 7.6(b) of the DSM Modalities, the following scheduling information is required to be provided on a daily basis:

i. Ex Bus generating schedule of generating station
ii. Ex Bus schedule for export to India
iii. Schedule for export to India at the delivery point after deducting applicable transmission losses

- For arriving at the import/export of energy at the India-Bhutan border, the meters installed in the Bhutan side shall be used primarily after accounting for the transmission line losses. In case of any discrepancy in the reading, meters installed in the Indian side shall be used. For this different transmission loss for lean season and peak season is declared.Further as per clause 7.7 (b) of the DSM Modalities,All the meters required as per clause 7.7(a) (i) & (ii) shall be time synchronized with Indian Standard Time(IST)
- **Calculation of Deviation**

o Algebraic sum of export and import transactions at delivery points, shall be considered as total schedule for import/export (ESch)

o Actual import/export (EAct) would also be determined by summing up all the meter data at delivery points.

o Deviation EDev = EAct-ESch

• Efforts shall be made by Bhutan to keep generation as per schedule and deviations shall be settled within Bhutan through the implementation of Grid Discipline Mechanism (GDM) 202, of Bhutan.

Members may note.

2.11 Mock Islanding test :ERLDC

As per **IEGC cl. 29(11),** Mock drills of the islanding schemes are to be carried out annually by the respective RLDCs in coordination with the concerned SLDCs and other users involved in the islanding scheme. In case a mock drill with field testing is not possible to be carried out for a particular scheme, simulation testing shall be carried out by the respective RLDC.
Presently, the following islanding schemes are present in the Eastern Region:

Station/System	State/Country	Installed Capacity (MW)
CHPC	Bhutan	84
CESC	West Bengal	750 (3 x 250 MW)
NALCO	Odisha	1200
ICCL	Odisha	258 (2 x 54 MW + 1 x 30 MW + 2 x 60 MW)
RSP	Odisha	255 (2 x 60 MW + 3 x 45 MW)
Bhushan Power & Steel	Odisha	506
Aryan ISPAT and power Ltd.	Odisha	18
Maithon Ispat Limited	Odisha	30
Hindalco	Odisha	467.5
IMFA	Odisha	258 (2 X 54 MW+ 1 X 30 MW + 2 X 60 MW)
VAL	Odisha	1215 (9 X 135 MW)
Bakreswar Islanding Scheme	West Bengal	1050 (5 x 210 MW)

Tata Power Haldia Islanding Scheme	West Bengal	120 (2 x 45 MW+ 1 x 30 MW)
Bandel Islanding Scheme	West Bengal	215
Narbheram Power & Steel Pvt. Ltd (Dhenkanal) Islanding Scheme	West Bengal	8

These islanding schemes shall be reviewed and augmented depending on the assessment of critical loads at least once a year or earlier if required. Therefore, all the concerned SLDCs are requested to coordinate with respective users and share a plan for conducting a Mock test or in case a mock test not possible then may share the following data for conducting simulation studies:

1. Updated Network (in PSSE file)
2. Updated LGBR details of the island node wise (in PSSE file)
3. Machine dynamic data as per FTC documents of ERLDC
4. Islanding logic

ERLDC may explain. Members may update.

2.12 Stakeholders Comments on Draft SOP for supply, installation & replacement of ISTS IEM as per IEGC 2023 and CEA metering regulations 2006(with ammendments):ERPC

As per **IEGC 2023**, CTUIL shall be responsible for procurement & installation of Interface Energy Meters and replacement of faulty meters. Further as per CEA, all interface meters installed at the points of interconnection with Inter-State Transmission System (ISTS) for the purpose of electricity accounting and billing shall be owned by CTU. Accordingly, CTUIL has prepared a draft SOP for supply, installation & replacement of **ISTS IEM/SEMs** which is put up for stakeholders' comments by **31st May, 2024** in compliance to **IEGC 2023** and CEA metering regulations.

This Standard Operating Procedure (SOP) (attached at **Annexure B.2.12** for Procurement and Installation of **Interface Energy Meter** (IEM/SEM) will be applicable only for the IEM/SEM falling under the purview of CTU as per the provisions under Regulations 49.12 (a) of CERC (Indian Electricity Grid Code), Regulations, 2023 and amendments thereof.

The objective of this procedure is to ensure timely installation of IEM/SEM in the new ISTS system and timely replacement of the defective IEM/SEM. Presently, **POWERGRID** is an authorized agency for procurement of IEM/SEM, installation of new IEM/SEM and replacement of defective IEM/SEM. Any mention of POWERGRID in this procedure shall also mean any other agency authorized by CTUIL to carry to aforesaid functions. CTUIL may authorize any other agency to carry to aforesaid functions in future. Replacement/Installation of IEM/SEM shall mean all the activities including **supply** of new meter and its **installation, testing and commissioning**.

Stakeholders (**Generators, Bulk consumers, STUs, RLDCs, SLDC and other ISTS users**) may give their observations, if any, latest by **31.05.2024** at mail ids; **rshakya@powergrid.in** & **tanay@powergrid.in**

Members may note.

2.13 Details of failure of Transmission line towers of 220 kV and above voltage level during period of January 2024 to April 2024: ERPC

A Standing Committee of Experts in the field of design & operation of EHV Transmission lines was constituted by Central Electricity Authority in 1999 as per the Electricity (Supply) Act No. 54 of 1948 and re-composition of the Standing Committee was issued in 2012 (with representative from CEA, CPRI, DTU, RPCs and representative from Power Utilities), which continues to carry out investigation of failure of transmission line towers of Power utilities as per the Section 73(1) of the Electricity Act, 2003. The scope and terms of reference of the committee are:

(i) To investigate the cause of failure of transmission towers of 220 kV & above voltage level.

(ii) Recommendations to avert recurrence of such failures in future.

2. As per the requirement of the Standing committee, all utilities/ transmission licensees are supposed to report the failure of towers of 220 kV and above voltage class transmission lines to CEA. However, many a times such information is not provided to this office or the information is provided, but after significant amount of time from the date of incident. In this regard, it is highlighted that Central Electricity Authority (Measures relating to Safety and Electricity Supply) Regulations, 2023 mandates that utilities shall inform to CEA regarding transmission system failures within forty-eight hours. The clause related to the intimation of failures may be referred to below:

Clause 48(8): *"Failures of any 220 kV and above voltage level transformer, reactor and transmission line towers shall be reported by the owner of electrical installation, within forty-eight hours of the occurrence of the failure, to the Central Electricity Authority and the reasons for failure and measures to be taken to avoid recurrence of failure shall be sent to the Central Electricity Authority within one month of the occurrence* in *the format given* in *Schedule-VII."*

It is requested that the aforementioned regulations shall strictly be complied with and intimation of incident of tower failure, if any, shall be provided within the stipulated time.

Further, it is informed that a meeting of Standing Committee of experts to investigate on Tower failure is **proposed to be held in 3" week of the May, 2024,** wherein all the incidents of the failure of 220 kV and above voltage Transmission line towers, which occurred during the period from January 2024 to April 2024, are to be discussed.

4. It is requested to provide the below-mentioned details of the incidents failure of transmission towers of **220 kV & above** voltage level, which occurred in-between the period from **January 2024 to April 2024**, so that the same can be examined and included in the agenda of the next meeting of the Standing Committee :

I. Duly filled CEA proforma for intimation of tower failure incident (soft copy in Word format). The proforma is available on the CEA website at following link: **https://cea.nic.in/wp-content/uploads/2021/03/format failure trans line.pdf**
II. Detail failure analysis report.
III. Material test report for the tests conducted on the members, nuts & bolts of failed towers including impact test on the members/bolts from NABL accredited lab.
IV. Tower spotting data.
V. Detail of weight spans adopted for the towers located in the affected stretch.
VI. Soft copy of the colored photograph.
VII. Soft copy of foundation drawing & design for the failed tower locations.
VIII. Soft copy of the structural drawing & design for failed tower locations. .
IX. Tower Schedule of the relevant section of line.
X. If the cause of failure is attributed as wind then wind speed data of the time and location of the failure of towers obtained from a nearby authorized observatory.
XI. If the cause of failure is attributed as flood in nearby river, then velocity, discharge and highest water level observed in the river at the time and near the location of the failure of towers. The report of nearby authorized observatory in this regard.
XII. Any other relevant information.

All ISTS and state transmission licensees were intimated regarding the same on behalf of ERPC vide mail dated 08.05.2024.

Only Powergrid ER-II has updated failure details till date.

All transmission licensees (ISTS and state) may update.

3. PART-C: ITEMS FOR UPDATE/FOLLOW-UP

3.1. ER Grid performance during April 2024.

The average and maximum consumption of Eastern Region and Max/Min Demand (MW), Energy Export for the month April -2024 were as follows:

AVERAGE CONSUMPTION (MU)	MAXIMUM CONSUMPTION(MU)/ DATE	MAXIMUM DEMAND (MW)	MINIMUM DEMAND (MW)	SCHEDULE EXPORT	ACTUAL EXPORT
		DATE/TIME	DATE/TIME	(MU)	(MU)
606.9 MU	667 MU 30.04.2024	31890 MW, 30.04.2024 at 23:18 Hrs.	20447 MW, 12.04.2024 at 05:27 Hrs.	1538	1656

ERLDC/ERPC may highlight the performance of the ER grid.

3.2. Status of ongoing Generation Projects: ERPC

Enhancing thermal capacity is imperative due to escalating load demands. As we approach the summer season, ensuring preparedness is of utmost importance. Possessing adequate capacity during peak load periods is crucial for effective grid management. There are several forthcoming thermal projects within the region, with a few Thermal Power Plants (TPPs) awaiting their CODs such as North Karanpura, Barh, Patratu, IBEUL (Unit #02) and SJVN.

It is necessary for these thermal power plants to strategize for their timely completion and integration into the grid, ensuring the region's readiness for the upcoming demand surge.

COD of Unit #02(660 MW) of North Karanpura TPP was completed on 20.03.2024. Status of Unit#03(660 MW) may please be confirmed by NTPC.

Generating unit	Update as per 212th OCC meeting	Update as per 214th OCC meeting
North Karanpura TPP U#3(660 MW)	-	to be commissioned by **December 2024**.
Barh stage-I U#3 (660 MW)	-	to be commissioned by **March 2025.**
Patratu	COD expected in Q4 of FY 2024-25.	-
Buxar TPP(SJVN)	-	Synchronization of Unit#1 is targeted in **September, 2024** and Unit#2 in **December, 2024**
IBEUL	-	• IBEUL U#2(350 MW) to be commissioned by end of **June 2024**.Presently w.r.t the project, **Bolier inspector clearance** and

		clearance from MOEFCC is pending. • **Dedicated Transmission line (DTL)** of the project to be tentatively completed by **1st week of September 2024.** • As per progress report submitted by IBEUL dated 13.04.2024, status of **400 kV IBEUL-Sundergarh DTL** is as follows: o Foundation works: **91.5%** completed o Erection works: **87%** completed o Stringing works: **55%** completed

As per deliberation in 214th OCC:

- OCC advised IBEUL to share the specific issue pertaining to MOEFCC clearance that is delaying commissioning of the IBEUL U#2 so that the same may be pursued with MOEFCC for early resolution.
- OCC further advised IBEUL to submit regular progress report of DTL highlighting significant progress in activities and also strictly adhere to the committed timeline for DTL commissioning.
- OCC advised all Thermal GENCOs to expedite progress of their new generation projects to ensure timely commissioning of the respective units, thereby keeping pace with unprecedented escalation in load demand.

All concerned Thermal GENCOs may update. Members may discuss.

3.3. Update on installation of 7th (Interim) 500 MVA ICT at 400 kV Subhasgram (PG)-ERPC

As per deliberation in 214th OCC:

Powergrid ER-II representative was not present in the meeting.

Member Secretary ERPC apprised the forum of the following:

- The 500 MVA ICT is still stranded near Achipur Ghat (Budge Budge).
- An alternate route has been explored for further movement of the ICT from Budge Budge and a separate bridge construction has commenced to materialize the same.

- As per present progress, the 500 MVA ICT is likely to be commissioned at Subhasgram(PG) by third week of May 2024.

OCC decision:

OCC forum noted the shared update in optimism to put the 7th (interim) 500 MVA ICT in service at 400 kV Subhasgram(PG) amid the ongoing crunch demand period.

As per latest available status, 7th (interim) **500 MVA ICT** has **already reached 400 kV Subhasgram(PG)** on **16.05.2024** which shall be put to service shortly.

Powergrid ER-II may please update. Members may discuss.

3.4. Regarding Non-Submission of Forecasting Data from States:ERLDC

The **Clause 2** of **Regulation 31** of **IEGC 2023** has mandated all the **SLDCs** to timely submit the demand estimate data to the respective RLDC and RPC.

The demand estimation data provided by SLDCs will be required in resource adequacy planning and regional load forecasts conducted by the RLDC. Currently, Jharkhand SLDC regularly provides day ahead and weekly forecasts and West Bengal SLDC is submitting day-ahead forecasts. ERLDC has planned to visit all the SLDCs to sensitize them about the Forecasting. Following the visit by the ERLDC team, DVC has started sending day day-ahead forecasts to ERLDC. The latest Forecast receipt status is shown below:

AS ON 16-05-2024	Forecast Receipt Status		
Entity Name	Day ahead	Weekly	Monthly
JHARKHAND	REGULAR	REGULAR	NOT RECEIVED
WEST BENGAL	IRREGULAR	NOT RECEIVED	NOT RECEIVED
DVC	RECEIVED	NOT RECEIVED	NOT RECEIVED
BIHAR	RECEIVED	NOT RECEIVED	NOT RECEIVED
SIKKIM	NOT RECEIVED	NOT RECEIVED	NOT RECEIVED
ODISHA	NOT RECEIVED	NOT RECEIVED	NOT RECEIVED

Hence it is again requested to all the concerned for timely submission of demand estimation data to ERLDC. This collaboration is essential for effective planning and preparedness to meet the region's electricity demands efficiently and reliably.

ERLDC may please update. Members may discuss.

3.5. Regarding Non-Submission of FRC data: ERLDC

Adhering to **IEGC** clauses **30.8 and 30.10.(a) to 30.10.(q),** generating stations within the eastern region are required to submit essential data to ERLDC within two days of receiving a notification regarding a reportable frequency event. Additionally, according to clause 30.10.(n), all control areas within the eastern region must assess their frequency response characteristics and share the evaluation, along with high-resolution data, with the ERLDC. If any data is not received or is incomplete, ERLDC resorts to using Scada data (low resolution) to calculate the performance of the respective control area. Therefore, timely submission of primary response data is crucial for compliance with the IEGC.

As per the decision taken in the **214th OCCM**, all the regional generators as well as states were advised to send the high-resolution data to ERLDC for assessing their performance. The data receipt status of the relevant events is attached herewith:

STATIONS	**23.04.2024**	**02.05.2024**
	20:15	**14:41**
Barh stage-1	Pending	Pending
Barh stage-2	Pending	Pending
BRBCL	**Received**	**Received**
Darlipalli	Pending	**Received**
FSTPP #STG 1 & 2	Pending	Pending
FSTPP # STG 3	Pending	Pending
KhSTPP #STG 1	Pending	Pending
KhSTPP #STG 2	**Received**	**Received**
NPGC	**Received**	Pending
TSTPP #STG 1	Pending	Pending
TALCHER STG2	Pending	Pending
TEESTA V	Pending	Pending
North Karanpura	Pending	Pending
TEESTA III	Pending	Pending
ADHUNIK	**Received**	Pending
DIKCHU	Pending	Pending
TASHIDING	Pending	Pending
GMR	**Received**	**Received**

JITPL	**Received**	**Received**
MPL	**Received**	**Received**
Bihar	Pending	Pending
Jharkhand	Pending	Pending
DVC	Pending	Pending
OPTCL	**Received**	**Received**
WB	Pending	Pending

Updated on 14.05.23

STATE	Station Name	23.04.2024 20:15	02.05.2024 14:41
Bihar	Barauni	Pending	Pending
Jharkhand	Tenughat	Pending	Pending
DVC	Mejia	Pending	Pending
	Koderma TPS	Pending	Pending
	RAGHUNATHPUR	Pending	Pending
	CTPS	Pending	Pending
	DSTPS	Pending	Pending
	Bokaro	Pending	Pending
OPTCL	Balimela	Pending	Pending
	GMR	Pending	Pending
	IBTPS	Pending	Pending
	U-Indravati	Pending	Pending
	OPGC	Pending	Pending
	U-Kolab	Pending	Pending
WB	Bakreshwar	Pending	Pending
	Bandel	Pending	Pending
	DPL	Pending	**Received**
	Budge-Budge	Pending	Pending

	Kolaghat	Pending	Pending
	Sagardighi	Pending	**Received**
	HALDIA	**Received**	**Received**
	Santaldih		

In view of the same the following action points may be noted:

- All regional generators are once again requested to take necessary action to ensure consistent data submission for every frequency event flagged by ERLDC.
- SLDCs to access FRC as well as the performance of their intra-state entities.

ERLDC may please update. Members may review and discuss.

3.6. Finalisation of dates for mock black start in capable units of Eastern region: ERLDC

As per **IEGC 2023** regulations, each user is required to carry out a mock trial run of the restoration procedure for different sub-systems including black-start of generating units along with grid forming capability of inverter-based generating station and VSC-based HVDC black-start support at least once a year under intimation to the concerned SLDC and RLDC.

As such a tentative list for the year 2024 is prepared for conducting mock Blackstart of capable hydro units in the Eastern Region, matching with the dates in which such tests were conducted in previous years. The same agenda was discussed in the **214th OCC** meeting and it was deliberated that all hydro stations of ER to update the schedule of mock black start as prepared by ERLDC.

A few tentative dates, as received, have been highlighted in sky blue color.

Sl No	Name of Hydro Station	2022 Actual Date of Test	2023 Actual Date of Test	Schedule of Mock Black Start	2024 Actual Date of Test
1	U. Kolab	23rd,June2022		June-2024	
2	Balimela	08th Sep-2022		July-2024	
3	Rengali	08-December- 2022	12th July 2023	June-2024	
4	Burla	23-June-2022		July-2024	
5	U. Indravati	25-May-2022		May-2024	

6	Maithon	DVC representative submitted that upgradation work is under progress due to issues in the governing system. Detailed timeline would be submitted to ERPC and ERLDC. Detail timeline yet to be received from DVC SLDC	14th August 2023	Dec-2024	
7	TLDP-III			Oct-2024	
8	TLDP-IV			Oct-2024	
9	Subarnarekha	13th December 2022		Sep-2024 4th week	
10	Teesta-V			N/A	
11	Chuzachen			Oct-2024	
12	Teesta-III	08-April- 2022		N/A	
13	Jorethang		19th and 20th December 2023	Dec-2024 3rd week	
14	Tashiding		12th December 2023	2nd week of Dec 2024	
15	Dikchu			N/A	
16	Rongnichu			March 2024	18th March and 20th March 2024
17	Mangdechu				

The users, in this case mean includes generating company and they are requested to kindly respond and review the tentative dates specific to their plant units and update the list. For intra state blackstart capable hydro units, SLDCs are requested to respond on their behalf.

So far , only Tashiding, Jorethang and Subarnarekha(JUSNL) have updated.

ERLDC may update. Members may review and discuss.

3.7. Commissioning Status of ADMS: ERLDC

Automatic demand management scheme (ADMS) has been already commissioned in West Bengal, DVC, Odisha, and Jharkhand and partially implemented by Bihar.

It was deliberated by Bihar in the **214th OCC** that an 80 MW load has already been implemented under ADMS while an additional 400 MW load is yet to be implemented. A detailed feeder list for 80 MW load under ADMS shall be shared with ERLDC. The feeder list is yet to be received at ERLDC.

DVC deliberated that after implementation of the Chandrapura islanding scheme, the ADMS scheme has got changed and the revised logic has been implemented. SCADA integration is pending for some of the ADMS feeders which shall be completed at the earliest.

ERLDC may update present status. Bihar may update the list. DVC may update the status of SCADA integration.

