

Action taken report of 27th TCC/NERPC by NERPC Secretariat				Annexure-1.3
Sl No	ISSUES	TCC/NERPC MEETING	MEETING DELIBERATION	Action taken/to be taken
1	Upgradation Activities of SCADA-EMS systems at Regional/State level in North-Eastern Region	27th TCC/NERPC	Resolution regarding construction of backup SLDC(Civil part) amounting to rs 65 Crore has to be sent to MoP	Resolution sent in January'2025
2	Implementation of Remote Access System (RAS) and Automatic Fault Analysis System (AFAS)	27th TCC/NERPC	Email /letter to be sent to Powergrid to provide technical specifications to aid NER states in making the DPR	Technical Specifications received from Powergrid. NERPC to circulate the same to states in order to facilitate them to make DPRs
3	High loading in 132 kV Rangia - Montanga international line	27th TCC/NERPC	Letter to be sent to PTC & Powergrid with copy to CEA, NLDC, CTU	Letter sent to Member PS on 26.12.2024 and to CE, PSPA-2, CEA on 31.01.2025
4	Establishment of redundant fibre path between NERLDC, Shillong, Khelieriat and NEHU for reliability of power system communication link till NERLDC	27th TCC/NERPC	Email/Letter to PCD Div, CEA to expedite finalizing the OPGW Sharing guidelines	1. Draft guidelines issued by CEA 2. Guidelines likely to be issued by March'25
5	Connectivity of NERLDC Guwahati with Sarusajai and Umiam bypassing Kahilipara for its redundancy	27th TCC/NERPC	Email/Letter to PCD Div, CEA to expedite finalizing the OPGW Sharing guidelines	1. Draft guidelines issued by CEA 2. Guidelines likely to be issued by March'25
6	Funding of proposals for strengthening of Intra State Transmission System of Meghalaya approved by CEA and CTU up To 2032 timeframe	27th TCC/NERPC	Resolution regarding strengthening of Intra State Transmission System to be sent to MoP	Resolution sent in January'2025
7	Setting up of Guest House/Transit Camp at Guwahati for NERPC Members	27th TCC/NERPC	Site inspection to be done in the month of December. Letter to CEA for allocating 5000sqft area of NPTI for constructing backup office of NERPC at Guwahati	A committee has been formed for site selection. Committee to submit report to MS, NERPC by February'2025
8	VOIP Communication system for Grid-Operation for all Five Regions NR, NER, SR, WR, ER as PAN India	27th TCC/NERPC	Special Meeting to be convened to finalize BoQ	Meeting held on 22.11.2024.

9	Capacity building for NER constituents on emerging technologies of Power Sector to be funded through PSDF or any other funds	27th TCC/NERPC	Proposal to be sent to PSDF Secretariat	Revised estimate sought from PTC via mail dated 30.01.2025. Then the revised DPR to be sent to PSDF Secretariat
10	Procurement of 2 nos. of UPS and 2 nos. of battery bank for PDMS server of NERPC	27th TCC/NERPC	2 Nos UPS and 2 Nos Battery banks to be procured	Installed in the 1st week of February'2025
11	Realignment/Alteration of existing 33kV Power supply to NERPC/PGCIL/NERLDC	27th TCC/NERPC	Letter to be issued to MePDCL	Work in progress.
12	Proposal for procurement of new office vehicle for NERPC	27th TCC/NERPC	White Color, Innova(Hybrid) to be procured	In progress. Quotation to be taken from vendor in February'2025.
13	Roster for TCC/NERPC Meeting	27th TCC/NERPC	PTC to convene 27th TCC & 27th NERPC meetings tentatively in the 2nd week of March'2025	28th TCC & NERPC Meetings are scheduled on 20.02.2025 and 21.02.2025
14	Re-Engineering of existing 33KV Line on 33 KV Lattice Structures/Towers from Umiam-Umtru Stage-III Power Station, Kyrdemkulai to Stage-IV Concrete Gravity Dam up to Umiam-Umtru Stage-IV Power Station, Nongkhyllam	27th TCC/NERPC	Resolution regarding strengthening of Intra State generating stations to be sent to MoP	Resolution sent in January'2025
15	Re-Engineering of existing 33 kV Line with 33 kV Lattice Structures/ Towers from Myntdu Leshka Stage-I Power Station to Myntdu Leshka Dam.	27th TCC/NERPC	Resolution regarding strengthening of Intra State generating stations to be sent to MoP	Resolution sent in January'2025
16	Formation and Activities of the Regional Disaster Management Group (RDMG) for Power Sector in NER	27th TCC/NERPC	Physical meeting to be convened at Guwahti in coordination with CEA	Letter sent to CEA on 14.01.2025
17	Agenda on Resource Adequacy- IRP Div, CEA	27th TCC/NERPC	Workshop with Discoms to be organized	Letter sent to CEA on 14.01.2025
18	Formation of Sub group of RE generators and discussion their challenges at RPC level	27th TCC/NERPC	Letter to GENCOs, STUs, SLDCs for nomination for RE group.	Letter sent to utilities on 22.01.2025
19	AMC of SAMAST Project	27th TCC/NERPC	To be taken up in next NETEst Meeting	Discussed in 30th NETEst on 24.01.2025



सं. 22-1306/4/2022-ओ एम [E-262577]

भारत सरकार
Government of India
विद्युत मंत्रालय
Ministry of Power

F-Wing, 2nd Floor, Nirman Bhawan
New Delhi, the 30th October, 2024

To,

1. Principal Secretary/Secretary (Energy) of State Governments/UTs.
2. CMD, Grid-India, New Delhi

Subject: Workforce Adequacy Guidelines for Load Despatch Centres and Guidelines for deputation of Workforce from SLDCs to Grid-India for fixed terms-reg.

Sir/Madam,

A copy each of the 'Workforce Adequacy Guidelines for Load Despatch Centres' and 'Guidelines for deputation of Workforce from SLDCs to Grid-India' approved by the Hon'ble Minister of Power is forwarded herewith for information and compliance.