3.8. Ensuring the healthiness of ADMS: ERLDC

State	Criteria for ADMS operation	Number of instances for which ADMS criteria satisfied in April 2024	Number of instances for which detail received	Discussion regarding previous month performance	Update in 214th OCC meeting
West Bengal	1. System Frequency < 49.7 Hz 2. WB over-drawl > 150 MW 3. Delay = 4 min	0	-	-	-
Jharkhand	1. System Frequency < 49.9 Hz 2. Jharkhand over-drawl > 150 MW 3. Delay = 3 min	36	Not received	-	-
DVC	1. System Frequency < 49.9 Hz 2. DVC over-drawl > 150 MW 3. Delay = 3 min	4	Not received	-	-
Odisha	1. System Frequency < 49.9 Hz 2. Odisha over-drawl > 150 MW	33	Not received	-	-

	3. Delay = 3 min				

4. PART-D: OPERATIONAL PLANNING

4.1. Anticipated power supply position during June-2024

The abstract of peak demand (MW) vis-à-vis availability and energy requirement vis-à-vis availability (MU) for the month of June 2024 were prepared by ERPC Secretariat (**Annexure D.1**) on the basis of LGBR for 2024-25 and feedback of constituents, keeping in view that the units are available for generation and expected load growth etc.

Members may update.

4.2. Major Thermal Generating Units/Transmission Element outages/shutdown in ER Grid (as on 15-05-2024)

a) Thermal Generating Stations outage report:

SL No	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
1	BARAUNI TPS	BIHAR	NTPC	7	110	Poor condenser vacuum	19-Jul-2023
2	BARAUNI TPS	BIHAR	NTPC	6	110	Low vacuum	22-Jul-2023
3	RTPS	DVC	DVC	2	600	Initially Unit was taken out due to very low lube oil presssure, later unit was taken under annual overhauling w.e.f 00.00 hrs of 27/02/2024, now under forced outage wef 23/03/2024 due to damage in turbine bearing.	26-Feb-2024
4	RTPS	DVC	DVC	1	600	Boiler Tube Leakage	14-May-2024
5	DARLIPALI	ODISHA	NTPC	1	800	Turbine related problem	27-Apr-2024
6	BARH	BIHAR	NTPC	1	660	Abnormal sound in the boiler of Unit-1	13-May-2024

All Generating stations are requested to update expected restoration time and reason outage to ERLDC/ERPC on weekly basis in case of any change at their end.

b) Major Generating stations Out on Reserve Shutdown due to low system demand:

SL No	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
NIL							

c) Hydro Unit Outage Report:

S. NO	STATION	STATE	AGENCY	UNIT NO	CAPACITY (MW)	REASON(S)	OUTAGE DATE
1	TEESTA STG III Hep	SIKKIM	TUL	1-6	200	Sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in Teesta River and damage of Teesta III Dam & downstream Powerhouses	04-Oct-2023
2	DIKCHU Hep	SIKKIM	SKPPL	1-2	48	Sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in Teesta River and damage of Teesta III Dam & downstream Powerhouses	04-Oct-2023
3	TEESTA HPS	SIKKIM	NHPC	1-3	170	Sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in Teesta River and damage of Teesta III Dam & downstream Powerhouses	04-Oct-2023
4	INDRAVATI	ODISHA	OHPC	2	150	Capital Maintenance	23-Nov-2023
5	CHIPLIMA HPS / HIRAKUD II	ODISHA	OHPC	1	24	Capital Overhauling	15-Dec-2023

6	BALIMELA HPS	ODISHA	OHPC	2	60	High Turbine Vibration	14-Mar-2024
7	BURLA HPS/HIRAKUD I	ODISHA	OHPC	1	49.5	Annual maintenance	18-Apr-2024

d) Long outage report of transmission lines (As on 15.05.2024):

Transmission Element / ICT	Outage From	Reasons for Outage
220/132KV 100 MVA ICT II AT LALMATIA	22.01.2019	Commissioning work of 220/132KV, 100MVA Transformer and its associated control Panel under progress.
220 KV PANDIABILI - SAMANGARA D/C	03.05.2019	Tower Collapsed during Cyclone FANI (Restoration project is entrusted upon PGCIL & 220kV Samangara-Pandiabili ckt-I&II are anti-theft charged from Pandiabili end from loc no.01 to loc no.74)
220/132KV 100 MVA ICT 3 AT CHANDIL	30.04.2020	Due to Fire hazard ICT damaged and burnt.
220KV-FSTPP-LALMATIA-I	21.04.2021	Conductor stringing 12.965 km has been completed and Stringing between Tower Loc. no. 152 to 159 is under progress. Transmission line is idle charged between Lalmatia GSS end to Tower Loc.no.169
220KV-WARIA-BIDHANNAGAR-1 & 2	08.06.2022	To control overloading of 220 kV Waria-DSTPS (Andal) D/C line
220KV-MUZAFFARPUR(PG)-GORAUL(BH)-1	11.06.2022	Main Bay is under breakdown due to flashing in GIS module
400/220KV 315 MVA ICT 2 AT PATRATU	27.09.2022	ICT tripped on few occasions due to Buchholz later DGA violation found, internal fault in transformer to be rectified. (DGA violation)
132KV-BARHI-RAJGIR-1	25.03.2023	Dismantling of tower no. 227, 228, and 229 crossing the

132KV-NALANDA-BARHI(DVC)-1	25.03.2023	premises of Mahabodhi Cultural centre along with Destringing of conductor of both circuits and Earth wire between tension tower no. 218-237 in same line.
400KV-RANGPO-TEESTA-V-1 & 2	04.10.2023	Tower near gantry of Teesta V powerhouse collapsed due to sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in TEESTA river and damage of Teesta III Dam & downstream Powerhouses
400KV-TEESTA-III-RANGPO-1	04.10.2023	Hand tripped from Teesta-III end due to sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in TEESTA river and damage of Teesta III Dam & downstream Powerhouses
400KV-TEESTA-III-DIKCHU-1	04.10.2023	
400KV-RANGPO-DIKCHU-1	04.10.2023	Hand tripped from Rangpo end due to sudden cloudburst at glacier fed LOHNAK Lake followed by huge inrush of water in TEESTA river and damage of Teesta III Dam & downstream Powerhouses
400KV/220KV 315 MVA ICT 1 AT FARAKKA	21.02.2024	Replacement of 220kV circuit breaker of 315 MVA ICT-1 bay under ADDCAP.
400KV-KHSTPP-BANKA (PG)-1	24.02.2024	Switchyard bay updation work
132KV-RIHAND-NAGARUNTARI-1	08.03.2024	Height raising of 132 KV Rihand-Nagaruntari & 132 KV Rihand-Garhwa Rd. T/L
400KV-JHARSUGUDA-ROURKELA-3&4	01.04.2024	Reconductoring work
132KV-MADHEPURA (BH)-SAHARSA(PMTL)-1	04.04.2024	To control loading on 132kV Madhepura-Saharsa line
400KV-BIHARSARIFF(PG)-SAHUPURI(CHANDAULI)-1	27.04.2024	Diversion works due to construction of four lane from Bakhtiyarpur to Rajauli by NHAI
400KV-BIHARSARIFF(PG)-VARANASI-2	27.04.2024	Diversion works due to construction of four lane from Bakhtiyarpur to Rajauli by NHAI

400KV-ALIPURDUAR (PG)-PUNASANGCHUN-JIGMELING-1	29.04.2024	APD:R-Ph,148km,Z-II Jigmelling: Tripped Yphase and Bphase,Distance 95.5km,Ir=1.43kA,Iy=0.62kA,Ib=0.28kA
HVDC PUSAULI	06.05.2024	Inspection of HVDC Valve hall to inspect the VESDA alarm reason
400KV/220KV 315 MVA ICT 2 AT RENGALI	07.05.2024	Commissioning of ICT-2 at Rengali under ADD CAP 2019-24

Transmission licensees/ Utilities are requested to update expected restoration date & work progress regarding restoration regularly to ERLDC/ERPC on monthly basis by 5th of each month so that status of restoration can be reviewed in OCC. Utilities are also requested to update outage of any elements within their substation premises like isolator/breaker to ERLDC/ERPC regularly. (Reported as per Clause 5.2(e) of IEGC)

4.3. Commissioning of new units and transmission elements in Eastern Grid in the month of April -2024.

The details of new units/transmission elements commissioned in the month of April -2024 based on the inputs received from beneficiaries:

NEW ELEMENTS COMMISSIONED DURING APRIL, 2024

GENERATING UNITS

SL. NO.	Location	Owner/ Unit name	Unit No / Source	Capacity added (MW)	Total/Installed Capacity (MW)	DATE	Remarks
NIL							

ICTs/ GTs / STs

SL. NO.	Agency/ Owner	SUB-STATION	ICT NO	Voltage Level (kV)	CAPACITY (MVA)	DATE	Remarks
NIL							

TRANSMISSION LINES

SL. NO.	Agency/ Owner	Line Name	Length (KM)	Conductor Type	DATE	Remarks
1	BSPTCL	220KV-PUSAULI-NADHOKAR-1 or 220KV Pusauli(BSPTCL)-Pusauli(PG) ckt-1	4.417	HTLS Conductor	05-04-2024	Reconductoring of the this line is done with HTLS conductor with its Bays are rated enough to match the uprated capacity of the line

LILO/RE-ARRANGEMENT OF TRANSMISSION LINES

SL. NO.	Agency/ Owner	Line Name/LILO at	Length (KM)	Conductor Type	DATE	Remarks
1	PGCIL	400 kV Biharsharif-Sahupuri(Chandauli)-1	289.44	Quad Moose	20-04-2024	400kV Biharsharif-Varanasi Ckt-1 Liloed at Sahupuri(Chanduali)(UPPTCL)
BUS/LINE REACTORS						
SL. NO.	**Agency/ Owner**	**Element Name**	**SUB-STATION**	**Voltage Level (kV)**	**DATE**	**Remarks**
NIL						
BUS						
SL. NO.	**Agency/ Owner**	**Element Name**	**SUB-STATION**	**Voltage Level (kV)**	**DATE**	**Remarks**
NIL						
BAYS						
SL. NO.	**Agency/ Owner**	**Element Name**	**SUB-STATION**	**Voltage Level (kV)**	**DATE**	**Remarks**
NIL						

Members may note.

4.4. UFR operation during the month of April 2024.

Frequency profile for the month as follows:

MONTH	MAX (DATE/TIME)	MIN (DATE/TIME)	% LESS IEGC BAND	% WITHIN IEGC BAND	% MORE IEGC BAND
Apr, 2024	50.43 Hz on 18-04-2024 at 18:04 hrs	49.55 Hz on 06-04-2024 at 11:24 hrs	5.25	78.56	16.19

Hence, no report of operation of UFR has been received from any of the constituents.

Members may note.

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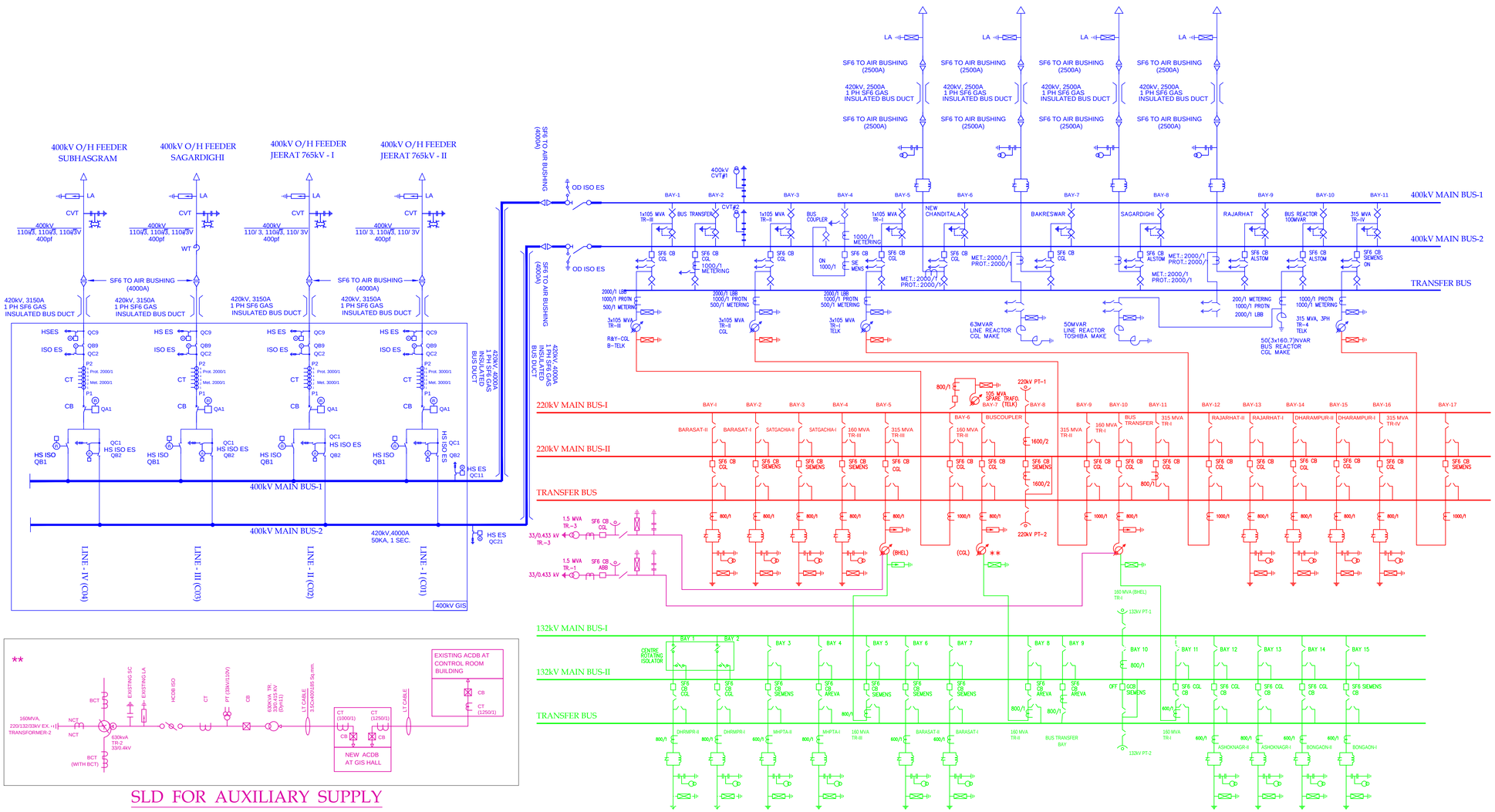
Annexure B.2.4

SINGLE LINE DIAGRAM OF JEERAT 400/220/132kV SUB-STATION WBSETCL



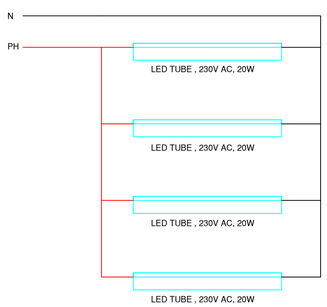
SLD FOR AUXILIARY SUPPLY

LEGENDS:

SYMBOL	DESCRIPTION
	AUTO TRANSFORMER
	2 WDG TRANSFORMER
	REACTOR
	CIRCUIT BREAKER
	PANTO ISOLATOR
	HCB ISOLATOR
	CENTRE ROTATING ISOLATOR
	CT
	PT
	CVT
	LA
	WAVE TRAP
	400 kV VOLTAGE LEVEL
	220 kV VOLTAGE LEVEL
	132 kV VOLTAGE LEVEL
	33 kV VOLTAGE LEVEL

400KV INDOOR EQUIPMENT LEGENDS :	
SYMBOL	DESCRIPTION
	CIRCUIT BREAKER
	CURRENT TRANSFORMER
	ISOLATOR WITH ONE E/S
	HIGH SPEED EARTH SWITCH
	HIGH SPEED ISOLATOR WITH ONE EARTH SWITCH
	HIGH SPEED ISOLATOR WITHOUT EARTH SWITCH

400KV OUTDOOR EQUIPMENT LEGENDS :	
SYMBOL	DESCRIPTION
	420 KV , 4000A , 50KA for 1 Sec. HCB, MOTOR OPERATED 3PH ISOLATOR WITH E/S
	420 KV, 4400pf Line CVT
	420KV, 3150A, 1.0 mH LINE TRAP
	336KV LIGHTNING ARRESTER
	SF6 AIR BUSHING (4000A)
	SF6 AIR BUSHING (2500A)



TYPICAL CONNECTION DIAGRAM OF LED TUBE

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER, UNLESS OTHERWISE SPECIFIED.
2. DIMENSION OF GLOW SIGN BOARD:- 2000X1250 MM.
3. MATERIALS USED:-
   a. FRONT MATERIAL- WHITE ACRYLIC SHEET (3MM THICK).
   b. ENCLOSURE MADE UP OF 0.6MM THICK GI SHEET.
4. PRINT TYPE:- UV PRINTING DIRECTLY ON ACRYLIC SHEET.
5. NUMBER OF LIGHTS:- 4 NOS LED TUBE OF 230V AC, 20W

REV	DESCRIPTION	PREP.	CHKD.	APPD.	DATE
0	FIRST SUBMISSION	SN	SB	NK	11.03.21

SIGN.

CUSTOMER	WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED.
	TECHNO ELECTRIC & ENGG. CO. LTD.

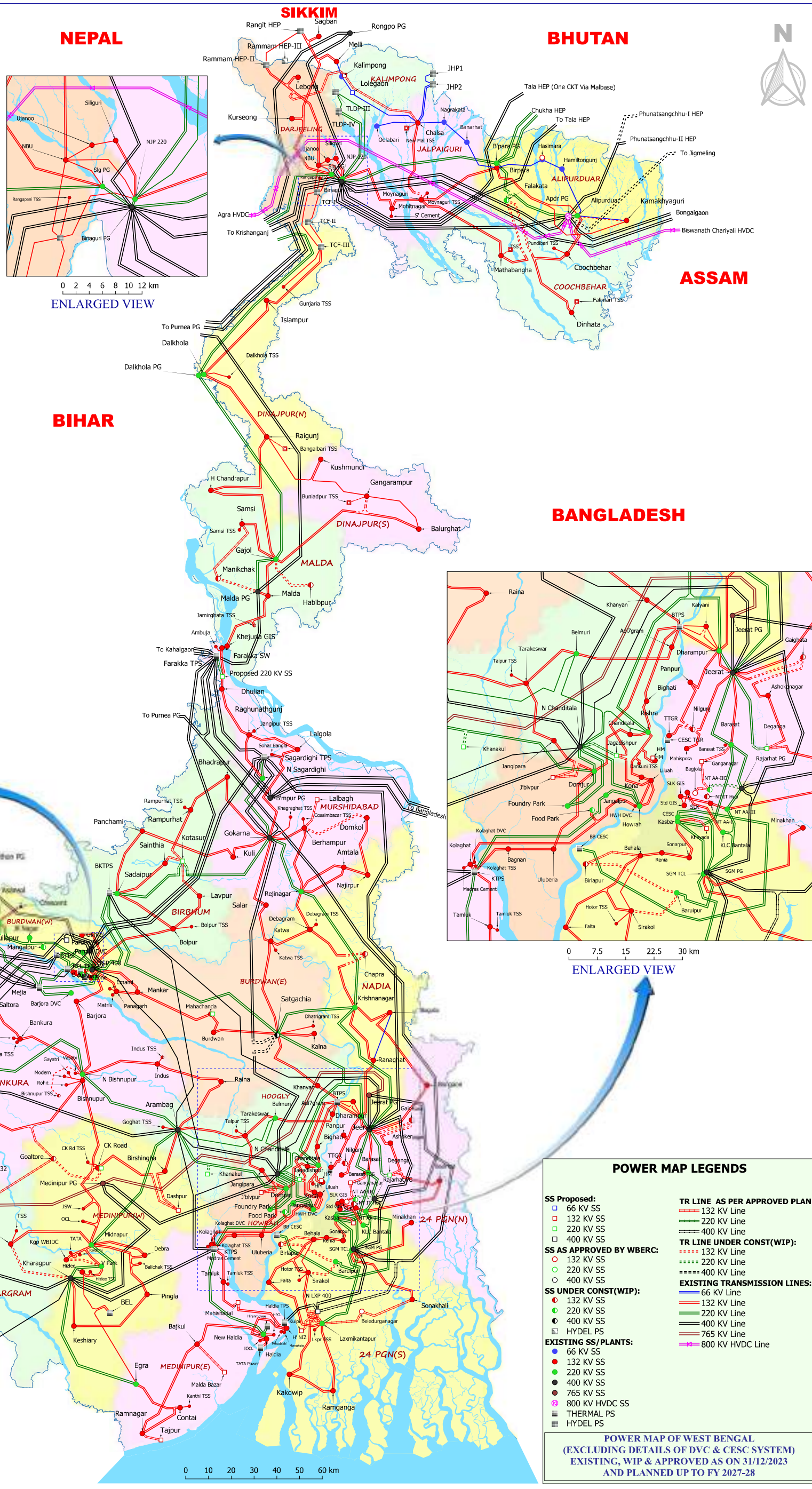
NOA NO.		
	SUPPLY	CEP/WBSETCL/Sub-Stn/Package-59 / Supply /2018-19/44 Dated:05.11.2018
	ERECTION	CEP/WBSETCL/Sub-Stn/Package-59 / Erection /2018-19/45 Dated:05.11.2018