2. The Workforce Adequacy Guidelines for Load Despatch Centres will serve as a benchmark for enhancing the Load Despatch Centres by ensuring they are equipped with sufficient skilled human resources. The Guidelines for Deputation of Workforce from State Load Despatch Centres (SLDCs) to Grid-India focus on fostering collaboration and knowledge-sharing among various LDCs. These guidelines facilitate the exchange of personnel, thereby promoting functional cohesion and building a robust talent pool of Power System Operators.

3. By adhering to these guidelines, LDCs can enhance their operational capacity, ensure efficient management of the grid and ultimately contribute to the stability and reliability of the electricity supply across the nation. Compliance with these guidelines is essential for achieving the goal of a well-equipped and skilled workforce in the power sector.

Encl: As Above

Yours faithfully

P. Parveen 30/10/24
(Parveen Dudeja)

Director (OM)

Email: parveen.dudeja@nic.in

Copy to : Chairperson, CEA

Copy for information to: PS to Hon. MoP /Sr. PPS to Secretary (Power)/ Sr. PPS to AS(SN)/ PPS to JS(OM)

Copy to: Incharge, NIC, Ministry of Power for uploading the guidelines on the website of Ministry of Power under 'New Notices' with heading "**Workforce Adequacy Guidelines for Load Despatch Centres and Guidelines for deputation of Workforce from SLDCs to Grid-India for fixed terms**".

Workforce Adequacy Guidelines for Load Despatch Centres



July 2024

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Introduction

The Electricity Act 2003 designates the Load Despatch Centres (LDCs) as apex bodies to ensure integrated, secure, reliable, economic, and efficient operation of power system under their jurisdiction. The LDCs would play an important role in facilitating the energy transition towards a sustainable and decarbonised electricity grid. Human Capital is the most important Asset in in any organizational setup. Human Resource adequacy has a direct effect on performance and efficiency of all functions and activities. Since LDCs carry out mission critical activities on a 24X7 basis, the availability of adequate human resources in the Load Despatch Centres play a very critical role for reliable and efficient power supply. These guidelines have been formulated to provide a benchmark for strengthening the State Load Despatch Centres by ensuring adequacy of skilled human resources.

The Committee on 'Manpower, Certification, and Incentives for System Operation and Ring-fencing Load Despatch Centres' 2008, estimated a total requirement of 60-70 persons in each Load Despatch Centre. However, it has been more than 14 years since the report was published and the landscape of Indian Power Sector has undergone major transformations since then.

The report on 'Capacity Building of Indian Load Despatchers'(CABIL) endorsed by the Forum of Regulators in 2018 elaborated the manifold expansion in the roles and responsibilities of the load despatch centres in India. The load despatch centres were placed in three groups viz Group-A (Large LDCs), Medium LDCs and Emerging LDCs. The total number of executives (including Supervisors, excluding staff for Sub-LDCs, Physical Security and REMC) in Group-A (Large LDCs) recommended in the report was in the range of 100 – 150 nos. The report further recommends additional 25 personnel for Renewable Energy Management Centres (REMCs).

Categorization of Load Despatch Centres

Considering the diversity of power system profile of different states in terms of their peak demand met, energy consumption and installed capacity of Renewable Energy Sources, all SLDCs have been categorised. Their Human Capital requirements are different as well. The thirty-five SLDCs have been grouped into three categories – Large SLDCs, Medium SLDCs, Emerging SLDCs. NLDC and RLDCs have been considered in the category of large LDCs for the purpose of estimating workforce requirement.

Table 1- Categorisation of SLDCs

S. No.	Large SLDCs	Medium SLDCs	Emerging SLDCs
1	Andhra Pradesh	Assam	Arunachal Pradesh
2	Gujarat	Bihar	Chandigarh
3	Haryana	Chhattisgarh	Dadra and Nagar Haveli /Daman & Diu
4	Karnataka	Damodar Valley Corporation	Goa
5	Maharashtra	Delhi	Manipur
6	Madhya Pradesh	Himachal Pradesh	Meghalaya
7	Punjab	Jammu & Kashmir and Ladakh	Mizoram
8	Rajasthan	Jharkhand	Nagaland
9	Tamil Nadu	Kerala	Puducherry
10	Telangana	Odisha	Sikkim
11	Uttar Pradesh	Uttarakhand	Tripura
12	West Bengal		Andaman & Nicobar*
13			Lakshadweep**

* As of now, LDC functions of A& N are being managed by the Energy Management Centre (EMC) at Port Blair. Considering the power system profiles such as Peak Demand Met, Energy Consumption and Installed Capacity of Renewable Energy Sources, A&N can be categorize under Emerging LDC.

** Managed by Electricity Department, Lakshadweep

The functions discharged by LDCs can be broadly classified into following categories - System Operation (SO), Market Operation (MO), Logistics, and

Support services. The System Operation function covers operational planning (including assessments, studies, crew management), real-time operation (including scheduling, forecasting, outage planning and reporting) and post despatch analysis (including reporting, MIS, feedback and analytics). The market operation function covers open access administration, day ahead market, real-time market, energy accounting and settlement activities, regulatory functions etc. Logistics covers decision support, Information technology. Cyber Security has emerged as an important function and requires dedicated specialized personnel. Support Services include human resource management, contract services, finance and account, establishment, administration are support services.

There are thirteen Renewable Energy Management Centre (REMC) in India which include the REMCs in Rajasthan, Gujarat, Madhya Pradesh, Maharashtra, Telangana, Tamil Nadu, Karnataka and Andhra Pradesh which are collocated with SLDCs. The REMCs are also envisaged for UT Ladakh and 3 more locations (under discussion stage). The REMC takes care of the forecasting, scheduling and real-time monitoring renewable energy resources. REMCs at all regions require dedicated, specialized employees.

Imperatives

In the past decade, due to rapid developments / interventions in the sector, through reforms, policy initiatives, changing corporate landscape and LDCs' own evolving roles in the Power Sector, several imperatives have emerged. Additional HR will be required to meet challenges related to exponential increase in electrical energy demand, growth in the economy and changes in technology, regulations, market design, administration and management of the power system. These imperatives will impact functions and require additional resources including Human Resources. Some of these are enumerated below:

1. Grid management has transitioned from supervisory role to sophisticated controls & faster Electricity Market administration such as Automatic Generation Control, System Integrity Protection Systems, Real Time

Market, Advance metering Architecture/Smart Grid. There is now an increased thrust on optimization – Economic Dispatch, Energy Optimization, Asset Optimization and Demand Optimization.

2. In addition to the round-the-clock System Operation, the Load Despatch Centres are expected to contribute in Market Operation, research & analysis, support / advocacy in regulatory affairs, Data dissemination (system data acquisition, Communication, IT systems) and other establishment services to carry out the various functions with suitably skilled workforce.
3. There have been dynamic changes in the electricity consumption patterns, in addition to this, System Operation is facing another major challenge of integration of Renewable resources, such as Solar & wind, in line with India's commitment to Climate change & NDC targets. This brings in new challenges in respect of its variability, intermittency and technological aspects associated with Power electronic devices. Further, constraints in terms of flexibility of conventional resources also contribute towards these challenges.
4. LDCs have undertaken several new work domains to improve reliability, security and economy, these include:- Load forecasting, RE forecasting, fuel security assessment, production cost optimization studies, generation outage planning, transmission outage planning, assessment of Transfer Capability, Reactive Power studies, Short circuit and transient stability studies, small signal stability studies, Electromagnetic transient studies, Mock black start drills, Activation of back up control centre, preparations for special events like festivals, natural calamities like cyclone, floods etc. and documentation of procedures (operating, restoration).
5. With advent of new players such as distributed generation, storage, electric vehicles, aggregators etc., there is a need for renewed thrust in areas such as Market Design, Open Access Administration, Day Ahead

Market, Real Time Market, Ancillary Services Market, Metering, Accounting, Settlement & Pool Accounts, Tax reconciliation & LDC fees and charges etc. With introduction of ancillary services, forecasting scheduling & deviation settlement regulations for RES, demand for market-based instruments (balancing & flexibility services viz. AGC, fast response tertiary regulation, ramping, load following etc.) is likely to arise on a significant scale. Hence, adequate personnel will be required to meet these challenges and carry out these evolving activities.

6. On technology front, focus areas essential for building and strengthening of technical infrastructure in LDCs are Engineering of new SCADA/EMS upgrades, Synchro-phasor technologies, Real time Applications, Off-line applications, Big Data Analytics tools, Website development, upgrading and maintaining Cyber security, etc.
7. Cyber Security is a new emerging area, where keeping updated, timely assessment of threats and facilitating collaboration on devising policies and strategies to strengthen Cyber Security efforts across Power Systems is important
8. Furthermore, for efficient running of the LDCs HR functions, Finance functions, Planning, Vigilance, etc. deployment of matching additional HR Resources would be a necessity.
9. There should be a sufficient number of power system operators to ensure that the grid can be operated safely and efficiently at all times, and that operators are not overworked. There is a need for some type of rotation of staff for scheduling, continuity of service and stress reduction of the power system operators, hence, a minimum tenure and reserve shift are important.

Figure 1- Emerging Areas for LDCs



Methodology adopted for working out HR Requirement

1. Based on existing functions and envisaged future functions, an organigram was prepared for LDCs.
2. Comprehensive list of existing and anticipated activities based on present area of operations and anticipated requirements was prepared.
3. Working out FTE (Full Time Equivalent) requirement for each activity- This was done based on daily time-required estimate for completion of each activity. FTEs have been estimated in particular function in increments of 0.25.
4. While estimating FTE Requirement, degree of automation and outsourcing which is present and/ or anticipated is also accounted for. Certain activities such as housekeeping, security etc. are envisaged to

be outsourced completely, with only supervisory function remaining with the LDCs.