PROJECT	CONSTRUCTION OF 2 NOS. 400 KV GIS LINE BAYS FOR TERMINATION OF JEERAT(NEW)– JEERAT (WBSETCL) 400 KV D/C LINE (ERSS XVIII) , CONSTRUCTION OF 2NOS. OF 400 KV GIS LINE BAYS FOR TERMINATION OF SAGARDIGHI TPS – SUBHASHGRAM PGCIL 400 KV S/C LINE (ERSS XV A) AND MODIFICATION OF TERMINATION ARRANGEMENT OF 4 NOS. 400 KV EXISTING FEEDERS AT JEERAT 400 KV SUBSTATION (ERSS XV B), DISTRICT – 24 PARGANAS (NORTH) [Package-59]
SUBSTATION	400kV JEERAT SUBSTATION (EXTN.)
DRG. TITLE	GLOW SIGN BOARD
DRG. NO. :	0737WB/JERT/SUB/E/DRG/GSB/001
SCALE :	NTS — JOB NO: 0737WB — SHEET: 1 OF 1

POWER MAP OF WEST BENGAL AS ON 31/12/2023

INSTALLED CAPACITY

GENERATING STATION	EXISTING	WIP
WBPDCL:		
Kolaghat TPS (4 X 210)MW)	840 MW	
Bakreswar TPS (5 X 210) MW	1050 MW	
Sagardighi TPS (2 X 500 + 2 X 300 + 1 X 660) MW	1600 MW	660 MW
Santaldihi TPS (2 X 250) MW	500 MW	
Bandel TPS (1 X60 + 1 X 215) MW	275 MW	
Total=	**4265 MW**	**660 MW**
WBSEDCL :		
Purulia PSP (4 X 225) MW	900 MW	
Rammam-II HPS (4 X 12.75) MW	51 MW	
TCF HPS (3 X 3 X 7.5) MW	67.5 MW	
Jaldhaka HPS(4 X9 + 2 X 4) MW	44 MW	
Mini-Micro HPS	8.8 MW	
Total =	**1071.3 MW**	
DPL :		
Unit #7	300 MW	
Unit#8	250 MW	
Total =	**550 MW**	
NTPC :		
Farakka Unit # 1-3 (3 X 200) MW	600 MW	
Farakka Unit # 4-6 (3 X 500) MW	1500 MW	
Total =	**2100 MW**	
NHPC :		
TLDP-III (4 X 33) MW	132 MW	
TLDP-IV (4 X 40) MW	160 MW	
Total =	**292 MW**	
DVC(WB) :		
Mejia TPS (4 X 210 + 2 X 250 + 2 X 500)MW	2340 MW	
Durgapur TPS (1 X 210) MW	210 MW	
Durgapur Steel TPS (2 X 500) MW	1000 MW	
Raghunathpur TPS (2 X 600) MW	1200 MW	
Maithon HPS (2 X 20 + 1 X 23.2) MW	63.2 MW	
Total =	**4813.2 MW**	
CESC Ltd., HEL, Others :		
Budge Budge TPS (3 X 250) MW	750 MW	
Southern TPS (2 X 67.5) MW	135 MW	
Titagarh TPS (4 X 60) MW	240 MW	Not In Service
Haldia Energy Ltd. (2 X 300) MW	600 MW	
Cresent Power Ltd. (1 X 40) MW	40 MW	
Philips Carbon Black Ltd. (1 X 30) Mw	30 MW	
Total =	**1795 MW**	
Others :		
Bengal Energy Ltd. (1 X 40) MW	40 MW	
Hiranmoyee Energy Ltd. (3 X 150) mW	300 MW	150 MW
Tata Power, Haldia (2 X 45 + 1 X 30) MW	120 MW	
Total =	**460 MW**	**150 MW**
Grand Total =	**15346.5 MW**	**810 MW**



POWER MAP LEGENDS

SS Proposed:
- 66 KV SS
- 132 KV SS
- 220 KV SS
- 400 KV SS

SS AS APPROVED BY WBERC:
- 132 KV SS
- 220 KV SS
- 400 KV SS

SS UNDER CONST(WIP):
- 132 KV SS
- 220 KV SS
- 400 KV SS
- HYDEL PS

EXISTING SS/PLANTS:
- 66 KV SS
- 132 KV SS
- 220 KV SS
- 400 KV SS
- 765 KV SS
- 800 KV HVDC SS
- THERMAL PS
- HYDEL PS

TR LINE AS PER APPROVED PLAN:
- 132 KV Line
- 220 KV Line
- 400 KV Line

TR LINE UNDER CONST(WIP):
- 132 KV Line
- 220 KV Line
- 400 KV Line

EXISTING TRANSMISSION LINES:
- 66 KV Line
- 132 KV Line
- 220 KV Line
- 400 KV Line
- 765 KV Line
- 800 KV HVDC Line

POWER MAP OF WEST BENGAL
(EXCLUDING DETAILS OF DVC & CESC SYSTEM)
EXISTING, WIP & APPROVED AS ON 31/12/2023
AND PLANNED UP TO FY 2027-28

WEST BENGAL STATE ELECTRICITY TRANSMISSION COMPANY LIMITED

Annexure B.2.5

MEMORANDUM FOR OPERATION CO-ORDINATION SUB-COMMITTEE (OCC) of EASTERN RESGIONAL POWER COMMITTEE (ERPC) ON ESTABLISHMENT OF REGIONAL RESEARCH & TESTING UNIT OF CPRI AT BHUBANESWAR.

The State of Odisha has ~1 crore electricity consumers and our grid demand hovers around 4800 - 5100 MW. Installed CGP capacity in the State is around 10 GW. Future electricity demand is likely to grow at a CAGR of 5-6% over the next 10-15 years, as per conservative assessments. Some industrial clusters, e.g. Paradeep (Jagatsinghpur), Kalingnagar (Jajpur), Dhamra (Bhadrak), Angul and Badbil (Keonjhar) are developing rapidly, which provides opportunities for further downstream & ancillary industries. Apart from Mining and Metal sectors, industry interests in the State range from Chemicals, Petrochemicals & Plastics to Biotech, IT, Food processing, Textile & Apparel etc., which are attracting good investments in the State.

The network expansion & up-gradation are planned to meet the demand growth. The four Power Distribution utilities in the State have plans for investment of more than Rs.5,600 crore by FY 2025-26. The four Discoms have collectively assessed procurement value of around Rs.1000 crore in the categories of PTR, DTR, Cable & Conductor, Switchgears, Poles, Meters, Battery and SCADA & Automation equipment.

To meet the huge supply requirement of the above electrical equipment and many MSMEs & other equipment manufacturers are expanding their manufacturing facility & new OEMs are also coming up. Equipment being procured are required to meet global quality standards to avoid any premature failure; therefore all such equipment are to be tested at reputed lab like CPRI before being accepted. The scope of electrical equipment testing including electricity meter is going to be huge.

The intake strength of 500+ ITI institutes in the State is more than 48,000 per annum; there is a need for training & skilling of students in equipment testing aspects. Collaborative research avenues can be undertaken through institutes like IIT, IIIT, NIT, NISER and Institute of Physics etc., which are present in the State. While projecting the testing facility capacity, requirement of neighboring States/ ER region is also to be considered.

1. **Existing infrastructure**

   The present peak power demand of Odisha for the DISCOMs is around 5,100 MW and is projected to grow at a CAGR of 5% for next 15 years. With such a projection, the State's peak demand will be nearly 10,000 MW by 2031-32. The snapshot of present power network infrastructure along with future growth is attached as **Annexure –A** for reference.

   Further, the State have ~13,000 MW IPP and ~11,000 MW CGP power generation capacity, 193 EHT grids, 17,800 circuit km EHT transmission line, 1170 sub-transmission primary sub-stations, 2.85 lakh distribution sub-stations and 4 lakh circuit km distribution line.

2. **Future investments**

   Privatized DISCOMs in their respective vesting orders have planned for investment in the Distribution sector to the tune of Rs. 5,600 core by FY 2025-26 through their own CAPEX.

   State Govt.'s distribution strengthening project of Rs.1,800 crore for 99 new 33/11 kV sub-stations and ~3,800 km HT line has also been notified in ODSSP Phase-IV scheme.

   Sanction has been made for Disaster Resilient infrastructure work to the tune of Rs.200 crore in TPWODL & TPSODL jurisdiction.

   Recently the State government has disbursed Rs.415 crore for Household electrification works under BGJY scheme.

   All these schemes would require procurement of PTRs, DTRs, conductors, cables, switchgears, meters, poles, battery, panels & associated equipment, automation, T&P in huge numbers. Besides, the annual material procurement value of DISCOMs is around Rs.1,000 crore for R&M of the Distribution Network.

   Existing industrial clusters at Paradeep (Jagatsinghpur), Kalingnagar (Jajpur), Dhamra (Bhadrak), Angul and Badbil (Keonjhar) are also expanding and some new such hubs are in the offing.

Coastal Odisha comprising the northern, eastern and central (partially) parts, are well connected with Airport, Sea Ports, Rail & Road network for transportation & export to south-east Asian countries. Western part of Odisha are being connected with express-highways & rail network. The State is promoting industrialisation in a focused approach towards mining, metals, downstream & ancillary, chemicals, petro-chemicals, food-processing, biotech, textile & apparel, information technology & electronics, renewable energy and green hydrogen & green ammonia. State has released conducive policies with best-in-category incentive structure for these sectors.

Recently concluded 3rd edition of the Make in Odisha 2022 conclave (held during 30th Nov. – 4th Dec. 2022) was a huge success attracting more than Rs.10 lakh crore investment commitments.

3. **Quantum of electrical industries in State and their demand for equipment testing**

Odisha has huge power intensive industries / units which requires almost 70% of the total power demand of the State (excluding CGP & IPPs). This putting a huge pressure on the State Testing Laboratory for the routine / annual inspection & testing requirements, which excludes tests being carried out outside the State at NABL accredited laboratories and other tests excluding routine tests.

The types of tests required by the DISCOMs frequently are attached as **Annexure –B** for ready reference.

4. **Existing manufacturers of product/ equipment/ component in power sector**

There are nearly 2,400 nos. MSME units set up under Electrical & Electronics sector in the State 2019. Besides, under Engineering & Metal category there are around 18,500 such units functioning in Odisha. As per Odisha Economic Survey Report 2022-23, almost 5.3 lakh MSME units are in operation in the State with an cumulative investment amount of Rs.25,656 Crore. Apart from this, there are nearly 70-80 medium to large scale industries related to Power Sector are operating in the State, which are either having CGP or IPP of their own.

5. Type of items/ equipment along with their brief specification

Sl.	Equipment	Category(ies)	Brief Specification
1	Pole & Tower	PSC, RS Joist, WPB, H-Pole, Tubular, Spun, Tower members	Length- 8 to 13 mtr. Load- 200 to 450 kg
2	Conductor	ACSR, AAC, AAAC, ACAR, Insulated conductor etc.	Size- 34 to 500 sq.mm Armoured, Un-armoured, Flexible etc.
3	Cable	AB cable, PVC, XLPE, XLPO, Control Cable etc.	1x35 + 1x25 sq. mm to 3.5x500 sq. mm
4	Transformer	PTR, DTR & Instrument Transformers	100 kVA to 12.5 MVA Wound- Cupper & Aluminium Core- CRGO & Amorphous
5	Switchgear	Breaker, Isolator, AB Switch, LA, HG Fuse etc.	Rating- 200 to 1250 Amp LA- 9kV 5kA to 30kV 10kA
6	Insulator	Pin, Post, Shackle, Disc, Strain, Suspension, Stay etc.	Rating- 45 to 120 kN Type- Porcelain, Polymer, B&S, T&C Class- LT, 11 kV & 33 kV
7	Auxiliary	Energy Meter, Instrument Meter, Metering Unit, Testing Equipment, Jointing & Termination, Clamp & Socket, MS & GI material, Distribution Box, Fuse Wire, HW Fitting, Safety equipment etc.	

All equipment/ material are conforming to relevant IS/ IEEE standard specifications.

6. Testing requirements being handled/ catered in the present scenario

In the current situation, when there are multiple CAPEX and System Improvement projects are being implemented by the State Govt., the Power Sector Utilities are mostly dependent upon outside State NABL accredited test laboratories. Some of

periodical & pre-commissioning test requirements like Instrument Transformer, Energy Meter, Relay, Measuring Instrument, Insulating Oil, Aggregate Load, Overhead Line, Sub-station & Generating Station equipment are conducted by State owned Standard Testing Laboratory (STL), which is however limited with staff & means. Due to high rate of industrialization and growing demand of electricity, volume of testing requirement would be high, which cannot be met with the existing arrangements. Besides, the new power distribution companies are creating new infrastructure of Rs.5640 Cr., which is apart from the Govt. support under various schemes for infrastructure creation, i.e. around Rs.3000 Cr. Therefore the testing requirements in future are going to be huge.

The present peak power demand of State Discoms is around 5,100 MW (excluding CGP demand), which is likely to be 10,000 MW by 2031-32. The Transmission & Distribution network of the State majorly constitutes of 192 EHT grids, 16,000 circuit km EHT transmission line, 1170 sub-transmission primary sub-stations, 2.8 lakh distribution sub-stations and 4 lakh circuit km distribution line. Further, construction of nearly 100 nos. new 33/11 kV sub-stations with associated incoming & outgoing feeders and 64 nos. independent 33 kV lines with an approved project outlay of Rs.1800 Cr. State Govt. is also planning to invest around Rs.1125 Cr. for strengthening of the distribution sector with up-gradation of DTRs, 11 kV lines, LT lines and conversion of 1 Ph. network to 3 Ph. Discoms are also taking up household electrification with State Govt. funding. Disaster resilient power infrastructure will be implemented under GoI supported schemes like Special Assistance for Capital Investment (SACI) & Revamped Distribution Sector Scheme (RDSS) etc. DISCOMs are committed to bring their own capex of Rs.5,600 crore by FY 2025-26. The State Transmission Utility (STU) is implementing intra-state transmission projects as per requirement and future expansion plan. As per revised 14th National Transmission Plan, OPTCL will take up 16 EHT grid stations, 932 km of 765 kV D/C lines, 858 km of 400 kV D/C lines, 175 km of 220 kV D/C lines and 330 km of 132 kV D/C lines by FY 2026-27. Under the green energy corridor programme of Govt. of India, Odisha has been approved 2 nos. 765 kV grids with ISTS connectivity at Paradip & Gopalpur for green hydrogen & green ammonia projects.

All these schemes would require procurement of PTRs, DTRs, conductors, cables, switchgears, meters, poles, battery, panels & associated equipment, automation, T&P in huge numbers. Besides, the annual material procurement value of DISCOMs is around Rs.1,000 crore.

Existing industrial clusters at Paradeep (Jagatsinghpur), Kalingnagar (Jajpur), Dhamra (Bhadrak), Angul and Badbil (Keonjhar) are also expanding and some new such hubs are in the offing.

Coastal Odisha comprising the northern, eastern and central (partially) part is well connected with Airport, Sea Ports, Rail & Road network for transportation & export to south-east Asian countries. Western part of Odisha are being connected with express-highways & rail network. The State is promoting industrialisation in a focused approach towards mining, metals, downstream & ancillary, chemicals, petro-chemicals, food-processing, biotech, textile & apparel, information technology & electronics, renewable energy and green hydrogen & green ammonia. State has released conducive policies with best-in-category incentive structure for these sectors. In the 3rd edition of the Make in Odisha 2022 conclave (held during 30th Nov. – 4th Dec. 2022) State has received investment intents of more than Rs.10 lakh crore, which will propel the industrial growth and electrical equipment testing requirements exponentially.

7. Number & type of upcoming OEMs and expansion/ up-gradation plans of existing manufacturers in power sector.

Investment intents obtained during Make in Odisha 2022 conclave for setting up of new-manufacturing installation in the State under power sector is given below.

Sl.	Name	Type	Capacity
1	ACME	Solar Cell & Module	5 GW
2	JSW Neo Energy	Solar Cell	17 GW
3	Saffrongrid	Solar Cell & Module	1 MW
4	Waree Energies	Solar Cell	10 GW

MoUs were executed with three leading Central PSUs in the Power Sector of the country for development of nearly 7,500 MW Renewable Power with a cumulative

investment of Rs.51,000 crore in Odisha state during MIO 2022. Details are as per below table.

Sl.	Name	Type	Capacity
1	NTPC	Solar	2,000 MW
		PSP	1,000 MW
2	NLC	Solar	600 MW
		GH2	5 MTPA
3	SJVNL	Solar	2,000 MW
		PSP	2,000 MW

No. of proposals received in Make in Odisha 2022 in the State of Odisha are presented below. The overall investment will to the tune of Rs.10.5 lakh crore. This will create tremendous opportunity in the near future in the areas of industrialization, manufacturing prowess, employment and inter alia the electrical equipment testing requirements.

Sectors	No. of Proposals
Minerals, Metals and Metal Ancillary & Downstream	145
Power, Renewable & Green Energy	32
Logistics & Infrastructure	86
Fertilizer, Petrochemical, Chemical & Plastics	94
IT & ESDM	36
Tourism	42
Agriculture & Food Processing	103
Paper, Wood & Forest Based	28
Cement	7
Healthcare and Pharmaceutical	22
Textile, Apparel and Technical Textile	20
Aerospace & Defence	10
Manufacturing	63
Electric Vehicle	1

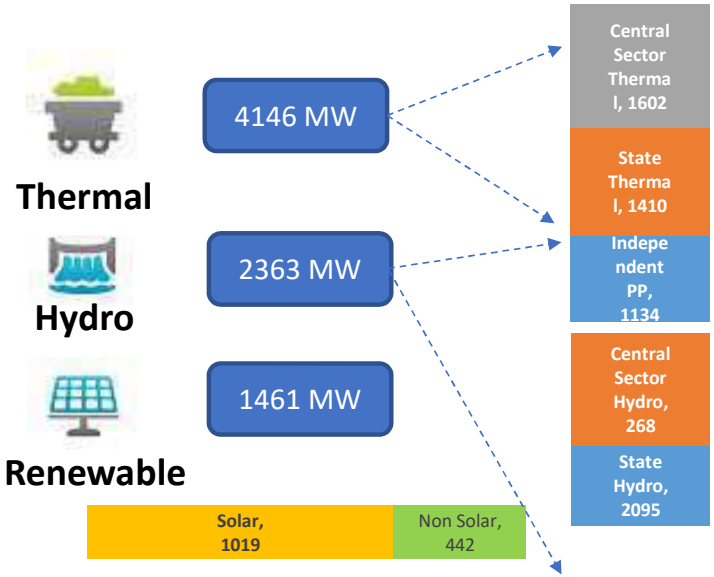
Start-Up	6
Ceramics, Glass, Marble & Granite	2
Waste Management	10
Agri-Business	10
Agri-Marketing	6
Others	15
Education	2
Film & Entertainment	1
Grand Total	**741**

At present, the State doesn't have the presence of a National level Testing Lab, which is affecting project implementation across multiple sectors. State Govt. has already placed its proposal before Ministry of Power and CEA in May 2023 (copy enclosed), who have sought the recommendation of ERPC for setting up the CPRI Regional Research & Testing Unit at Bhubaneswar, which would cater to the requirements of Eastern zone states. The agenda may be placed in the upcoming OCC of ERPC for discussion and recommendation to CEA for establishing the regional research & testing unit of CPRI at Bhubaneswar.