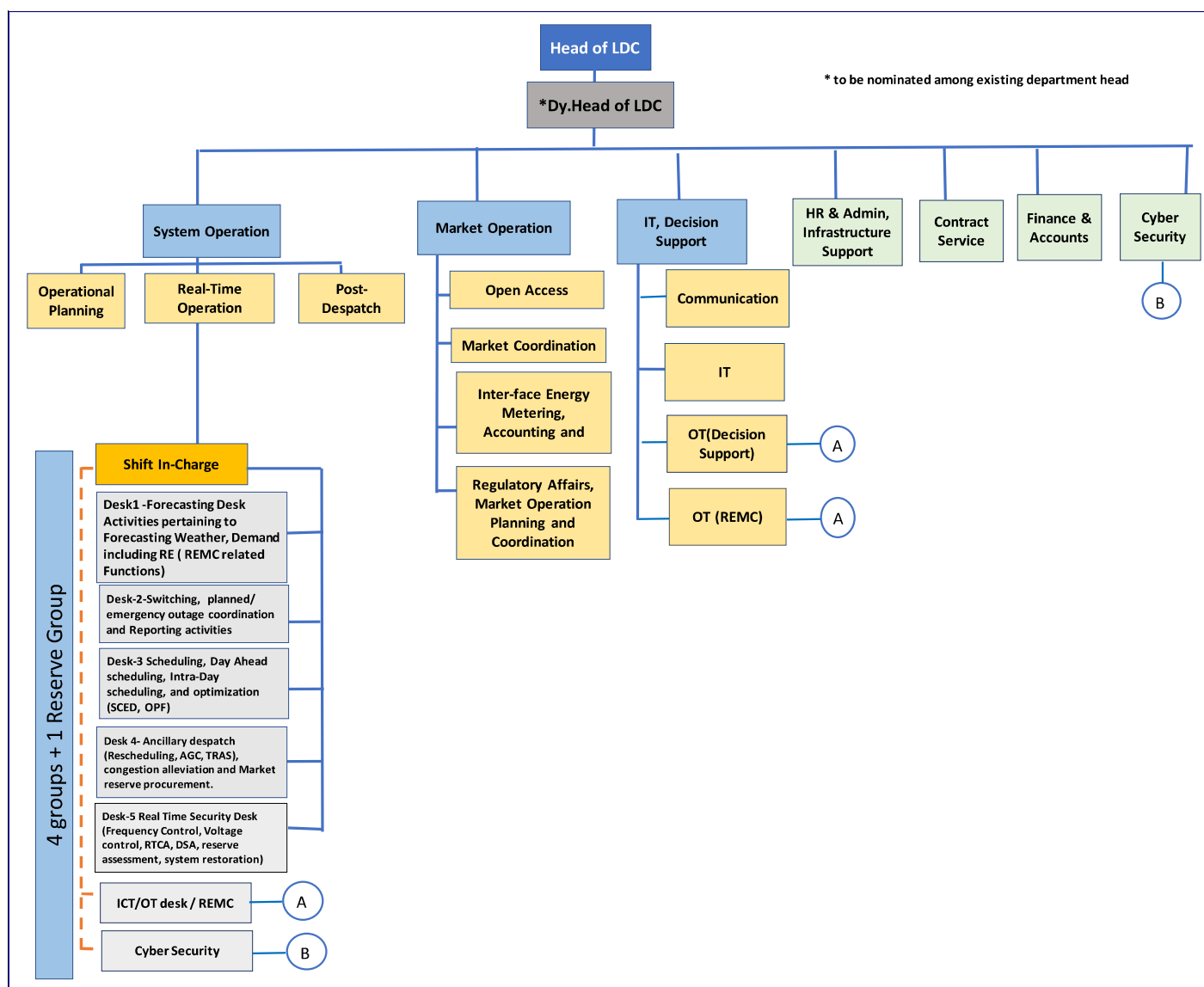
5. In critical functions such as Real-Time System operation, it is essential to plan for contingencies and build reserves, a requirement underscored by COVID-19 Pandemic. Hence, in a major change of approach, a reserve shift has been considered, making it 5 shifts in total for Real –Time Grid Management.
6. The number of activities performed in Large, Medium and emerging LDCs remain more or less the same, the volume and extent of the activities being carried out differs based on the size of the LDC, hence, the number of personnel differs at each LDC. There are certain statutory activities which will remain the same irrespective of the size of the LDCs and therefore, a minimum number of workforce allocation will be required at each LDC.

DEPARTMENT CATEGORISATION - NLDC, RLDCs & SLDCs

FTEs allocation has been done to these 7 Functions: i. System Operation, ii. Market Operation iii. Logistics iv. Cyber Security v. Contract Services vi. Finance and Accounts vii HR, Admin & Infrastructure Services. These numbers do not include workmen or staff requirement for non-core functions such as general upkeep of the premises, security, assistants etc. and do not include workmen, these requirements are different for every LDCs based on their local. Regional requirement and ongoing legacy.

Further, it is not envisaged that these numbers are achieved immediately, as culture and socialisation of employees is important it is important that there is a gradual scaling or workforce at every LDCs.

Figure 2- Typical Organogram for an LDC



1. System Operation

System Operation in each LDCs has been organized under three divisions-

i. Operational Planning or Pre-Despatch; ii. Real-Time Operation- to be operated in Shifts, with respective Shift-In charges and with one offline In-charge, iii. Post-Despatch

a. Functions, roles and responsibilities of **Operational Planning** are as follows:-

- i. Primary Frequency Response Testing
- ii. Primary/secondary/tertiary reserve capacity assessment
- iii. Validation of standards conformity test reports submitted by RE developers through in-house simulations
- iv. Enforcement and Compliance of various standards and regulations under RE
- v. Network model validation for simulation studies
- vi. Fuel adequacy assessment
- vii. Protection coordination, resilience coordination
- viii. Enhanced coordination with stakeholders for system reliability for high impact low probability events (Lights off, cyclone, Solar Eclipse etc.
- ix. Increasing number of Power System Elements- especially Renewables, EVs, Solar Roof-top
- x. Studies such as Steady State Studies, Dynamic Studies, Optimisation Studies. Forecasting, Fuel Security Assessment and Generation & Network Outage Planning.
- xi. Disaster Management Coordination
- xii. Transnational Coordination, resilience coordination Mock black-start drills, contingency plans, Preparation for Special Events
- xiii. Augmentation in Back-Up control centre operations- As a part of the initiatives to enhance resiliency of control centre operations, back-up control centres and disaster recovery systems are being implemented in some of the LDCs. Dedicated HR is required for satisfactory operation of these centres to enable them to cater for emergency situations.
- xiv. Resource Crew Management, documentation

Some of the key additional functions also include Carrying out data intensive research consultation / collaboration with other grid operators, multilateral agencies, academia and other statutory bodies in India. Strengthening capabilities in system simulation, optimization, forecasting, model validation, data management, situational awareness, synchrophasor applications, dynamic security assessment and other decision support technologies, harmonization of operating procedure.

- b. Functions, roles and responsibilities of **Real-Time Grid Operation** are as follows :

Real-Time operation is at the heart of any LDC. Therefore, adequate deployment of trained and certified personnel is required. Each control room must operate in five shift groups with 3-8 Nos. per shift. There would be total 5 shift groups. The fifth group is recommended to factor leave reserves and training needs of real-time operations personnel. This is in line with the international best practices. COVID-19 Pandemic has underscored the importance of Reserve Shifts. This fifth reserve group will ensure continuity of operation even in cases where entire groups have been quarantined. Thus, the HR budget for real-time operations takes into account round-the clock operations, entitled leaves, public holidays, festivals, business travel, training, special assignments etc. making a total of 15 – 40 Nos. overall for control room shift operation.

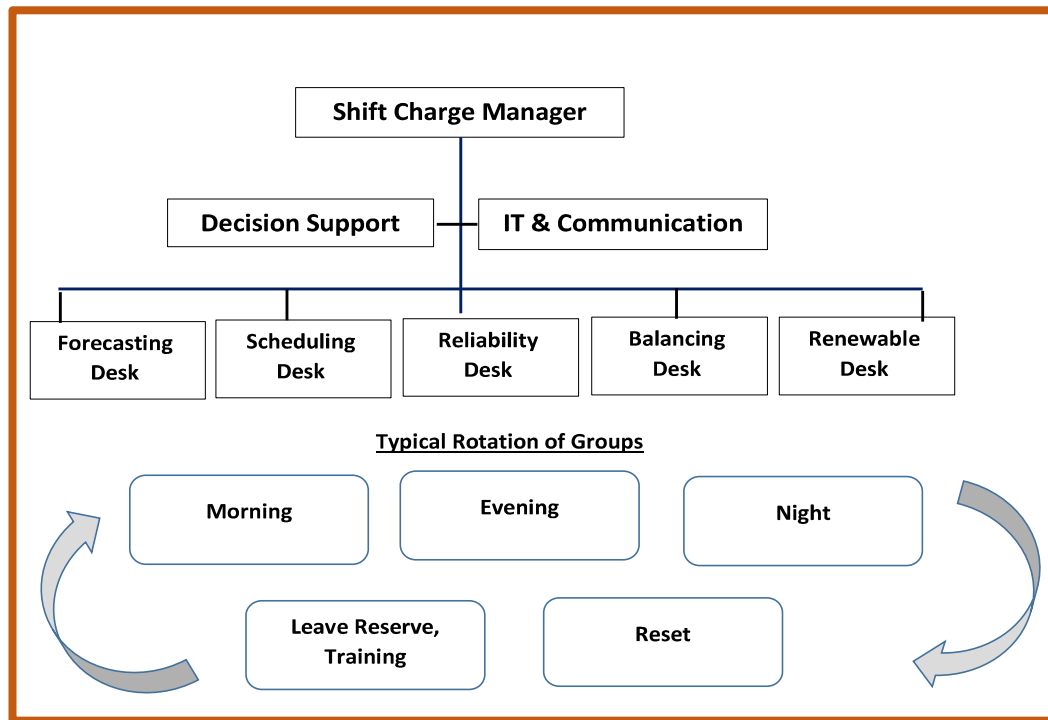
These functions in each shift group have been segregated into desks, each desk will perform specific duties. Shifts will be headed by Shift In-charges, with an overall in-charge in offline (General Shift), to oversee and coordinate. The Desks are as follows:-

- i. Desk 1- Forecasting Desk – Activities pertaining to Forecasting Weather, Demand including RE (REMC related Functions)
- ii. Desk-2-Switching, planned/emergency outage coordination and Reporting activities
- iii. Desk-3 Scheduling- Day Ahead scheduling, Intra-Day scheduling, and optimization (SCED, OPF)- for activities and functions pertaining to Security Constrained Economic Despatch and Optimal Power Flow.
- iv. Desk 4- Ancillary despatch (Rescheduling, AGC, TRAS), congestion alleviation and market reserve procurement. This require dedicated persons in real-

time for reserve assessment, reserve procurement from DAM/RTM and despatch and coordination with the ancillary service providers.

- v. Desk-5 Real Time Security Desk (Frequency Control, Voltage control, RTCA, DSA, reserve assessment, system restoration).

Figure 3- Organogram of Real-time shift operation



c. Functions, roles and responsibilities of **Post Despatch** are as follows: -

- i. System performance assessment.
- ii. MIS and Reporting, Grid standards, code compliance monitoring and reporting.
- iii. Low Frequency Oscillation Display and Analysis Evaluating Primary Response- Inertia and frequency response Ramp performance assessment AGC response assessment Network availability verification Grid incident/ disturbance analysis, reporting and documentation.
- iv. Operation feedback compilation.
- v. Simulation of events and learning, Data analytics and research.

2. Market Operation

Market Operation function is an evolving Dynamic Function, which is changing due to various regulatory initiatives and reforms. Market Operation has been organized under 4 divisions - Open Access, Market Coordination, Inter-face Energy Metering, Accounting and Settlement, Regulatory Affairs. Functions and activities related to Electricity markets are limited in medium and emerging LDCs, hence, comparatively the staffing requirements are lower in these LDCs. Functions, roles and responsibilities which have been added to Market Operation include: -

a. Open Access Administration:

- i. Administration of Electricity Market through National Open Access Registry (NOAR) Short term open access - bilateral / e-bidding
Open Access Short term open access - collective / DAM, RTM, billing, collection, disbursement, reconciliation
- ii. Day Ahead Market, proposed GDAM, MBED, Market coupling
- iii. Real Time Market
- iv. Accounting and settlement of Secondary/Tertiary Reserve and Ancillary Services
- v. Ancillary Services Market
- vi. forecasting scheduling & deviation settlement regulations for RES
- vii. Market based instruments (balancing & flexibility services viz. AGC, fast response tertiary regulation, ramping, load following etc.)
- viii. DSM Amendment Regulations

b. Market Coordination:

- i. Grid Access- User registration, fees and charge sharing

- ii. Market Participants Coordination, allocations, Energy contracts, losses, regulation of power supply, Day Ahead Ancillary Requirement
- iii. Finalisation of inter-change schedule

c. Inter-face Energy Metering, Accounting and Settlement:

- i. Energy meter placement and integration, FTC clearance
- ii. Meter data collection, AMR
- iii. Energy meter data validation including with SCADA
- iv. Energy meter data processing
- v. Energy accounting (active & reactive) including trans-national accounting, Congestion Account
- vi. Congestion, Ancillary (SRAS, TRAS...) account
- vii. SCED account
- viii. Transmission charge computation
- ix. Pool account operation including reconciliation (Finance Executive)
- x. Transnational exchanges Settlement and Reconciliation

d. Regulatory Affairs, Market Operation Planning and Coordination

- i. Market analytics,
- ii. Market design feedback
- iii. Audit / Stakeholder coordination
- iv. Physical Grid access administration-Connectivity, long/medium term access
- v. Power purchase agreement, database
- vi. Regulatory compliance verification coordination, first time charging coordination, Performance test, COD verification
- vii. Filing petitions and replies
- viii. Coordination with legal, regulatory institutions, law firms

3. Logistics

Logistics functions have been organised in 4 divisions which are:- i. Operation Technology; ii. Renewable Energy Management Centres; iii. Information Technology; iv. Communication.