Electrical & RE Equipment Manufacturing to create a RE Ecosystem in ODISHA

Synopsis of the Odisha Power Sector

GRIDCO



- **Odisha Average Power Purchase Cost - Rs. 3.12 per kWh as against National Average of Rs. 4.68 per kWh**
- **Supply Adequacy –** 8000 MW tied up capacity against peak demand of 5000 MW

OPTCL

Grid Sub Stations

185

25000 MVA

Transmission Capacity

Transmission Network

16000 ckm

>99.9% Network Availability since 2012-13

- **3% Transmission Losses**

Amongst Top Three States for Access, Affordability & Reliability

DISCOMS

4 Discoms managed by Tata Power in the PPP Model

1.54 lakhs Sq Km

Area in Sq Km

27,400 MUs

Energy Demand

95 lakhs

Consumers

24 Hours of supply in urban areas;
23.6 Hours of supply in rural areas

5% AT&C Loss Reduction in TPCODL

- **Other discoms are on Track**

as per Niti Aayog State Energy and Climate Index

The India growth story….

2016		2050	
China	1	1	China
US	2	2	India
India	3	3	US
Japan	4	4	Indonesia
Germany	5	5	Brazil
Russia	6	6	Russia
Brazil	7	7	Mexico
Indonesia	8	8	Japan
UK	9	9	Germany
France	10	10	UK

IMF & PWC report

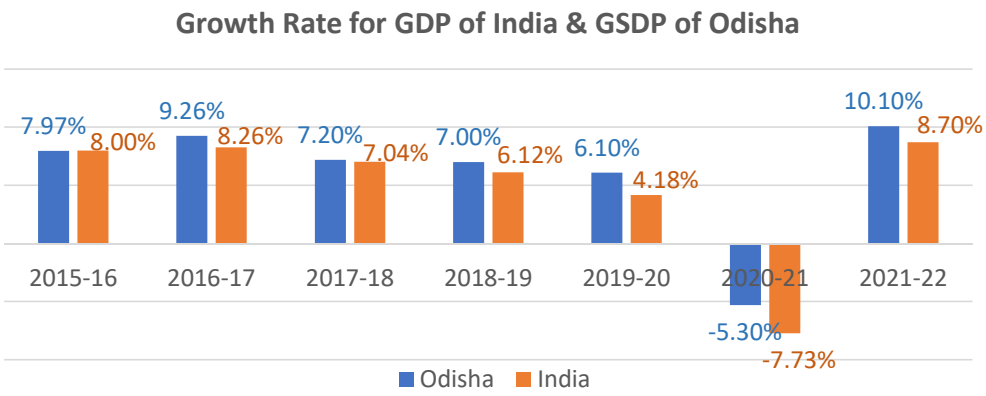
By 2050, India is poised to become world's 2nd largest economy by Purchase Power Parity

India to become 5 Trillion dollar economy by FY 27

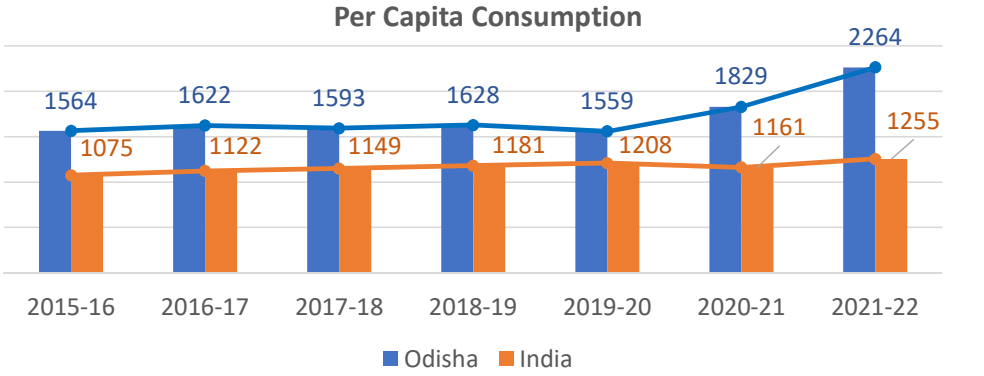
Per Capita Income to double in next 10 years

Power Demand to double by 2030

50 % Power by non-fossil fuel by 2030

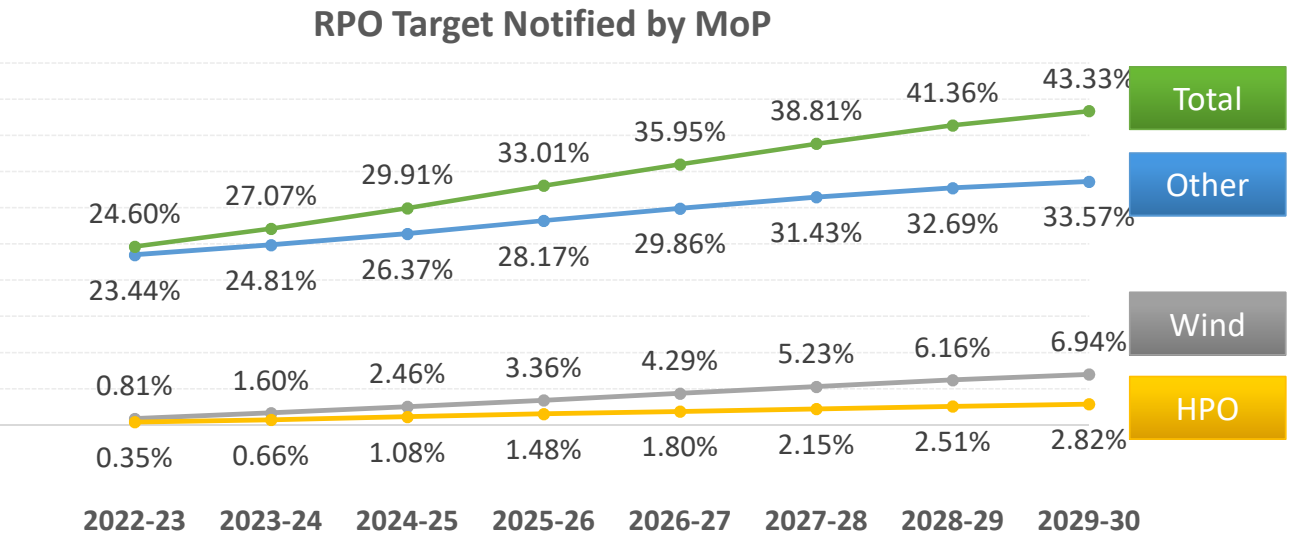


Odisha's has grown at CAGR of 4.0% against national CAGR of 1.41%



Odisha's Per Capita Consumption has grown at CAGR of 6.3% against national CAGR of 2.6%

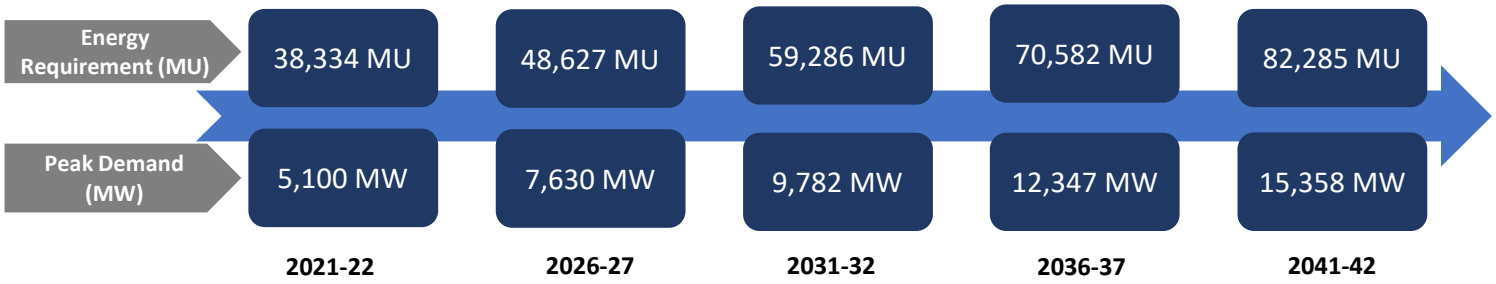
Green Energy Status



Tie-Ups required to meet RPO Targets by 2030

	Discom	Captive	Total
Wind	985	2630	3615
HPO	305	910	1215
Other / Solar	1800	12720	14520
Total	3090	16260	19350

15 GW of solar power



#Peak Demand & Energy Requirement expected to grow at a CAGR of 5% over the next 20 years
#Odisha has a share of more than 20% Energy Requirement in Eastern Region

Key Growth Drivers

- **Jindal Steel Odisha Limited (1627 MW)**
- **AMNS (849 mw)**
- **JSW Utkal Steel Ltd (340 MW)**
- **ReNew Efuels (150 MW)**
- **Thriveni Earthmovers Pvt Ltd (100 MW)**
- **Solar Parks**
- **Industrial Parks**
- **Hotel Chains**
- **Airconditioning load …**

Building Utilities of Future . . . . .

Centralised Power System Control Centre

210 remotely (through SCADA) operated PSS, **68** unmanned PSS.

Composite Insulated Cross Arm (CICA)

Low cost solution for **11KV & 33KV** line poles to eliminate premature faults on distribution lines.

Rebar Lacing Poles (RLP)

Light weight and low cost cyclone resilient poles that can withstand wind speed of up to **300 kmph**

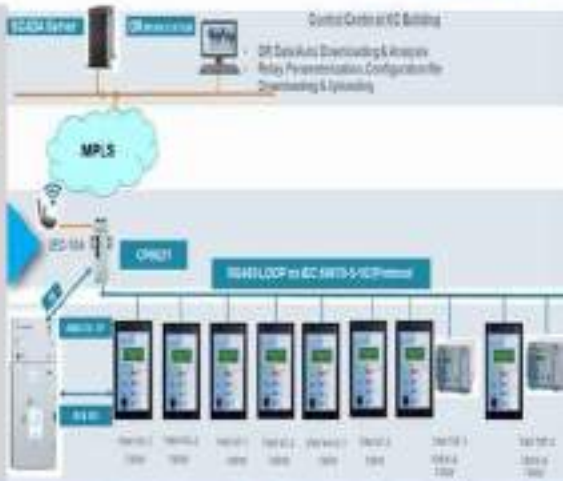
Line Voltage Regulator Transformer (LVRT)

Low cost solution for voltage improvement used for the **First Time in India**

OCR-based meter reading & spot billing

Implemented across all division with highest success rate of **95%**

Reliable Low-Cost Automation Solution for 33/11 kV Primary Sub-Station



Infra works in Power Sector

Annual Power Infra spend is Rs 5000 Crores +…..

Capex

Rs 1500 Cr –
Capital Expenditure for Infrastructure Upgrade

Renovation

Rs 800 Cr –
Works for Shifting of Lines, Renovation

Disaster Resilience

Rs 500 Cr –
Building system resilience for Disaster

Opex

Rs 1000 Cr -
Operational Expenses including R&M

Special Projects

Rs 2000 Cr –
Special Funded Projects for Improving infrastructure

RDSS envisages projects over Rs 50,000 Crores in the neighbouring states.

Why Odisha

Odisha Advantage

Adequate supply - Zero peak deficits	Reliable hours of supply	Low industrial tariffs	Low carbon supply	Forward looking policies
8 GW Capacity tied-up against 5 GW peak demand +	**23+ *** Hours of supply – higher than national average	**Rs. 3.12^** per unit power purchase cost – amongst the lowest in India	**Nil **** Dues to generators against Rs. 1 trillion for India	**Rs. 5,640 cr** Planned capital expenditure by DISCOMs upto 2026-27
Financially self-sustaining utilities	**Capital investment in infrastructure**	**Focus on ease of doing business**	**Digitalization**	**Consumer Service**

Only State with all distribution utilities operating under PPP Model

Tata Power is the private sector partner

Policy incentives++ and other support to industries

- Concessional tariffs for new industries
- Special tariffs for CGPs and steel plants
- Dedicated industrial feeders
- Power Bill Subsidies upto Rs. 2 / unit
- 100% Electricity Duty Exemption
- Green Tariff category
- Energy audit cost reimbursement
- Support to consumer owned network

Power Sector Vision

To enrich society, businesses and environment through safe, reliable and affordable power supply and superior consumer experience by adoption of smart technologies

24X7 Reliable and Quality supply by delivering sustainable value to all Stakeholders		
Fully disaster resilient infrastructure	Best in consumer service and ease of doing business	Technology driven smart utility

\+ Source: GRIDCO

* As per MoP & REC's Customer Service Rating of Discoms Report FY 2020-21

^ Rs 3.12 is as per GRIDCO BSP Order of March 22. The national average is Rs. 4.68 per unit (3-year weighted average power purchase cost for FY 19, 20, 21) as per PFC 10th Integrated Rating Report

** PRAAPTI Portal

^^ Source: GRIDCO Pool Cost FY21-22, CEA

++ The incentives depend on type of industry, size of investment and employment created and are provided for a period specified in the policies

Why Odisha

Odisha – An ideal destination for Industries

- **Good Governance & Stable Political Leadership**
- **Abundant Power**, Water, & **Industrial Park**
- **Progressive Industrial Policy**
- **Available of skilled manpower**
- **Well connected Road and Rail Network**
- **Sea ports at Paradeep, Gopalpur and Dhamra**

**Tata Power plans to tie up with Diploma / ITI colleges in all districts of Odisha to upskill young diploma engineers and ITI holders. The successful students shall be awarded certificates and shall be a valuable asset for enrolment in all sector firms, including Tata.*

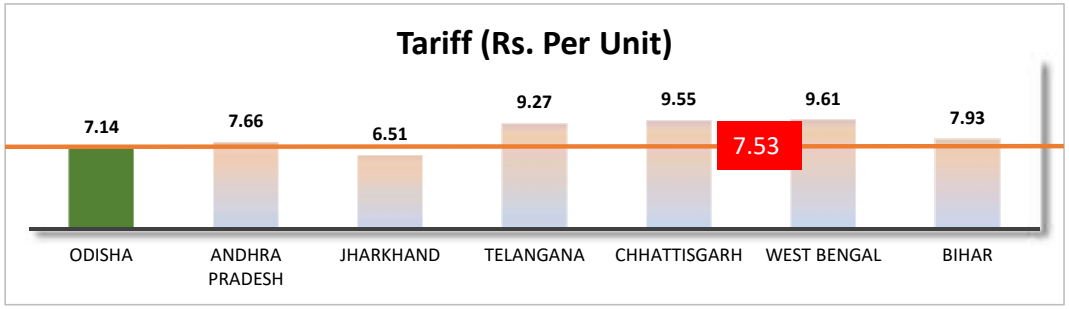
Incentives/Policies in Odisha

- **Special Economic Zone Policy**
- **Public Private Partnership**
- **Single Window System for Ease of Doing Business**
- **Relaxations for MSME**
- ***Focus will be on building capabilities***

225+ Skill Centres across Odisha

Dedicated Energy Park

Tariff Incentives



Industrial Tariff is amongst the lowest in the country

Industrial Tariff

Consumer Type	LF≤60%	LF≥60	LF>80%
HT	5.85	4.75	4.75
EHT	5.80	4.70	4.60

HT Industrial Consumer (Steel Plant, ≥1 MVA); EC Rebate

Load Factor	CD up to 6 MVA	CD above 6 MVA
65% - 75%	10%	-
>75% - 85%	15%	8%
>85%	20%	10%

Special Scheme for CGPs

CGP	Incentive
CD ≤ 20 MW (operating at CD ≥80 & avail power up to double CD	No Overdrawl Penalty; Incremental energy drawl @Rs 4.30/kVAh beyond CD
CD≥20 MW (operating at LF ≤80%	No Overdrawl Penalty; Incremental energy drawl @Rs 4.75/kVAh beyond CD

Complete privatisation of Urban & rural consumers

DISCOMS with no arrears to GENCOS

Incentives as per IPR 2022

Category	100% Exemption of Electricity Duty	Reimbursement of Tariff for Power consumed from local DISCOMS	100% Exemption / Reimbursement of Cross Subsidy & Additional Surcharges; State Transmission Charges
Priority Sector	For a period of 7 Years	Rs 2.00 per unit for a period of 7 Years	For a Period of 7 Years
Thrust Sector	For a period of 10 Years	Rs 2.00 per unit for a period of 10 Years	For a Period of 10 Years

20% Capital Investment subsidy for priority sector

30% Capital Investment subsidy for thrust sector

Priority Sectors

- Metal Sector ancillary
- Agro Processing
- Cold Storage, Food
- Gemstone Processing
- Handicraft, Handloom
- IT, ITES and DC
- Plastics
- Steel, Ship building
- Tourism & Hospitality

Thrust Sectors

- Aerospace and Defense
- Automobile
- Biotech, Pharma
- Chemicals, Petrochem
- Electronics
- Green Energy
- Green Hydrogen and Ammonia
- Aviation
- Electrical and Mechanical Goods

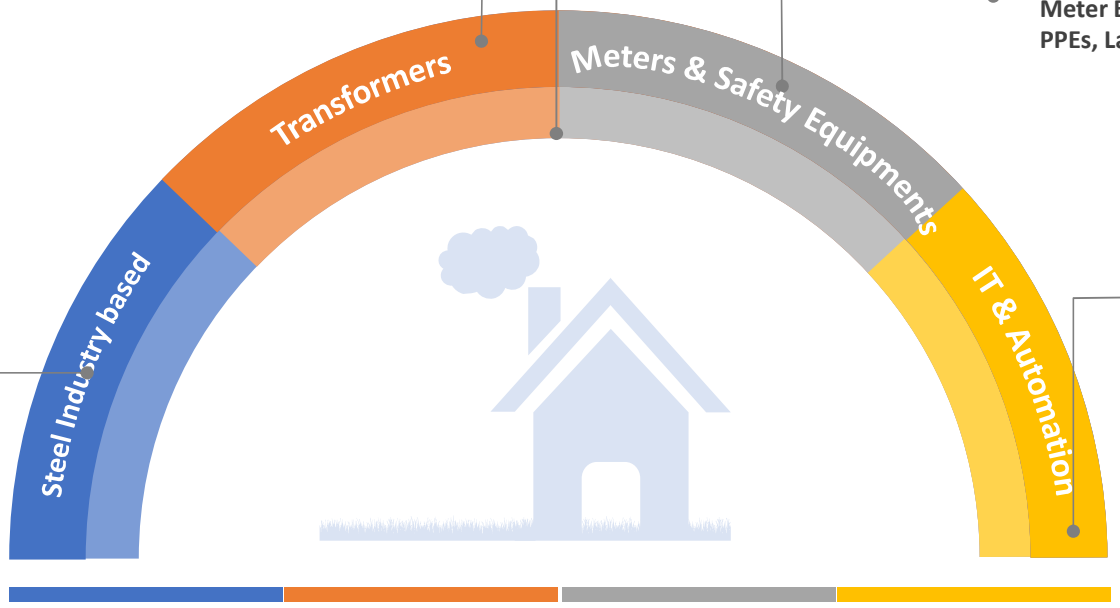
Equipment Manufacturing

Power Transformers
Distribution Transformers
Auxiliary Equipment

Solar Modules
Inverters
Anciliaries

Static Meters
Meter Boxes
PPEs, Ladders

Poles
Cables
Hardware
Cross-Arms
Fencing Material



RMUs, RTUs, FPIs
VCBs, Panels
Autorecloser, Sectionaliser
Data Centre Equipments

To make Odisha the Industrial hub of Eastern India

Globally competitive manufacturing companies……

While creating cost advantage the real focus will be to ***build capabilities*** *through* ***workforce skilling, innovation, quality*** & ……***sustainability***

Accelerating ***integration in India & global value chains*** by reducing trade barriers & ……***enabling global market access***

Focusing on reducing ***the cost of compliance*** & establishing manufacturing capacities faster ……..***MIO benefit***

…… *Globally competitive manufacturing companies*

GOVERNMENT OF ODISHA
ENERGY DEPARTMENT
***

No. 5369 /En., Bhubaneswar, dt. 18/05/2023
ENG-TDER-RR-0006-2022

From

S B K Pradhan
Additional Secretary to Govt.