Real-Time SCADA/ IT Support Desk - With automation of the scheduling process and introduction of ancillary despatch, AGC control system, dynamic security assessment, the real-time supervision of the communication and the information technology systems has become critical. This desk would oversee the decision support systems and the data and speech communication in real-time.

b. Functions, roles and responsibilities of Operation Technology Logistics are as follows:

- i. Engineering of upgrades of SCADA/ EMS, R&M, Integration of PMU and RTU,
- ii. Development & Maintenance-SCADA database, SCADA Display, ICCP,
- iii. Synchro-Phasor Technologies- Database and display development & maintenance
- iv. Real-Time Software Application - SCED, AGC, RRAS, State Estimation
- v. Decision Support-State Estimation, EMS, Dynamic security assessment, Optimal Power Flow
- vi. Dispatcher training simulator maintenance
- vii. Local and remote back up control centre (incl REMC) maintenance
- viii. Power Supply System - UPS/DG Set, Control Room Air Conditioning
- ix. AMC coordination, certification, verification
- x. Support for real-time ICT/OT desk / REMC Support

c. Functions, roles and responsibilities of Information Technology - Logistics are as follows:

Advanced digitization and automation requirements without compromising cyber security and hygiene. Effective redundancy and disaster recovery mechanism which is seamless and wide-spread. The thrust would be towards timely execution of the Technology roadmap that has been evolved through a wide consultation.

- i. IT systems infrastructure, networking, hardware engineering design and maintenance
- ii. -JanIT systems- Application software maintenance
- iii. Information access control and security (Implementation of CISO,
- iv. CERT-GO Advisories)
- v. Information interface (Internal, external)
- vi. Database administration and maintenance
- vii. Application software design and development
- viii. Data analytic system
- ix. Disaster recovery system
- x. Data lake, warehouse and mining

d. Functions, roles and responsibilities of Communication Logistics are as follows:

- i. Voice communication (Internal and external, recording)
- ii. Data communication - (PLCC, Leased line, Optic fibre, GPRS, VSAT, Satellite), Wi-Fi
- iii. Remote Conferencing and Meeting Facilities- Audio-Visual
- iv. Communication Network Availability Verification

4. Renewable Energy Management Centres(REMCs)

The REMCs in the southern, western, northern region and the national REMC in New Delhi began operations in February 2020 are being managed by GRID - INDIA. They require dedicated human resource for maintaining the IT systems, overseeing the operations, and other related IT, OT and forecasting aspects.

Functions, roles and responsibilities of **Renewable Energy Management Centres** are as follows:

- i. RES Integration
- ii. REMC database/ Display development, maintenance, Support for Real-time REMC Desk
- iii. Forecast Service Provider, Weather Service Provider coordination in REMC
- iv. Availability and Performance Verification

5. Cyber Security

Cyber Security is a major focus area in view of changing Information Technology Landscape globally. A real-time 24X7 desk to coordinate activities and functions pertaining to Cyber Security in LDCs. RLDCs and NLDC are under the same corporate structure, a few cyber security functions have been centralised at GRID-INDIA, at the corporate level.

Functions, roles and responsibilities of **Cyber Security** are as follows:

- i. Roles and responsibilities of CISO, Alternate CISO, and various requirement to coordinate with the statutory bodies and monitoring and ensuring cyber security initiatives and compliances within the LDC
- ii. Coordination and enactment of cyber security controls and compliances.
- i. SOC function - works related to 24 x 7 monitoring at Security operation Centre (if established at the organizational level) and

analysis of the events thereof, . With future growth and possibility of establishment of NOC (Network Operation Centre), SOC at unit level etc. the requirement may also increase.

- ii. CISO, CERT GO related coordination with stakeholders, CERT-In, NCIIPC
- iii. ISMS compliance
- iv. Real-time Cyber security monitoring

6. Support Functions– Contract Services, Finance and Human Resources

For efficient running of the LDCs the support functions like HR/ Admin, Finance, Planning, Vigilance, Contract service, Legal etc. play a very important role. The Work place policies keep up with necessary protective measures and implementation and provide solutions to issues between team members, avoiding risk for the company and its employees. The financial information are required to operate effectively and efficiently, keeping the overall guidelines and direction.

Functions, roles and responsibilities of **Support Functions** are as follows:

Finance & Accounts : Revenue Accounting & Reconciliation, Pool Accounts & STOA - Accounting & Reconciliation, Third party payment (CAPEX/REPAX/Opex, Admin exp.) - Accounting, Payments, MIS, Maintenance of BG, Establishment - (Salary & Employee Claims, Loans and Advances) - Payments to employees viz Salary, TA, Medical, Contingent claims, Lease payments, Tax calculation, Issuance of Form 16, Filing of quarterly and annual TDS returns, Payment to retired Employees claims, Financial Concurrence and Committee works, Banking , Payment to employees & Third party on daily basis, Bank Reconciliation, Liaoning with bank, Taxation - Deposit of monthly tax, Filing of Quarterly & Annual return, TDS reconciliation, Coordination with Income Tax Deptt. GST Returns & Compliance, internal, statutory and CAG audits etc.

HR/HRD & Admin : Performance Appraisal & Coordinating Promotion, HRD, HR Operation, Social Security and Compliances including IMS/ DPE/ MoP/ CERC etc., Recruitment, HR Operation, Social Security and Compliances including IMS/ DPE/ MoP/ CERC etc., House Keeping, Despatch, Reception & Visitor Management; Welfare, AMS, Sports, Other agencies; Ergonomics & ambience - Furniture, Lighting, Acoustics, horticulture, Public Address System etc.

Contract Service: Quotation collection, tender preparation, GeM portal, Bid processing, opening, Placing of LoA/PO, Contract closing.

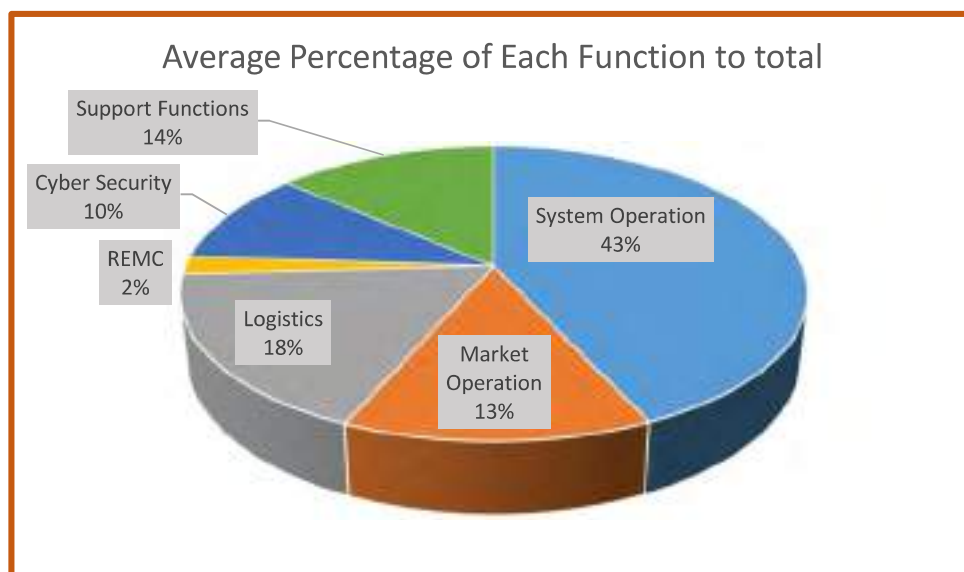
7. Summary of Function-wise Allocation of FTEs in LDCs are follows:-

Table 2- Function-wise Workforce allocation

LDCs - Workforce Staffing Norms						
SN	Function	NLDC	RLDC	Large SLDC	Medium SLDC	Emerging SLDC
System Operation						
1	System Operation - Operational Planning	18	18	18	16	9
2	Real Time Grid Operation (For SO only)	31	31	31	26	18
3	Post-Despatch	10	10	10	10	4
Sub -Total (SO)		59	59	59	52	31
Market Operation						
4	Open Access Administration	5	4	4	1	1
5	Market Coordination	4	4	4	3	1
6	Inter-face Energy Metering, Accounting and Settlement	10	8	8	4	1

7	Regulatory Affairs, Market Operation Planning and Coordination	7	5	5	1	1
Subtotal - MO		26	21	21	9	4
Logistics						
8	Logistics _Operation technology	15	14	14	8	3
9	IT Logistics	9	9	9	6	3
10	Communication Logistics	4	4	4	2	2
Subtotal - Logistics		28	27	27	16	8
REMC						
11	REMC Logistics	3	3	3	2	1
Cyber Security						
12	Cyber Security	17	8	14	13	10
Support Functions						
13	Contract Services	3	3	3	2	2
14	Finance and Accounts	9	9	9	5	3
15	HR & Admin	8	8	8	4	3
Subtotal -Support Functions		20	20	20	11	8
Grand-Total		153	138	144	103	62

Figure 4- Average percentage of each function



Level-Wise Requirement

In order to facilitate decision making and empower control rooms and functions to take decisions independently without any time lag and waiting for approval for all actions, it is imperative that appropriate senior level persons are deployed at every level.

Table 3- Level-wise Requirement at each LDC

Level	Percentage of total Workforce in LDCs
Top Management	1 %
Senior Management (experience of 20 years & above)	9 %
Middle Management (Experience of 15 -20 Years)	20 %
Working Executives (experience of below 15 Years)	70 %

a. Top Management:

Head of LDC- All LDCs are required to be headed by senior level executive, as they are required to interact with external stake-holder and give inputs. Hence, experienced and senior person is required who is able to communicate with all institutions such as SERCs, STUs & SLDCs and interact with head of institutions, at the level of Secretary of State Energy dept., CMD / Directors of other Power Utilities etc.

b. Senior Management:

- i. They typically serve as Heads of functions (based on their seniority. Further, it is essential to keep succession planning in mind and these

senior executives shall take the roles of Head of LDCs / future Directors of similar institutions.

- ii. Represent LDCs at various forums and multi-lateral agencies. They are responsible for motivating their teams, leading and coordinating efforts, and have to undertake assignments.

c. Middle Management Level

Will head each shift group and divisions, within functions in LDCs including function like HR, Finance etc. It is essential that he/she is given responsibility to ensure that there is independent real-time decision making. They are empowered to take complex actions and decisions. Thus, there is decentralization of authority and responsibility.

d. Working Level

These are working and learning levels and these employees progress through the hierarchy to take more responsibilities.