To

Sri G R Viswanath,
Additional Director,
Central Power Research Institute,
Post Box No-8066, Bengaluru-560080,
Email-grv@cpri.in

Sub: **Compliances on the requirement of CPRI for establishment of a Regional Research & Testing Laboratory in Bhubaneswar.**

Sir,

In inviting reference to your letter dt. 21.12.2022 on the above mentioned subject, I am directed to enclose herewith the compliances from Govt. of Odisha on the requirement of CPRI for establishment of a Regional Testing & Research Laboratory in Bhubaneswar for consideration and necessary action at your end.

Sri Gagan Bihari Swain, Director (Finance), GRIDCO has been authorised to visit CPRI HQ Office at Bengaluru for a detailed discussion on further modalities to be followed on the above proposal.

Yours faithfully,
18.5.2023
Additional Secretary to Govt.

Memo No. 5370 /En, Dated. 18/05/2023

Copy along with copy of enclosure forwarded to Director (F&CA), GRIDCO for information and necessary action.

18.5.2023
Additional Secretary to Govt.

Sl No	Requirements of CPRI	Compliance of Govt. of Odisha
1	**Request from the State Govt.**	Energy Department, Govt. of Odisha has already requested CPRI to set up a Regional Research & Testing Laboratory at Bhubaneswar vide letter No-12189 dt. 13.12.2022 (Annexure-I)
2	**Analysis of demand and suitability**	• The present peak power demand of Odisha for the DISCOMs is around 5,100 MW which is likely to be around 10,000 MW by 2031-32. • Further, the T&D network of the State consists of 191 EHT grids, 16,000 circuit km EHT transmission line, 1150 sub-transmission primary sub-stations, 2.8 lakh distribution sub-stations and 4 lakh circuit km distribution line. • Construction of 99 nos. of 33/11 KV primary sub-stations & associated lines and 64 nos. of independent 33 kV lines is under progress with financial assistance to the tune of Rs. 1800 crs from the State Govt. In addition to this, Govt. is also planning to invest around Rs. 1125 crs. for strengthening of the distribution sector through up-gradation of DTRs, 11 kV, LT lines, conversion of single phase network to 3 phase etc. • The DISCOMs are taking up household electrification with financial support from the State Govt. • Further, various projects for strengthening of transmission &

		distribution sector of the State are being taken up through financial assistance from GoI under Special Assistance to States for Capital Investment (SACI). Moreover, the proposal of modernisation of distribution sector and creation of disaster resilient infrastructure in the State under Revamped Distribution Sector Scheme (RDSS) has been placed for consideration of MoP. • The private DISCOMs are committed to invest over Rs. 5500 crs. under their CAPEX for expansion and strengthening of distribution network. • Moreover, the State Transmission Utility OPTCL is taking up various transmission projects across the State with financial assistance from the State Govt. in shape of equity under various Govt. funded schemes. • OPTCL is also taking up various transmission projects for evacuation of RE power to be generated from prospective industries coming up in the State under Green Energy Evacuation Transmission Corridor. Besides this, necessary transmission infrastructure including two nos. of 765 kV systems under ISTS at Paradeep & Gopalpur and several 400 kV systems under In-STS are also in pipeline to cater to the demand of upcoming power intensive industries coming up in industrial hubs in the State such as Paradeep, Gopalpur, Barbil, Dhamra. • Execution of the above projects will require large scale procurement of electrical equipment which will augment the need of testing facility in the State. • Coastal Odisha is well connected with

		other parts of the country through air, sea ports and rail link. The State Govt. is focusing on growth of industries through conducive policy framework and incentivisation. In the recently concluded Make in Odisha conclave, the State has been able to attract investment commitments worth more than Rs. 10 lakh crores.
3	**Quantum of Electrical Industries in the State and their demand for equipment testing**	• Odisha has huge power intensive industries / units which account for almost 70% of the total power demand of the State (excluding CGP & IPPs). Further, investments worth Rs. 1.52 lakh cr. in Renewable Energy generation, Green Hydrogen/ Ammonia are also coming up in the State. • Around 50 lakhs of Smart meters are proposed to be installed under RDSS. Further, several projects for disaster resilience, loss reduction and modernisation of distribution sector are coming up in the succeeding years. • This will lead to huge pressure on the State Testing Laboratory for the routine / annual inspection & testing. The types of tests required by the DISCOMs frequently is annexed.
4	**Identification of location and land by the State Govt.**	It is proposed to set up the CPRI unit in the vicinity of the State capital Bhubaneswar. IDCO, the nodal agency for allotment of land has been requested to identify suitable patch of land measuring 15-20 acres for this purpose.
5	**Joint site visit by**	The joint site visit can be conducted as per

	CPRI & State Govt. officials	convenience of CPRI team after identification of the land by IDCO.
6	**Lease rent for the land**	The land will be allotted as per Industrial Policy Resolution, 2022.
7	**Proposal to MoP for Grant-in-Aid**	After receipt of in-principle approval from CPRI, MoP shall be requested for Grant-in-Aid.
8	**Signing of MoU between CPRI & Govt. of Odisha**	After receipt of in-principle approval from CPRI, the MoU may be executed after obtaining Govt. approval. CPRI may share a sample MoU format for necessary reference.
9	**Land Registration**	Land will be taken from IDCO on lease basis and agreement will be executed with IDCO. Necessary support from other Departments shall be ensured for land registration.
10	**Other**	Other issues like construction work, placement of PO for equipment and completion of project can be taken up after preparatory works and execution of MoU. If decided, the project can be executed either through any of the State PSU, as decided by State Govt. or by CPRI or jointly through an SPV.

Annexure - A

GOVERNMENT OF ODISHA
ENERGY DEPARTMENT
****

No. 12189 /En., Bhubaneswar, dt. 13th December, 2022
ENG-RR-GOI-0005-2018

From
Sri Nikunja B. Dhal, IAS
Principal Secretary to Government

To
The Director General,
Central Power Research Institute (CPRI),
Post Box No. 8066, Bengaluru–560080

Sub: Establishment of a Regional Research & Testing Laboratory unit of CPRI at Bhubaneswar, Odisha – Regarding.

Sir,

The State of Odisha has ~1 crore electricity consumers and our Grid demand hovers around 4800 - 5100 MW. The installed CGP capacity exceeds 10 GW. The future electricity demand is likely to grow at a CAGR of 5-6% over the next 10-15 years, as per conservative assessments. Some industrial clusters, e.g. Paradeep (Jagatsinghpur), Kalingnagar (Jajpur), Dhamra (Bhadrak), Angul and Barbil (Keonjhar) are developing rapidly, which provide opportunities for further downstream & ancillary industries. More than 10 lakh Cr of investment intents in diverse sectors such as Mining and Metals, Chemicals and Petrochemicals, Food processing and Biotech, IT and ESDM , Textiles & Apparel , Green Hydrogen and Green Ammonia were received in the just concluded Make in Odisha Conclave, 2022.

A glimpse of the electrical infrastructure available & operating in the State is given below;

i. Generation	:	~13,000 MW installed capacity (IPP) ~11,000 MW CGP capacity.
ii. Transmission network	:	178 EHV Grids & ~16,000 Ckm line
iii. Distribution network	:	1136 primary S/s, 2500 PTRs ~2.7 lakh DTRs, ~4.1 lakh Ckm line

The network expansion & up-gradation are planned to meet the demand growth. The plans for investment in Distribution Sector is more than Rs.5,600 crore by FY 2025-26. The four Discoms have collectively assessed annual procurement value of around Rs.1000 crore in the categories of PTR, DTR, Cable & Conductor, Switchgears, Poles, Meters, Battery and SCADA & Automation equipment.

To meet the huge supply requirement of the above electrical equipment and many MSMEs & other equipment manufacturers are expanding their manufacturing facility & new OEMs are also coming up. These equipment are required to meet global quality standards to avoid any premature failure; therefore all such equipment are needed to be tested at reputed lab like CPRI before being accepted.

P.T.O.

The scope of electrical equipment testing including electricity meter is going to be huge. At present, the State doesn't have a National level Testing Lab, which is affecting project implementation across multiple sectors. CPRI may consider setting up a Regional Testing Lab at Bhubaneswar along with Research and Training facility. The intake strength of 500+ ITI institutes in the State is more than 48,000 per annum; there is a need for training & skilling of students in equipment testing aspects. Collaborative research avenues can be undertaken through institutes like IIT, IIIT, NIT, NISER and Institute of Physics etc., which are existing in the State. While projecting the testing facility capacity at the proposed lab at Bhubaneswar, requirement of neighbouring States / NE region may also be considered.

Your early response on the matter will be highly appreciated.

Yours faithfully,

13/12/2022

✓Principal Secretary to Government

Memo No. 12190 /En, Dated. 13/12/2022

Copy forwarded to CMD, OPTCL / CEO, TPCODL / EIC-cum-PCEI, Odisha, Bhubaneswar / Managing Director, GRIDCO for information and necessary action.

ADAS 13.12.22

✓Additional Secretary to Government

List of Type/Special Tests:

A. **DTR/PTR:**

1.Lightning Impulse Test
2.Short Circuit Withstand test
3.Temperature Rise Test
4.Pressure Test
5.Determination of sound levels
6.Test to verify Degree of protection IP 55/66
7.Measurement of impedance voltage / short-circuit impedance and load loss.
8.Measurement of no load loss and current.
9..Dielectric Test.
10.Tests on on-load tap-changer.

Special Tests

1. Measurement of the harmonics of the No-Load Current
2. Determination of transient voltage transformer characteristics
3. Measurement of insulation resistance to earth of the windings, and / or measurement of Dissipation factor (tan δ) of the insulation system capacitances. (These are reference values for comparison with later measurement in the field. No limitation for the values are given here.)
4. Lightning impulse test on Neutral terminals
5.Magnetic circuit (isolation) test
6.SFRA Test.

B. **CABLES:**

a. Tests on Conductor

1. Conductor resistance test
2. Conductor water penetration test

b. Tests on Insulation

1. Tensile strength & Elongation at break (before ageing)
2. Ageing in air oven
3. Tensile strength & Elongation at break
4. Tests for thickness of insulation
5. Eccentricity and Ovality of insulation
6. Hot set test
7. Shrinkage test
8. Gravimetric test (Water absorption)
9. Volume resistivity/ Insulation Resistance

c. Tests on Inner Sheath

1. PVC thickness

d. Tests on Extruded semi-conducting screen

1. Volume resistivity test of conductor screen
2. Volume resistivity test of core screen

e. Tests on Outer Sheath (PVC)

1. Flammability test for outer sheath
2. Thickness
3. Tensile strength and Elongation at break (before ageing)
4. Tensile strength and Elongation at break (after ageing)
5. Variation due to ageing
6. Loss of mass test
7. Shrinkage test
8. Hot deformation test
9. Heat shock test
10. Thermal stability test
11. Flammability test
12. Oxygen index
13. Temperature index
14. Acid gas generation
15. Smoke density

f. Tests on Armour for 3 Core Cable

1. Tensile test
2. Torsion test
3. Wrapping test
4. Resistance test
5. Mass of zinc coating
6. Uniformity of zinc coating
7. Adhesion test

g. Tests on Armour for 1 Core Cable

1. Tensile test
2. Wrapping test
3. Resistance test

h. Tests on complete cable

1. Partial discharge test
2. Thermal ageing test
3. Bending test
4. Dielectric power factor test
5. High voltage test
6. Heat cycle test
7. Impulse withstand test

C. **TERMINATION:**

a. **Terminations & Straight Through Joints**

1. Conductor resistance with Ferrule/Lugs/Mechanical

b. **connectors**

1. AC Voltage withstand Test (Air)
2. AC Voltage withstand test (under wet conditions) (for outdoor termination only)
3. Partial Discharge
4. Impulse voltage test
5. Heat Cycle test in air and water
6. Thermal Short Circuit Test for Screen
7. Thermal Short Circuit Test for Conductor
8. DC Voltage Withstand
9. Dynamic short circuit test
10. Thermal Endurance test
11. Salt fog test (Only for Outdoor terminations only)

c. **For Tubing and Moulded Components**

1. Corrosion Resistance
2. Density
3. Water Absorption
4. Electric strength
5. Flame Retardance
6. Heat Shock
7. Low temperature flexibility
8. Relative Permittivity
9. Tensile strength and Ultimate elongation
10. Thermal Ageing
11. Tracking Resistance
12. **Volume Resistivity**

D. **CONDUCTOR:**

1. UTS test on stranded conductor Mechanical Properties
2. DC resistance test on stranded conductor

E. **SWITCHGEAR/RMU:**

1. Measurement of the resistance of the main circuits
2. Short time withstand current and peak withstand current tests
3. Short circuit making and breaking tests
4. Verification of the degree of protection
5. Mechanical Endurance tests
6. Short line fault tests
7. Out of phase making and breaking tests
8. Electrical endurance tests
9. Double earth fault tests
10. Capacitive Current switching tests
11. Temperature Rise test.

12. Internal Arc withstand test,
13. Degree of Protection test.
14. Test to check the capability of main and earthing circuits subjected to rated peak and short
15. Salt Spray Test

F. Isolator:

a. TYPE TEST:

1. Lightning impulse voltage test(Dry)
2. Power frequency voltage withstand test(Dry)
3. Power-frequency voltage withstand test(Wet)
4. Short time withstand current test
5. Peak withstand current test
6. Temperature rise test
7. Measurement of contact resistance
8. Short time withstand current test for Earth Switch
9. Peak withstand current for Earth Switch
10. Satisfactory Operation & Mechanical endurance test

b. Types Tests for Insulator:

1. Visible discharge test
2. 50% lightning impulse voltage flashover test
3. Lightning impulse voltage withstand test
4. Power frequency voltage flashover test(dry)
5. Power frequency voltage withstand test(dry)
6. Power frequency voltage flashover test(wet)
7. RIN test at 4 MHz
8. Temperature cycle test
9. Mechanical strength test
10. Porosity test

Annexure **B.2.8**

एनटीपीसी NTPC

एन टी पी सी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)
दर्लिपाली/**DARLIPALI**

Ref.: 1053/NTPC/DPL/Unit 1

Date: 24.04.2024

To,

The Member Secretary,
ERPC,14, Golf Club Road, Tollygunje
Kolkata-700033

Sub: NTPC Darlipali Unit 1 Emergency Shutdown

Dear Sir,

Darlipali Unit #1 is being taken under emergency shutdown due to low LP Turbine differential expansion issue on 26.04.2024 00:00 hrs for a period of 7 days.

Yours Sincerely,

Hare Ram Singh
GM(O&M)

Copy to:

- ED, ERLDC
- ED(OS),Raipur
- RED(ER-I& II)

RE: Intimation of unit with withdrawal

ERLDC Control Room

Fri 5/3/2024 12:09 PM

Sent Items

To:Sce Dstps <scedstps@ntpc.co.in>;

Cc:Bihar <sldc.dept@bsptcl.bihar.gov.in>; WRLDC Control Room <wrldccr@grid-india.in>; Jharkhand JSEB (sldcranchi@gmail.com) <sldcranchi@gmail.com>; 'sldcgridco@yahoo.com' <sldcgridco@yahoo.com>; WB <wbsldc@gmail.com>; sikkim.sldc <sikkim.sldc@gmail.com>; nrldccr@gridindia.in <nrldccr@gridindia.in>; bilash.achari@grid-india.in <bilash.achari@grid-india.in>; Chandan Mallick (चंदन मलिक) <chandan.mallick@grid-india.in>;

Sir,

As per the trailing mail, Unit-1 of Darlipalli taken under emergency shutdown at 00:23 Hrs of 27/04/2024 for 7 days. You are requested to update the revival status of the same.

Regards

पाली प्रभारी/Shift Charge Manager
पूर्वी क्षेत्रीय भार प्रेषण केंद्र
Eastern Region Load Despatch Centre
Grid Controller of India (GRID-INDIA)
ग्रिड कॉन्ट्रोलर ऑफ़ इंडिया (ग्रिड-इंडिया)

Follow GRID-INDIA

Erstwhile -Power System Operation Corporation Ltd.
Contact: 033-24235875, 033-35687459
Hotline: 20331000,20330002,20330070,20330000
Mob-7596084290, 8100299321
Email: erldccr@grid-india.in ; **Website**: www.erldc.in

Mail domain of GRID-INDIA changed from erldccr@posoco.in to erldccr@grid-india.in. Kindly mail to grid-india domain (erldccr@grid-india.in)

From: Sce Dstps <scedstps@ntpc.co.in>
Sent: Saturday, April 27, 2024 11:52 AM
To: ERLDC Control Room <erldccr@grid-india.in>
Subject: Re: Intimation of unit with withdrawal

Dear Sir,

Unit-1 Darlipali emergency shutdown for turbine inspection is for 7 days only.

Thanks & Regards

SCE
NTPC Limited
Darlipali Super Thermal Power Project
Phone No. 9937359201

From: ERLDC Control Room <erldccr@grid-india.in>
Sent: Saturday, April 27, 2024 8:48 AM
To: Sce Dstps <scedstps@ntpc.co.in>
Cc: Bihar <sldc.dept@bsptcl.bihar.gov.in>; WRLDC Control Room <wrldccr@grid-india.in>; Jharkhand JSEB (sldcranchi@gmail.com) <sldcranchi@gmail.com>; 'sldcgridco@yahoo.com' <sldcgridco@yahoo.com>; WB <wbsldc@gmail.com>; sikkim.sldc <sikkim.sldc@gmail.com>; nrldccr@gridindia.in <nrldccr@gridindia.in>; mserpc-power@nic.in <mserpc-power@nic.in>; R Sutradhar (आर सूत्रधार) <rajibsutradhar@grid-india.in>; NLDC Control Room (एन.एल.डी.सी. कंट्रोल रूम) <nldccr@grid-india.in>
Subject: RE: Intimation of unit with withdrawal

Sir,

Initially communication was received from your end regarding emergency shutdown of the unit for 7 days. However, some of the beneficiaries did not agree for such outage. SLDC, Odisha had also requested to defer the shutdown till the end of June-2024.

Further, the unit was taken out citing emergency reasons. After outage of the unit, the outage of the unit converted from 7days to 60 days without further investigation.

You are requested to clarify the reason with supporting documents for requesting such long outage of the unit in prevailing summer crunch period.

Regards
Rakesh Kumar Pradhan
SCE, ERLDC

From: Sce Dstps <scedstps@ntpc.co.in>
Sent: Saturday, April 27, 2024 12:28 AM
To: ERLDC Control Room <erldccr@grid-india.in>; sldc, sd <sd_sldc@sldcorissa.org.in>; 'sldcgridco@yahoo.com' <sldcgridco@yahoo.com>; Suresh Babu Kummara <KSURESHBABU@NTPC.CO.IN>; sldc west bengal <wbaldc@gmail.com>; sldc.dept@bsptcl.bihar.gov.in
Cc: Suresh Babu Kummara <KSURESHBABU@NTPC.CO.IN>
Subject: Intimation of unit with withdrawal

Dear Sir,

Unit-1 Darlipali has been withdrawn at 00:23 hr today due to turbine related problem, It will be revived after 60 days.

Thanks & Regards

SCE
NTPC Limited
Darlipali Super Thermal Power Project
Phone No. 9937359201

Chandan Mallick (चंदन मलिक)

From: ERLDC Control Room
Sent: 16 May 2024 17:29
To: Chandan Mallick (चंदन मलिक)
Subject: Fw: NTPC Darlipali Unit 1 Turbine inspection

Importance: High

From: DEBABRATA PATEL <DEBABRATAPATEL@NTPC.CO.IN>
Sent: Tuesday, May 7, 2024 11:54 PM
To: ERLDC Control Room
Cc: 'sldcgridco@yahoo.com'; SUDIP NAG; Jharkhand JSEB (sldcranchi@gmail.com); sikkim.sldc; NRLDC SO; Bilash Achari (बिलाश आचारी); Shyamal Konar (श्यामल कोनार); Sce Dstps; Hare Ram Singh; Harsha Nath Chakraborty; Suresh Babu Kummara; R Sutradhar (आर सूत्रधार); mserpc-power@nic.in; ER2OS; wbaldc@gmail.com
Subject: Re: NTPC Darlipali Unit 1 Turbine inspection

Dear Sir,

Unit-1 LPT-B preliminary inspection was done on 07-05-2024.

OEM/OES has suggested to do the complete inspection and overhauling of the TG and do the corrections similar to Unit-2.

The TG overhauling period shall be tentatively 60 days, bar to bar.

Regards

Debabrata Patel
Sr. Manager(EEMG)
Darlipali
Sundargargh
Mob :- 9437018453

From: ERLDC Control Room <erldccr@grid-india.in>
Sent: Monday, May 6, 2024 11:25:48 AM
To: Suresh Babu Kummara <KSURESHBABU@NTPC.CO.IN>
Cc: 'sldcgridco@yahoo.com' <sldcgridco@yahoo.com>; SUDIP NAG <SUDIPNAG@NTPC.CO.IN>; Jharkhand JSEB (sldcranchi@gmail.com) <sldcranchi@gmail.com>; sikkim.sldc <sikkim.sldc@gmail.com>; NRLDC SO <nrldcso@grid-india.in>; Bilash Achari (बिलाश आचारी) <bilash.achari@grid-india.in>; Shyamal Konar (श्यामल कोनार) <konar_s@grid-india.in>; Sce Dstps <scedstps@ntpc.co.in>; DEBABRATA PATEL <DEBABRATAPATEL@NTPC.CO.IN>; Hare Ram Singh <HRSINGH01@NTPC.CO.IN>; Harsha Nath Chakraborty <HNCHAKRABARTY@NTPC.CO.IN>; R Sutradhar (आर सूत्रधार) <rajibsutradhar@grid-india.in>; mserpc-power@nic.in <mserpc-power@nic.in>; ER2OS <er2os@ntpc.co.in>; wbaldc@gmail.com <wbaldc@gmail.com>
Subject: RE: NTPC Darlipali Unit 1 Turbine inspection

Sir,
With reference to trailing mail, you are requested to update the status of Unit-1.

With Regards
SCE/ERLDC

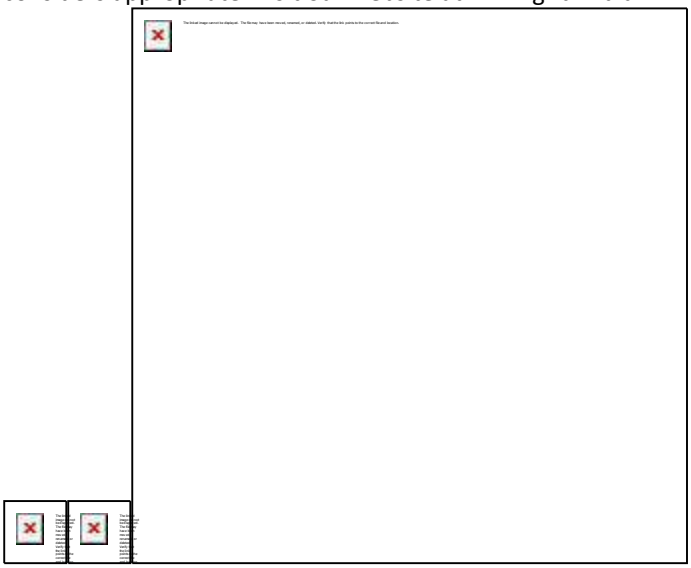
From: Suresh Babu Kummara <KSURESHBABU@NTPC.CO.IN>
Sent: Friday, May 3, 2024 10:30 PM
To: ERLDC Control Room <erldccr@grid-india.in>
Cc: 'sldcgridco@yahoo.com' <sldcgridco@yahoo.com>; SUDIP NAG <SUDIPNAG@NTPC.CO.IN>; Jharkhand JSEB (sldcranchi@gmail.com) <sldcranchi@gmail.com>; sikkim.sldc <sikkim.sldc@gmail.com>; NRLDC SO <nrldcso@grid-india.in>; Bilash Achari (बिलाश आचारी) <bilash.achari@grid-india.in>; Shyamal Konar (श्यामल कोनार) <konar_s@grid-india.in>; Sce Dstps <scedstps@ntpc.co.in>; DEBABRATA PATEL <DEBABRATAPATEL@NTPC.CO.IN>; Hare Ram Singh <HRSINGH01@NTPC.CO.IN>; Harsha Nath Chakraborty <HNCHAKRABARTY@NTPC.CO.IN>; R Sutradhar (आर सूत्रधार) <rajibsutradhar@grid-india.in>; mserpc-power@nic.in; ER2OS <er2os@ntpc.co.in>; wbaldc@gmail.com
Subject: NTPC Darlipali Unit 1 Turbine inspection

Dear sir,
Unit-1 of NTPC, Darlipalli was taken out of bar on 27-04-2024 for turbine inspection to ascertain the condition of turbine rotors due to low LP-DE (Differential Expansions) issues.
The turbine cooling and dismantling activities are in progress. Turning gear was stopped on 03-05-2024. However, due to difficulty in dismantling, the preliminary inspection of LP Turbine is expected to be completed by 07-05-2024.
On the basis of the preliminary inspection and root cause analysis, further action will be taken at the earliest.

Regards,

Suresh Babu K
AGM(EEMG)
NTPC Darlipali
Contact No. 9493546143

Follow Grid-India on:



Follow Grid-India on:

Modalities for compliance to Deviation Settlement Mechanism (DSM) between India and Bhutan

1. Introduction

India and Bhutan share unique and exemplary bilateral relations, which are based on mutual trust, goodwill and understanding. Mutually beneficial hydro-power cooperation with Bhutan is a key pillar of bilateral economic cooperation. The Jaldhaka Agreement signed in 1961 was the first bilateral agreement between India and Bhutan for electricity exchange between the two countries. Further, the agreement for the development of the 336 MW Chhukha run-of-the-river (RoR) Hydro-Electric Project (HEP) was signed in 1974, thereafter construction of Kurichhu HEP completed and sale of power from there started in 2001-2002.

An Agreement between the Government of the Republic of India (GOI) and the Royal Government of Bhutan (RGoB) concerning Cooperation in the field of Hydroelectric Power was signed on 28th July, 2006 and its Protocol was signed in 2009. Four hydro-electric projects (HEPs) namely Tala, Chhukha, Kurichhu and Mangdechhu, totaling 2136 MW are supplying electricity to India under Government to Government (G2G) mode. Further, Dagachhu HEP and Basochhu HEP are supplying power to Indian entities/Indian power exchanges through separate agreements.

Bhutan also imports electricity during the winter months from Indian Power Exchanges, from past few years.

A Secretary-level discussion in the field of hydropower cooperation between the RGoB and the GOI was held in Thimphu on 31st October 2022. In the meeting, GoI desired to work towards bringing the existing long-term Power Purchase Agreements (PPAs) under the Deviation Settlement Mechanism (DSM) by the end of 2023. RGoB intended to bring their domestic market under grid discipline through the introduction of suitable regulatory and policy framework.

2. Power System of India

Power System of India is one amongst the largest in the world. Installed electricity generation capacity in India is about 425 GW (September, 2023) comprising about 44% from non-fossil fuel capacity. Peak demand has been of the order of 240 GW in September, 2023.

All India National Grid having voltage level up to 765 kV AC and +/- 800 kV HVDC system is widely spread over 476,000 circuit km (ckm, 220 kV and above voltage level) across the country integrated with the latest technologies such as Flexible Alternating Current Transmission System (FACTS), Gas Insulated System (GIS switchgear and sub-station), Advanced Load Despatch Centres, Phasor management Units (PMUs) Renewable Energy Management Centres (REMC), Unmanned sub-stations, on-line maintenance practices etc.

Indian grid is operated as per provisions of the Indian Electricity Grid Code and other regulations. Several measures for grid discipline measures like Deviation Settlement Mechanism (DSM), reactive energy charges, congestion charges etc are in place.

Vibrant power market is under operation. Apart from long term power purchase agreements, power exchange between India and neighbouring countries has been started through market mechanisms as well.

3. Power System of Bhutan

Bhutan's hydropower installed capacity is 2,335 MW as on September 2023. The national coincidental peak demand was recorded as 921.87 MW in November 2023. About 65% of the electricity generated in Bhutan is being exported to India in 2022.

The transmission network consists of 66 kV, 132 kV, 220 kV and 400 kV voltage levels. Prior to the commissioning of 2x63/80 MVA, 220/132 kV Jigmeling substation the Eastern and Western grids, were operated in isolation. With the establishment of the east-west interconnection, the energy security in the country has been enhanced. Grid Map of Bhutan is given at Figure 1.

In Bhutan, the Guidelines for scheduling and deviation settlement mechanism for sellers and buyers is in the process of being implemented.

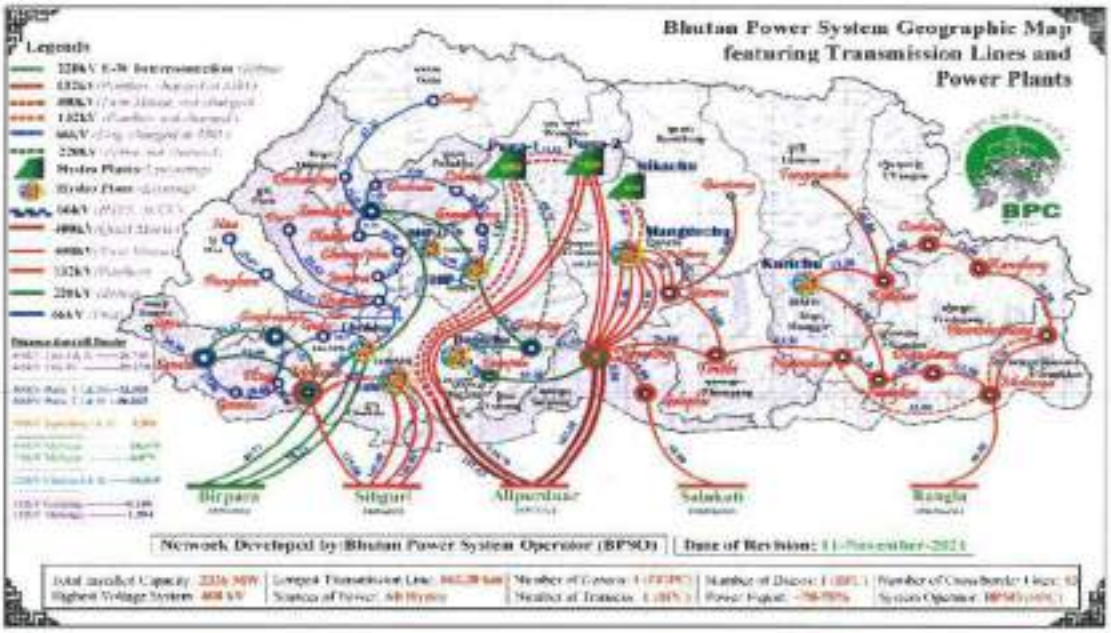


Figure 1 Grid map of Bhutan

4. Generating Stations in Bhutan exporting power to India

Power from Tala (1020 MW), Chhukha (336 MW), Kurichhu (60 MW), and Mangdechhu (720 MW) is being imported by India under existing long-term Power Purchase Agreements (PPAs). Details of these projects are given in Table 1 below:

Table 1

Project	Capacity (MW)	Commissioned in	Transmission link	Indian Beneficiaries
Tala HEP (West Bhutan)	1020 (6x170)	2006-07	**400 kV** 1. Tala- Binaguri Ckt-I 2. Tala- Binaguri Ckt-II 3. Tala-Malbase-Binaguri Ckt-III	**ER** (85%): Bihar, Jharkhand, DVC, Odisha, West Bengal

Project	Capacity (MW)	Commissioned in	Transmission link	Indian Beneficiaries
			4. Tala- Binaguri Ckt-IV	**NR** (15%): UP, Rajasthan, J&K, Haryana, Punjab, Delhi
Chhukha HEP (West Bhutan)	336 (4x84)	1986-88	**220 kV** 1. Chhukha –Birpara Ckt-I 2. Chhukha –Birpara Ckt-II 3. Chhukha -Malbase – Birpara Ckt-III	**ER** (100%): Bihar, Jharkhand, DVC, Odisha, West Bengal, Sikkim
Kurichhu HEP (East Bhutan)	60 (4x15)	2001-02	**132 kV** 1. Motanga-Rangia 2. Gelephu -Salakati	**ER**: DVC (50%), West Bengal (50%)
Mangdechhu (Central Bhutan)	720 (4x180)	2019 (Jun-Aug)	**400 kV** 1. Mangdechhu Jigmeling twin circuit (Circuit -I to IV) & Jigmeling - Alipurduar D/C Quad line & Jigmeling - Punatsangchhu – II - Alipurdar D/C line	**ER** (79.98%): Bihar, Odisha, West Bengal **NER** (20.02%): Assam

Apart from above generating stations, power from Dagachhu HEP 126 MW (2x63) is being imported by Indian Entities under short term access and Basochhu HEP 64 MW (2x12 + 2x20) is being sold through Indian power exchanges.

Further, Punatsangchhu-II HEP 1020 MW (6x170) is expected to be commissioned in the year 2024 and Punatsangchhu-I HEP 1200 MW (6x200) is expected to be commissioned in near future.

5. Existing Accounting Methodology for import/export of electricity

The Power Purchase Agreements (PPAs) of Tala HEP (THP), Chhukha HEP (CHP), Kurichhu HEP (KHP) and Mangdechhu HEP (MHP) provides about metering points and accounting methodology for export of electricity from respective generating stations. Relevant provisions of energy accounting from PPAs are enclosed at **Annexure-I.** Power from Dagachhu HEP is exported to India as per the modalities provided by Central Electricity Regulatory Commission (CERC) vide Order in Petition No. 187/MP/2014 dated 11.09.2014.

Single Line Diagram (SLD) showing generating projects in Bhutan and transmission system for import/export of power is shown at

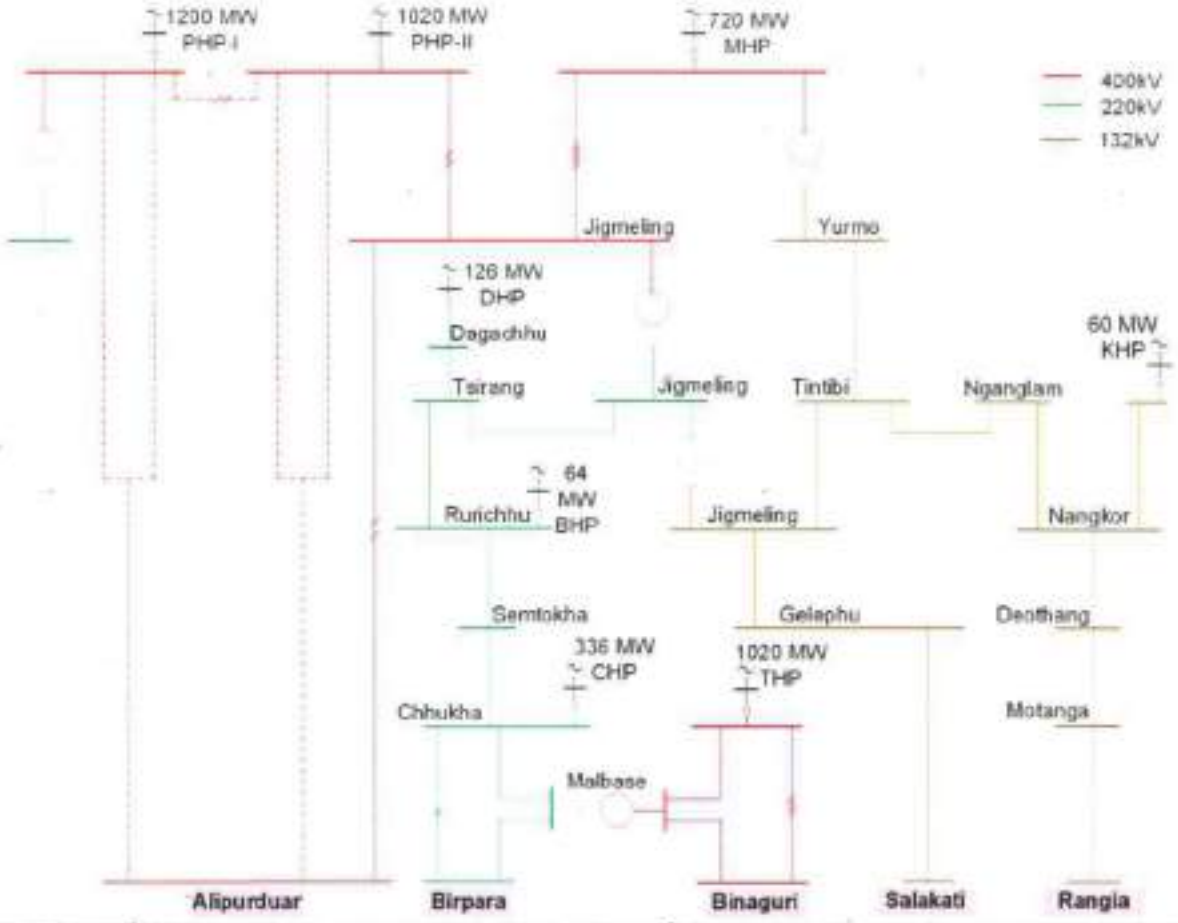


Figure 2.

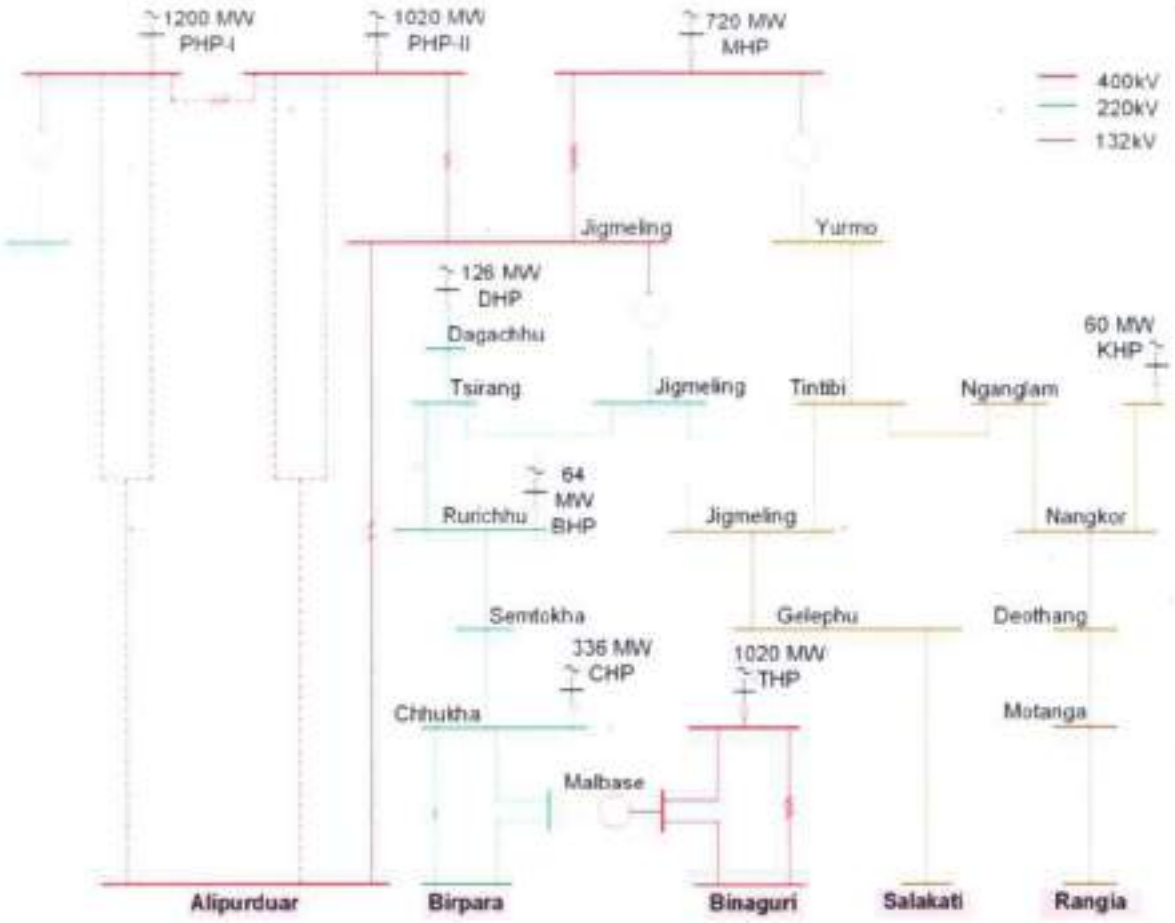


Figure 2 Generating stations in Bhutan and transmission system for import/Export of electricity

Considering the provisions of PPAs, order of CERC and other decisions, accounting of energy exchange between India and Bhutan is being carried out by Eastern Regional Power Committee (ERPC) Secretariat as briefed below:

- Power from Tala, Chhukha, Kurichhu and Mangdechhu HEPs are not covered under DSM and energy accounting is done based on actual energy receipts at agreed delivery points, after meeting internal consumption of Bhutan.
- The energy accounting of Bhutan's generators is done on a monthly basis after the receipt of Energy Meters' data of all the hydro power generators through PTC (PTC India Ltd, PTC being the nodal agency for these projects).

<u>Tala HEP, Chhukha HEP, Dagachhu HEP</u>

- Receipt through 3 Nos. of Tala-Binaguri and Malbase-Binaguri 400 kV lines and 220 kV Chhukha/Malbase – Birpara circuits is considered as receipt from Tala, Chhukha and Dagachhu. The electricity receipt is adjusted with transmission losses of respective territory to reflect it at agreed points as per the PPAs (i.e. Khogla, Pugli and Phuentsholing).
- The receipt from Dagachhu HEP is calculated by deducting 2% loss from ex-bus generation of Dagachhu HEP. Since the HEP is covered under Deviation Settlement Mechanism (DSM) (as per CERC Order for Petition No. 187/MP/2014 dated 11.09.2014), deviation charges and transmission deviation charges are

calculated accordingly. The charges are settled by Tata Power Trading Company Limited (TPTCL) with the Eastern Regional deviation pool of India.

- After deduction of Dagachhu energy, the net receipt is segregated at a predetermined ratio between Tala and Chhukha.

Kurichhu HEP

- Energy from Kurichhu HEP is received through 132 kV Gelephu-Salakati and 132 kV Motanga-Rangia transmission interconnections. The energy flow from 220 kV side of Jigmeling transformer to 132 kV side is considered as Chhukha power and is added to the Chhukha receipt and subtracted from Kurichhu receipt.

Mangdechhu HEP

- For Mangdechhu HEP, Indo-Bhutan border at Jigmeling is considered to be the delivery point for energy received from 4 nos. of 400 kV Mangdechhu -Jigmeling–Alipurduar transmission lines and also for power flowing through 400/132 kV Mangdechhu Pothead Yard.
- Summation of energy from 4 nos. of 400 kV Mangdechhu-Jigmeling feeders is considered. Flow of energy from HV to LV side of 400/132 kV ICT at Mangdechhu Pothead Yard is considered as internal consumption of Bhutan. As per the agreement with Bhutan, its internal power consumption during any month shall be met through cheapest power source among Tala, Kurichhu, Chhukha and Mangdechhu in the ascending order of its exportable tariff. Therefore, the energy flow HV to LV side through 400/132 kV ICT is subtracted from Tala HEP receipt and added to Mangdechhu export after considering the transmission losses. In case the receipt at Tala is not sufficient, the adjustment is to be done in order from Kurichhu, Chhukha, and Mangdechhu.
- When power flows from LV to HV side of 400/220 kV ICT at Jigmeling(as this power is not included in MHP energy), it is considered as power of Chhukha and added to the export of Chhukha.
- In case of flow of power from HV to LV side of 400/220 kV ICT at Jigmeling [as this power is already included in MHP energy (shown in Mangdechhu export)], it is subtracted from cheapest source among Tala, Kurichhu, Chhukha, Mangdechhu in the ascending order of its tariff.

General

- The final available receipt of power from each hydro-generator is segregated among its beneficiaries in the ratio of their share of allocation from respective generators
- Deviation from schedule is settled by the beneficiaries of India of the plant as per the rate of the power purchase cost from the plants on monthly basis with Eastern Regional Deviation and Ancillary Service Pool Account.

Import by Bhutan from India

- During winter months, Bhutan is importing power from India through Indian power exchanges. During such period, the transactions between India and Bhutan are covered under DSM. Accordingly, actual interchange of Druk Green Power Corporation Limited (DGPC Bhutan) is computed from the meters at Indian periphery after subtracting Dagachhu injection. Deviation of DGPC-Bhutan is

based on the actual interchange and net schedule prepared by ERLDC. This deviation of energy to be computed as per CERC DSM Regulations and settled with Bhutan from ER Deviation Pool Account by the Settlement Nodal Agency (SNA). For Dagachhu HEP, DSM is computed as per CERC DSM Regulations and settled with Bhutan from the ER Deviation Pool Account.

5. Requirement of scheduling and deviation settlement mechanism

(i). Guidelines for Import/Export (Cross Border) of Electricity-2018 issued by Ministry of Power, Government of India provides that "*8.7 The transmission charges, scheduling, metering, accounting, deviation settlement, secure grid operations involving the Indian Grid and any other related operational mechanism shall be governed in accordance with the applicable Regulations of the Government of India.*"

(ii). CERC (Cross Border Trade of Electricity) Regulations, 2019 provides that "*26(3) The Settlement Nodal Agency shall pay or receive charges on account of deviation to or from Regional Deviation Pool maintained by NLDC as per Deviation Pool account issued by Regional Power Committee. The Settlement Nodal Agency shall settle the same with the selling entity or buying entity of the neighbouring country, as the case may be*".

(iii). Presently, several adjustments are carried out to account for Bhutan's internal consumption before booking energy from the generating projects to the beneficiaries of India. Such post facto adjustments imposed deviation charges on beneficiaries.

(iv). Power of various Bhutanese power plants is intermingled at Indian periphery, segregation of power based on some ratio may lead to improper booking from that plant.

(v). Power of Dagachhu HEP is being sold under bilateral transaction and accounts are settled on the basis of schedule, whereas, CHP, THP, KHP and MHP energy is settled on actual basis. Further, during import by Bhutan, the energy charges are paid based on schedule. Different accounting philosophies for different projects/time is not desirable. Therefore, rational, transparent and verifiable accounting and settlement system need to be in place.

(vi). In the Secretary-level discussion on hydropower cooperation between the Royal Government of Bhutan (RGoB) and the Government of India held in Thimphu on 31st October 2022, Government of India (GoI) desired to work towards bringing the existing long-term Power Purchase Agreements (PPAs) under the Deviation Settlement Mechanism (DSM) by the end of 2023.

(vii). DGPC, Bhutan has signed Cross Border Settlement Nodal Agency Agreement with NVVN [NTPC Vidyut Vyapar Nigam Ltd. (NVVN)] on 13th December, 2022. The PPAs of THP, CHP, KHP, MHP and DHP are mentioned as "Legacy PPAs" and SNA Agreement for Legacy PPAs shall be effective from 01.01.2024.Further, it is mentioned that "For any extensions or exemptions, the Parties shall refer the matter to their respective Governments for directions/ decisions".

(viii). The CERC Order for Petition No. 187/MP/2014 dated 11.09.2014 approved modalities for DSM on Dagachhu. Further, CERC vide order dated 16.02.2016

mentioned that the Commission is in the process of framing draft Regulations on Cross Border Transactions. Therefore, the interim arrangement approved by the Commission in order dated 11.9.2014 shall continue till the notification of the Regulations on Cross Border Transactions and thereafter, the transaction for evacuation of power from Dagachhu HEP shall be governed in accordance with the said regulations.

(ix). As, the Regulations on cross border trade of electricity have already been notified by CERC, the accounting methodology for Dagachhu HEP need to be aligned to the provisions of the Regulations.

7. Proposed methodology for electricity transactions with Bhutan

The proposed methodology charts out the activities to be carried out for bringing the transactions with Bhutan under the ambit of Import/Export (Cross Border) Guidelines-2018 of India and Central Electricity Regulatory Commission (Deviation Settlement Mechanism and Related Matters) Regulations, 2022 and as amended from time to time.

As and when the regulations are being revised by CERC, Bhutan may submit their suggestions and comments.

Since the power of various generators are getting mixed up at Indian Boundary, the Scheduling, Accounting and DSM aspects need to be applied holistically. Further, the energy charges for each project are governed by separate PPAs.

7.1. Control Area Jurisdiction

Geographically, Bhutan grid is connected with Eastern Region of India at Birpara 220 kV, Binaguri [Siliguri (New)] 400 kV and Alipurduar 400 kV and with North-Eastern Region of India at Salakati 132 kV and Rangia 132 kV. As whole Bhutan grid is synchronously connected with Indian grid, Bhutan system will be treated as a single control area for the purpose of bidding, scheduling, deviation settlement, reactive energy charges, and transmission deviation.

7.2. Data Telemetry and Voice communication

Telemetry of cross-border transmission lines between Indian Grid and Bhutan Grid shall be made available through Supervisory Control and Data Acquisition (SCADA) and voice communication system to National Load Despatch Centres (NLDCs) of India and Bhutan.

Further, real time data and interface meter data of the generating station of Bhutan exporting power to India shall be provided to NLDC (India).

Similarly, real time data and interface meter data at interconnection point in India shall be provided to Bhutan NLDC.

NLDC Bhutan and NLDC India shall maintain seamless communication and availability of data.

The telemetry and data shall be firewall protected and compliant to cyber security standards.

7.3. Agreements/Approvals

(a) The generating stations namely Tala, Chhukha, Kurichhu and Mangdechhu HEPs are under Government to Government (G2G) Agreements, therefore, no additional approvals will be required to export power from these stations to India.

(b) Similarly, export by new projects under G2G agreements will not require approval from the Designated Authority under Guidelines for Import/Export (Cross Border) of Electricity-2018.

(c) Transactions from Dagachhu HEP and Nikachhu HEP shall be deemed to have approval under the Guidelines-2018, till validity period of PPAs.

(d) For the generating projects, other than the projects covered above, agreements need to be signed between generating company and Indian entity (either directly or through trader) for export of power from Bhutan.

(e) For (d) above, the Indian entity shall seek approval from Designated Authority as per Guidelines for Import/Export (Cross Border) of Electricity -2018.

7.4. Transfer Capability Assessment

(a) Total transfer capacity (TTC)/Available transfer capability (ATC) between Indian grid and Bhutan grid shall be carried out by National Load Despatch Centre (NLDC) of India and Bhutan.

(b) Scheduling of transactions shall be considered the minimum of the TTC as calculated and agreed by the Indian and Bhutanese side.

(c) If capacity is not there, both sides may consider upgradation of the transmission interconnectivity.

7.5. Delivery Points

Presently, delivery points for exporting power from each generating stations in Bhutan are different points on India-Bhutan Border. Also, billing of energy is at delivery points. Since, meters can be installed in substations only, energy at the delivery point is a calculated (assessed) figure for transmission lines, namely Feeder I, II and IV for Tala HEP and Feeder I and II for Chhukha HEP while the actual metered energy from all other interconnecting lines are used.

In case of import of power by Bhutan, the delivery points were considered as sub-stations in Indian Territory.

With the implementation of the DSM modalities, the delivery points for import/export of power by Bhutan shall be at the India-Bhutan border after accounting for the transmission line losses.

7.6. Scheduling

(a) All Scheduling shall be through Settlement Nodal Agency (SNA) to NLDC, India on 15-minute time block basis as per Indian Electricity Grid Code (IEGC).

(b) All generating stations exporting power to the India shall provide following scheduling information:

a. Total Ex-bus generation schedule of the generating station.

b. Ex-bus schedule for export to India

c. Schedule for export to India at delivery point after deducting applicable transmission losses.

(c) In case of import of power by Bhutan, the drawal schedule of Bhutan shall be considered at delivery points.

(d) Both side NLDCs shall make efforts to keep the import/export within schedule so as to minimise the deviations.

(e) Re-scheduling of export from the run-of-river hydropower plants in Bhutan shall be carried out as per provisions of IEGC.

7.7. Metering

(a) Interface Energy Meters as per class and specifications mentioned in Central Electricity Authority (Installation and Operation of Meters) Regulations shall be installed at following locations :

(i). The existing and upcoming generating stations exporting power to India shall have Interface Energy Meters at all the outgoing feeders, generating units and station transformers. Meter readings at generating units and station transformers will be used in case of discrepancy in main and check meters.

(ii). Both side sub-stations of transmission interconnectors.

(The schematic of metering arrangement at Generating station and Transmission Interconnector is shown at **Annexure-II).**

(b) All the meters shall be time synchronised with Indian Standard Time (IST).

(c) Weekly meter readings (import or export in terms of MWh and MVArh) for actual injection or drawl by exporting generators/importing entity of Bhutan shall be provided to the RLDC(s) /NLDC through Settlement Nodal Agency as per timelines prescribed in IEGC.

7.8. Energy Accounting

(a) Energy accounting for scheduled energy, charges for deviation, reactive energy, and transmission deviation shall be done by Eastern Regional Power Committee (ERPC) / National Power Committee (NPC) Secretariat of India. The data used for accounting shall be provided to NLDC, Bhutan. The discrepancy, if any noticed by Bhutan shall be intimated to ERPC/NPC within prescribed time schedule.

(b) For arriving at the import/export of energy at India-Bhutan border, the meters installed in the Bhutan side shall be used primarily after accounting for the transmission line losses. In case of any discrepancy in the reading, meters installed in the Indian side shall be used.

(c) The energy charges of the generating station exporting power to India shall be based on Scheduled Energy at the agreed delivery point.

(d) Algebraic sum of export and import transactions, at delivery points, shall be considered as total schedule for import/export (E_{Sch}).

(e) Actual import / export (E_{Act}) would also be determined by summing up all the meter data at delivery points.

(f) Deviation energy from schedule of Bhutan shall be calculated based on total actual import/export and total schedule energy ($E_{Dev} = E_{Act} - E_{Sch}$).

(g) The rate of deviation energy (D_{rate}) will be as per CERC regulations.

(h) Deviation charges shall be calculated by multiplying deviation energy with rate of deviation energy ($C_{Dev} = E_{Dev} \times D_{rate}$).

(i) Efforts shall be made by Bhutan to keep generation as per schedule and deviations shall be settled within Bhutan through implementation of Grid Discipline Mechanism (GDM) 2024, of Bhutan which is likely to be implemented w.e.f. 1st May 2024.

(j) The discrepancy, if any noticed by India, shall be intimated to NLDC, Bhutan

(k) Infirm energy by the upcoming generating stations under G2G mode, shall be accounted from the interface energy meters installed at generating units. The energy metered by the infirm unit, shall be subtracted from the total export from the generating station and treatment of infirm energy will be as per Agreements.

(l) Reactive energy accounting will be done on the basis of meter readings at both ends i.e., interconnecting substations.

(m) Transmission Deviation Account shall be prepared according to CERC regulations considering the total General Network Access (GNA) quantum and total actual meter data computed at agreed delivery point.

7.9. Settlement of Charges

(a) Energy charges shall be settled between Bhutan and Indian entities based on energy figures provided in the energy accounts issued by ERPC/NPC Secretariat. The discrepancy, if any noticed by Bhutan shall be intimated to ERPC/NPC within prescribed time schedule

(b) Transmission charges, scheduling charges etc. shall be settled as per Agreements.

(c) Grid related charges i.e. Deviation Settlement Charges, Reactive Energy Charges, Transmission Deviation charges, Congestion charges, ancillary service charges or other charges, as applicable, shall be settled by SNA. SNA in turn will settle the charges with Bhutan.

8. Applicability, Review and Revision of the DSM Modalities

8.1. The modalities shall be reviewed and revised as and when necessary, as mutually agreed by the Bhutan and India sides.

8.2. These modalities shall not be applicable for radial inter connections between the two countries.

(Sh. M.A.K.P Singh)	(Daho Chhewang Rinzin)
Member (Hydro), CEA & Team lead, India	Managing Director, DGPC & Team lead, Bhutan

Annexure-I

Existing provisions for energy accounting in the PPAs

(i). **Chhukha HEP (CHP)** - Agreement between PTC and DoE, Bhutan signed on 31st August, 2002, the relevant excerpt of the agreement are as below:

2.2 CHPC shall supply to PTC, and PTC shall purchase, all surplus energy from CHPC that is in excess of the requirements within Bhutan.

3.1 Delivery Points : Phuentsholing (220 kV level), the midpoint between Chhukha and Birpara shall be deemed to be the Delivery Point for the energy to be received by PTC for power flowing on 220 kV Chhukha-Birpara Circuits I and II.

6.1 The quantum of energy received by PTC during any month shall be the actual energy delivered to PTC at the Delivery Point during that month.

6.2 The actual energy delivered to PTC at the Delivery Point shall be taken as follows:

- The average of net energy recorded by the energy meters at Chhukha end and Birpara end of 220 kV Chhukha- Birpara Circuits - I & II feeders
- The net energy recorded by the energy meters at Singyegaon end on feeder III in respect of 220 kV Singyegaon-Birpara feeder.
- In the event any of these feeders are tapped between the above said ends, the procedure for accounting of energy shall be appropriately revised in a manner as may be decided jointly between PTC and CHPC/BPC.

(ii). **Tala HEP (THP)** - Agreement between PTC and DoE, Bhutan signed on 27th September, 2006, the relevant excerpt of the agreement are as below:

2.2 THPA shall supply to PTC, and PTC shall purchase, all surplus energy from THPA that is in excess of the requirements within Bhutan.

3.1 Delivery Points: The Indo-Bhutan border, shall be deemed to be the Delivery Point for the energy to be received by PTC for power flowing on 400 kV Tala – Siliguri (New) D/c Lines. For the power flowing on 400 kV feeders I and II, Khogla shall be deemed to be the Delivery Point, and each feeder Delivery Point is located at 115.65 km from Siliguri (New) and 24.615 km from THP, Pagli shall be deemed to be Delivery Point for the power to be received by PTC for power flowing on 400 kV feeders III and IV. Pagli is at a distance of 98.087 km from Siliguri (New) and 47.967 km from THP. Feeder III is tapped within Bhutan for loop-in loop-out connection with 220 kV system at Malbase, which is 24.010 km from THP and 27.079 km from Pagli.

6.0 ACCOUNTING OF ENERGY

6.1 The quantum of energy received by PTC during any month shall be the actual energy delivered to PTC at the delivery point during that month.

6.2 The actual energy delivered to PTC at the delivery point shall be taken as follows:

6.2.1 Energy recorded by the energy meters at Tala end less 17.55% of the difference of energy recorded at Tala and Siliguri (New) ends of 400 kV Tala-Khogla- Siliguri (New) feeders

6.2.2 Energy recorded by the energy meters at Tala end less 32.84% of the difference of energy recorded at Tala and Siliguri (New) ends of 400 kV Tala-Pugli- Siliguri (New) feeder IV.

6.2.3 Energy recorded by the energy meters at Malbase outgoing end less 21.63% of the difference of energy recorded at Malbase and Siliguri (New) ends of the 400 kV Tala Malbase-Pagli-Siliguri (New) feeder III.

6.2.4 Energy recorded by the energy meters at Malbase 220 kV outgoing feeder to Birpara.

In order to ascertain plant wise injection from Tala HEP and Chhukha HEP and to ascertain the booking of energy for Bhutan Loads (Malbase/Singhlgaon) the meter readings at the following locations shall also be required:

- Energy recorded by energy meters at 220 kV side of 200 MVA, 400/220 kV Malbase transformer.
- Energy recorded by energy meter of 220 kV Malbase - Singhigaon D/C at Malbase end.
- Energy recorded by energy meter at 220 kV side of 220 kV/66 kV Malbase Transformer.

METHODOLOGY:

Computation of Energy Injection (Ref: Diagram at Figure 3)

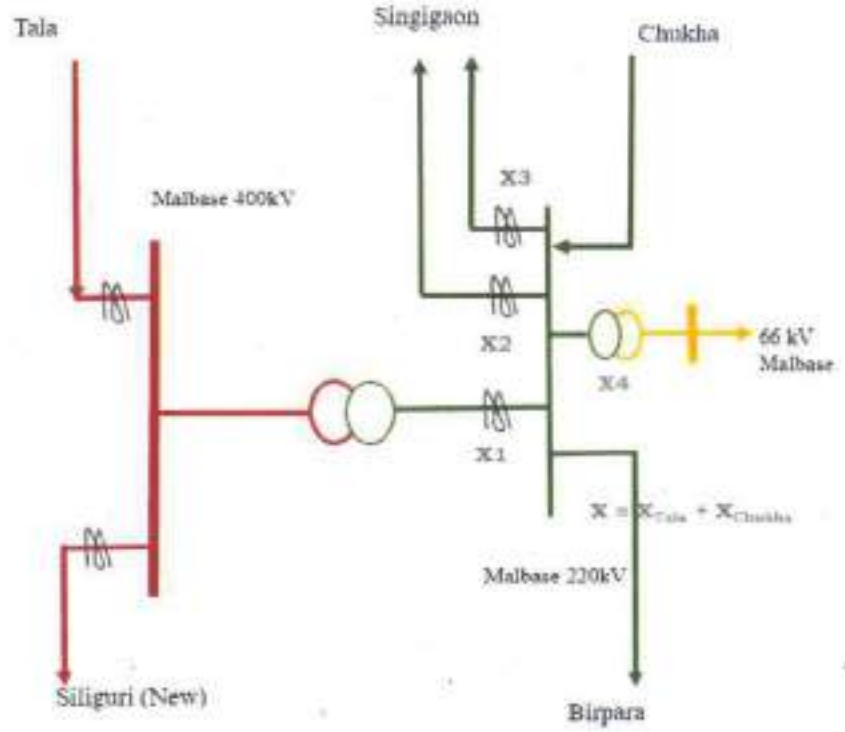


Figure 3 Tala and Chukha Energy Computation

Let X1 = net export from Malbase 220 kV Transformer to Malbase 220 kV Bus.

X2 + X3 + X4 = net energy export to Singhigaon and Malbase 220/66 kV transformer recorded at Malbase.

A) If Singhigaon/Malbase Consumption booked against Tala

Say, Xtransf = X1 - (X2+X3+X4)

Energy Injected from Tala = (Summation of energy readings for Siliguri (New) – Tala feeders 1, 2 & 4 + energy meter reading for Malbase - Siliguri (New) feeder 3 + Xtransf)

Energy injected from Chukha =Summation of energy readings for Birpara – Chukha feeders 1 & 2 + Energy meter readings for Malbase- Birpara 220 kV feeder- Xtransf

Note: X1 is (+) ve for energy flow from 220 kV side of Transformer to 220 kV Bus

X2, X3, X4 are (+) ve for energy flow from Malbase to Singhigaon and Malbase 220 kV bus to 220/66 kV Transformer

B) If Singhigaon / Malbase Consumption booked against Chukha

Say, Xtransf = X1

Energy injected from Tala =Summation of energy readings for Siliguri (New) - Tala feeders 1, 2 & 4 + energy meter reading for Malbase - Siliguri(New) feeder 3 + Xtransf

Energy injected from Chukha = Summation of energy readings tor Birpara - Chukha feeders 1 & 2 + Energy meter readings for Malbase - Birpara 220 kV feeder - Xtransf

Note: X1 is (+) ve for energy flow from 220 kV side of Transformer to 220 kV Bus of Malbase.

Under normal circumstances, methodology under A) above will be used for computation of energy injection.

6.3 In the event any of these feeders are tapped between the above said ends, the procedure for accounting of energy shall be appropriately revised in a manner as may be decided jointly between PTC and THPA/BPC.

(iii). **Kurichhu HEP (KHP)** - Agreement PTC and DoE, Bhutan signed on 31st October, 2002

2.2 KHPC shall supply to PTC and PTC shall purchase, all surplus energy from KHPC that is in excess of the requirements within Bhutan.

3.1 Delivery Point(s):

3.1.1 Gelephu end of 132 kV Salakati – Gelephu line shall he the Delivery Point for the energy to be received by PTC from KHP.

3.2 Motanga end of 132kV Motanga-Rangia line shall be the additional Delivery Point for the energy to be received by PTC from Druk Green's Kurichhu Hydropower Plant

6.1 The quantum of energy received by PTC during any month shall be the actual energy (i.e. net of export and import) delivered to PTC at the Delivery Point during that month.

6.2 The joint meter readings of the main and check meters installed at Gelephu and Salakati ends shall be taken as per the regional energy accounting procedures.

(iv). **Mangdechhu HEP (MHP)** - Agreement between PTC and DGPC, Bhutan signed on 15th August, 2019

2.2 DGPC shall supply to PTC, and PTC shall purchase all surplus energy from MHP that is in excess of the requirements within Bhutan.

3.1 Delivery Point(s):

3.1.1 The Indo-Bhutan international border at Jigmeling shall be deemed to be the Delivery Point for the energy to be received by PTC for power flowing on the 4 Nos. of 400 kV Mangdechhu- Alipurduar transmission lines and also for power flowing through 400/132 kV ICT at MHP pot head yard.

3.1.2 For Mangdechhu power flowing through transmission lines other than provided in Clause 3.1.1 above, Indo-Bhutan international border shall be deemed to be the Delivery Point for energy received by PTC.

6.0 ACCOUNTING OF ENERGY

6.1 The quantum of MHP energy received by PTC during any month shall be accounted as below:

MHP_{EXP} = MJ1 + MJ2 + MJ3 + MJ4 +/- {ICT (HV) - Transmission loss} - MHP_{INT}

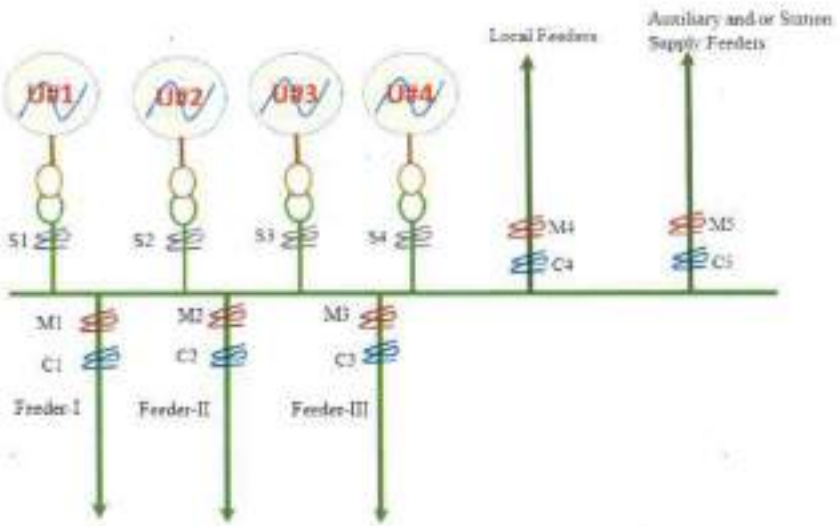
Where:

- MHP_{EXP} is the quantum of MHP energy received by PTC during the month.
- MJ1, MJ2, MJ3 and MJ4 are the energy meter readings on the 4 Nos. of 400 kV Mangdechhu -Jigmeling incoming at Jigmeling end.
- ICT (HV) is the energy meter reading on the HV side of the 400/ 132 kV ICT at Mangdechhu pot head yard. *(The readings shall be considered positive for energy flowing from 400 kV to 132 kV side and the reading shall be considered negative for energy flowing from 132 kV to 400 kV side. The Transmission Lass shall be calculated and be applicable only when the energy flows from HV Side to LV Side).*
- Transmission Loss = % Average Transmission Loss in 400 kV Mangdechhu - Jigmeling 400 kV feeders * ICT(HV)
- MHP_{INT} is the quantum of MHP energy internally consumed by Bhutan during the month, which shall be determined as specified in Clause 6.2 below.

6.2 The internal power requirements within Bhutan during any month shall be met from the cheapest source among THP, KHP, CHP and MHP in the ascending order of its exportable tariff, as applicable from time to time.

Annexure-II

1. Schematic of Metering arrangement at Generating Station

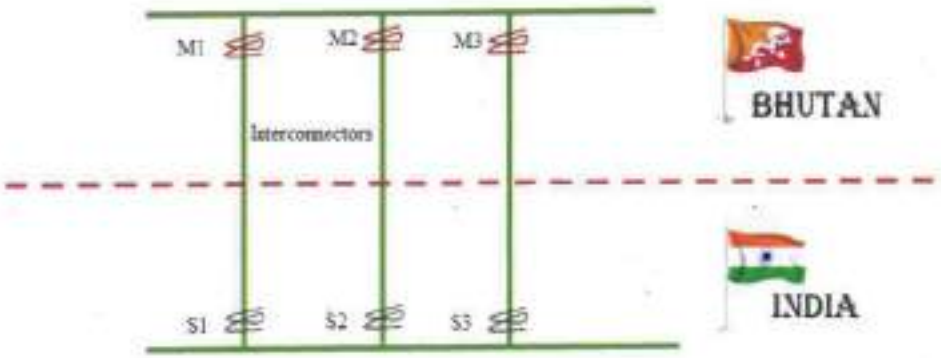


	(M1,M2,M3....etc.) Main Meter
	(C1,C2,C3.....etc.) Check Meter
	(S1,S2,S3.....etc.) Standby Meter

Actual Generation Recorded by Main Meters	M1+M2+M3+M4
Actual Generation Recorded by Check Meters	C1+C2+C3+C4
Actual Generation Recorded by Standby Meters	S1+S2+S3+S4-M5

Figure 4 Schematic of Metering arrangement at Generating Station

2. Schematic of Metering arrangement at Transmission Interconnector



	(M1,M2,M3....etc.) Main Meter
	(S1,S2,S3.....etc.) Standby Meter

Figure 5 Schematic of Metering arrangement at Transmission Interconnector

Note: Meter connections should be such that power leaving the BUS is recorded as positive and power entering into the BUS is recorded as negative.

Annexure B.2.12

Standard Operating Procedure (SOP)

Procurement & Installation of ISTS Interface Energy Meter (IEM/SEM)

Introduction:

This Standard Operating Procedure (SOP) for Procurement and Installation of Interface Energy Meter (IEM/SEM) will be applicable only for the IEM/SEM falling under the purview of CTU as per the provisions under Regulations 49.12 (a) of CERC (Indian Electricity Grid Code), Regulations, 2023 and amendments thereof. The Regulation 49.12(a) is re-produced below:

"*49.12* ***Energy Metering and Accounting:***

(a) The CTU shall be responsible for procurement and installation of Interface Energy Meters (IEM/SEM), at the cost of respective entity, at all the ISTS interface points, points of connections between the regional entities, cross border entities and other identified points for recording of actual active and reactive energy interchanged in each time-block through those points, and its operation and periodic calibration shall be done by the respective entity. CTU shall be responsible for replacement of faulty meters."

The objective of this procedure is to ensure timely installation of IEM/SEM in the new ISTS system and timely replacement of the defective IEM/SEM.

Presently, POWERGRID is an authorized agency for procurement of IEM/SEM, installation of new IEM/SEM and replacement of defective IEM/SEM. Any mention of POWERGRID in this procedure shall also mean any other agency authorized by CTUIL to carry to aforesaid functions. CTUIL may authorize any other agency to carry to aforesaid functions in future. Replacement/Installation of IEM/SEM shall mean all the activities including supply of new meter and its installation, testing and commissioning.

The complete cycle of installation/replacement of IEM/SEM has been divided in various steps as described in Part A & B. Since timely procurement and availability of sufficient no. IEM/SEM is the key a critical requirement, Part C of this procedure deals with timely estimation of requirement & procurement of IEM/SEM.

A. Procedure for replacement of Faulty ISTS IEM/SEM

1. **Identification of faulty IEM/SEM and communication to CTU:**

1.1 Based on the inputs from respective RLDC & its observations on the meter data (received through AMR system or otherwise), the Entity in whose premises the said IEM/SEM for ISTS is installed, shall identify the defective IEM/SEM. The RLDC shall send a communication to the entity within 5 working days from the detection of defective IEM/SEM.

1.2 Within 7 working days from receipt of above communication from RLDC, the Entity shall send a communication (through letter or e-mail) to CTUIL requesting replacement of the defective IEM/SEM. The said communication shall include the followings:

a. The location, serial no. and make of the defective IEM/SEM
b. The date of installation of the above IEM/SEM
c. The observations wrt the said defective IEM/SEM

A copy of this communication shall be sent to respective RLDC and regional nodal officer of POWERGRID. The contact details of POWERGRID Nodal officers shall be made available on CTUIL's website.

1.3 In line with applicable Regulations, the replacement of IEM/SEM shall be on a chargeable basis. The Entity shall undertake in the said communication that they will make payment for supply & installation of the IEM/SEM having automatic remote meter reading facility as per the invoice raised by POWERGRID within 45 working days from the date of installation/replacement of IEM/SEM.

2. **Communication to POWERGRID:**

2.1 On receipt of the above communication from the Entity, CTUIL shall advise POWERGRID to replace the defective IEM/SEM within 5 working days from receipt of the said communication.
A copy of the advice shall also be sent to the respective Entity.

3. **Replacement of Faulty IEM/SEM:**

3.1 The POWERGRID shall raise the invoice on the Entity within 7 working days from the receipt of the advice from CTUIL and shall replace the defective IEM/SEM within 10 working days from date of issuance of invoice. POWERGRID shall inform CTUIL after replacement of the defective IEM/SEM.

3.2 After replacement of faulty IEM/SEM, the entity shall inform respective RLDC & CTUIL about the same.

3.3 The Entity shall make payment to POWERGRID within 45 working days from the date of replacement of IEM/SEM.

4. **Payment and Warranty:**

4.1 The payment towards supply & replacement of IEM/SEM by POWERGRID shall be made by entity within 45 (Forty-Five) working days from its, failing which late payment surcharge @ 0.04% of the invoice amount per day shall be payable for the delayed period.

4.2 IEM/SEM once replaced, shall be under the warranty of 1 year from the date of installation. During this period, the entity shall take up the matter pertaining to the replaced IEM/SEM directly with POWERGRID's nodal officers with copy to CTUIL. POWERGRID's nodal officers shall arrange to replace such IEM/SEM within 15 working days from the date of intimation by the entity.

B. Procedure for Installation of ISTS IEM/SEM for new systems

1. The Entity shall request for installation of new IEM/SEM to CTUIL along with the metering scheme issued by respective RLDC (Suggestive format for metering scheme is attached with this SOP). Entity shall send its request to CTUIL for supply & installation of IEM/SEM at least three months in advance.

2. CTUIL shall communicate, within 5 working days from receipt of communication from entity to POWERGRID for installation of new IEM/SEM.

3. The POWERGRID shall raise the invoice on the Entity within 7 working days from the receipt of the advice from CTUIL and shall install the IEM/SEM within 10 working days from date of issuance of invoice. POWERGRID shall inform CTUIL after installation of IEM/SEM.

4. After installation of IEM/SEM, the entity shall inform respective RLDC & CTUIL about the same.

5. The Entity shall make payment to POWERGRID within 45 working days from the date of installation of IEM/SEM.

6. Payment and Warranty:

   6.1 The payment towards supply & installation of IEM/SEM by POWERGRID shall be made by entity within 45 (Forty-Five) working days from its, failing which late payment surcharge @ 0.04% of the invoice amount per day shall be payable for the delayed period.

   6.2 IEM/SEM once installed, shall be under the warranty of 1 year from the date of installation. During this period, the entity shall take up the matter pertaining to the installed IEM/SEM directly with POWERGRID's nodal officers with copy to CTUIL. POWERGRID's nodal officers shall arrange to replace such IEM/SEM within 15 working days from the date of intimation by the entity.

C. Bulk Procurement of ISTS IEM/SEM

1. By the end of September of each year, CTUIL/STU shall provide the details of ISTS projects coming up in the next 2 years to respective RLDC.

2. RLDC shall work out the metering scheme for total requirement of IEM/SEM under the following heads:

   i. For new ISTS system
   ii. Spares @10% of the IEM/SEM population in the region
   iii. Projected requirement towards replacement of defective IEM/SEM based on past 2-year trend.

   RLDC will get the total IEM/SEM quantity approved by respective RPCs and inform to CTUIL by November end.

3. On receive of the IEM/SEM quantity from RLDCs, CTUIL shall aggregate the requirement on PAN India basis and issue procurement advice to POWERGRID by December end.

4. Thereafter, POWERGRID shall initiate procurement process so as to get IEM/SEM within 6 months from receipt of procurement advice from CTUIL.

Annexure D.1

Anticipated Peak Demand (in MW) of ER & its constituents for June 2024

1	**BIHAR**	**Demand (MW)**	**Energy Requirement (MU)**
	NET MAX DEMAND	7411	4411
	NET POWER AVAILABILITY- Own Sources	429	308
	Central Sector+Bi-Lateral	6901	4232
	SURPLUS(+)/DEFICIT(-)	-81	129
2	**JHARKHAND**		
	NET MAXIMUM DEMAND	2259	1211
	NET POWER AVAILABILITY- Own Source	464	194
	Central Sector+Bi-Lateral+IPP	1251	694
	SURPLUS(+)/DEFICIT(-)	-544	-323
3	**DVC**		
	NET MAXIMUM DEMAND	3625	2175
	NET POWER AVAILABILITY- Own Source	6161	3667
	Central Sector+MPL	379	217
	Bi- lateral export by DVC	2305	1660
	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	610	49
4	**ODISHA**		
	NET MAXIMUM DEMAND (OWN)	5800	3456
	NET MAXIMUM DEMAND (In Case of CPP Drawal)	6598	3197
	NET POWER AVAILABILITY- Own Source	4013	3305
	Central Sector	1754	1174
	SURPLUS(+)/DEFICIT(-) (OWN)	-33	1023
	SURPLUS(+)/DEFICIT(-) (In Case, 900 MW CPP Drawal)	-831	1282
5	**WEST BENGAL**		
	WBSEDCL		
5.1	NET MAXIMUM DEMAND	10091	5912
	NET MAXIMUM DEMAND (Incl. Sikkim)	10096	5916
	NET POWER AVAILABILITY- Own Source (Incl. DPL)	5430	3144
	Central Sector+Bi-lateral+IPP&CPP+TLDP	2509	1281
	EXPORT (To SIKKIM)	5	4
	SURPLUS(+)/DEFICIT(-) AFTER EXPORT	-2157	-1492
5.2	**CESC**		
	NET MAXIMUM DEMAND	2695	1305
	NET POWER AVAILABILITY- Own Source	830	557
	IMPORT FROM HEL	541	389
	TOTAL AVAILABILITY OF CESC	1371	946
	DEFICIT(-) for Import	-1324	-359
		830	-359
	WEST BENGAL (WBSEDCL+CESC+IPCL)		
	(excluding DVC's supply to WBSEDCL's command area)		
	NET MAXIMUM DEMAND	12786	7217
	NET POWER AVAILABILITY- Own Source	6260	3701
	CS SHARE+BILATERAL+IPP/CPP+TLDP+HEL	3050	1670
	SURPLUS(+)/DEFICIT(-) BEFORE WBSEDCL'S EXPORT	-3476	-1847
	SURPLUS(+)/DEFICIT(-) AFTER WBSEDCL'S EXPORT	-3481	-1851
6	**SIKKIM**		
	NET MAXIMUM DEMAND	100	48
	NET POWER AVAILABILITY- Own Source	378	208
	Central Sector	128	82
	SURPLUS(+)/DEFICIT(-)	406	242
	EASTERN REGION		
	NET MAXIMUM DEMAND	31354	18518
	NET MAXIMUM DEMAND (In Case of CPP Drawal of Odisha)	32136	18259
	BILATERAL EXPORT BY DVC (Incl. Bangladesh)	2305	1660
	EXPORT BY WBSEDCL TO SIKKIM	5	4
	EXPORT TO B'DESH & NEPAL OTHER THAN DVC	642	462
	NET TOTAL POWER AVAILABILITY OF ER	28864	17791
	(INCLUDING CS ALLOCATION +BILATERAL+IPP/CPP+HEL)		
	SURPLUS(+)/DEFICIT(-)	-5442	-2853

	SURPLUS(+)/DEFICIT(-) (In Case of CPP Drawal for Odisha)	-6224	-2594