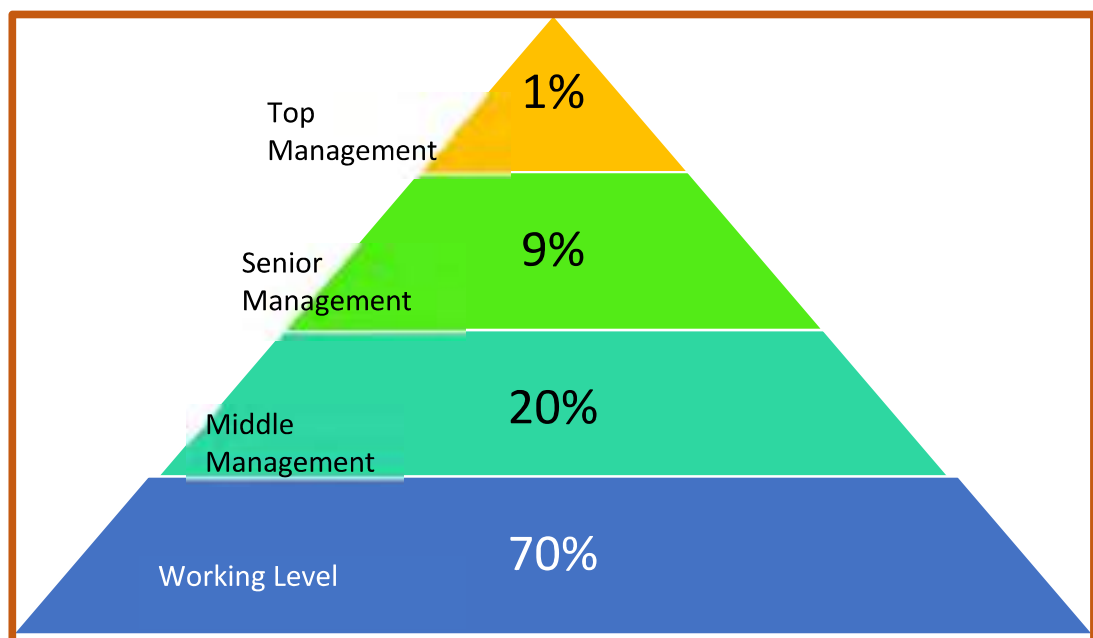


Figure 5- Level-wise distribution of Workforce

Creating Skilled and Motivated Workforce at LDCs

i. Training of System Operators

System operators need to be up-to-date with the evolving technology, policies, rules, standards, regulations, procedures and best practices. Therefore, capacity building through training and refresher programme has been implemented through National Power Training Institute (NPTI) for Load Despatchers. It is categorized into 3 levels - Basic Level, Specialist Level and Management Level. Basic Level System Operation programme is the foundation course required for all System Operators and can also be attended by those posted in other functional areas in LDCs. Basic Level Course on Cyber Security is required for those posted in IT & OT functions. The specialist courses on topics such as Reliability, Regulatory Framework in Power Sector, and Advanced course on Cyber Security are available for experienced specialist professionals employed in these respective fields in LDCs. The payment of Tuition fee for these courses is exempt for employees of SLDCs. Detailed list of Training Courses for LDC personnel is given at **Annexure-I**.

In addition to this, LDC personnel should also be encouraged to pursue online training and certification available at several national and international academic institutes and offered by Massive Online Open Courses (mooc) platforms such as LinkedIn Learning, Edx, Coursera etc. Learning has evolved from structured learning programs to individualised learning journeys where the content, pace, and assessment of the learning are tailored to the individual learner's needs and preferences. This approach allows learners to set their own learning goals. The learning journey must align to employees' career advancement as well as bridge the gaps between the present skills, knowledge and behaviours to what is required to meet future challenges and promote the mantra of 'Learning on the go'. Forum of Load Despatchers (FOLD) can also evolve its own e-learning platform, to cater to unique requirements of system operators.

ii. Certification of System Operators & Fixed Retainer-Ship Incentives

Presently, National Power Training Institute (NPTI) has been entrusted as Nodal Agency for Training & Certification of System Operators and various certification exams for Basic and Advance Level are being conducted by NPTI. List of training/certification programs is given at Annexure-I. As per Central Electricity Authority (Measures relating to Safety and Electric Supply) Regulations, 2022, Ref No. CEA-PS-16/1/2021-CEI Division, dated 8th June 2023, “***no personnel shall be engaged as Load Despatcher without certification***”. For details guidelines regarding mandatory Training & Certification of Basic and Advance Level refer Central Electricity Authority’s “***Statutory Guidelines for Training and Certification of Load Despatchers & Recognition of Training Institutes’ January 2024***”.

The Load Despatchers who acquire the certificate of basic level and of advance level in their respective area of specialization shall be allowed a fixed retainer-ship amount during the validity of such certificate period in line with the Central Electricity Authority’s “***Statutory Guidelines for Training and Certification of Load Despatchers & Recognition of Training Institutes’ January 2024***”.

iii. Short term exposure Programme for System Operators

Power system operators should have the necessary education and training to perform their duties, and should be regularly updated on new technologies and industry developments, there should be concerted efforts to increase collaboration and communication among System Operators from LDCs. A Short-Term Exposure Programme has been envisaged to provide opportunity the system operators to learn from each other and to propagate best-practices. Rotation of System Operators would also enhance cohesive working and coordination in operations. The programme will include 2-10 days’ duration rotational assignments to other LDCs. The officials from one LDC will be rotated to other LDCs in System Operation, Market Operation and Logistics functions. Detailed modalities of the Short-Term Exposure Programme are given **as Annexure- II**.

iv. Tenure of Posting in SLDCs

Reliable and safe operation of power systems is critical to the country. Tacit knowledge gained through practical experience is essential for handling minute to minute challenges and for training new entrants. Therefore, a minimum posting for a period of three years is recommended for any official posted in SLDC. Any person posted in an LDC shall be provided training and must acquire relevant basic level certificate within six months of being posted in the LDC.

v. Creating a Progressive Culture

LDCs play a critical role in ensuring the reliability and efficiency of the electric power grid. Organizational culture, the values, beliefs, and practices that shape how an organization functions.

There have been immense transformations in the power sector resulting into an increase in the scope, volume and complexities of all the functions. LDC's external business environment has always been fast-evolving, requiring continuous knowledge upgradation and inherently challenging. The years ahead will bring additional challenges, both anticipated and uncertain. LDC's success in meeting them will depend largely on an engaged, highly skilled and motivated workforce.

In order to build competence and ensure that LDCs are able to deliver high levels of performance, due importance must be given to developing a progressive culture and creating an ecosystem that values employees and empowers them.

A strong organizational culture can help establish trust with stakeholders, by promoting transparency and consistency, LDCs can demonstrate its commitment to fair and impartial decision-making internally and externally.

When employees feel that they are valued and respected, they are more likely to be committed to the organization and motivated to perform at their best.

A positive organizational culture can improve communication and collaboration among employees, which can help ensure that the grid is operated in a safe and efficient manner. It can help in building teamwork and trust among employees, resulting in better coordination and better outcomes.

An LDC's culture plays an important role in encouraging innovation, improving communication, attracting and retaining talents and maintaining safety and compliance. A strong, positive culture can help the LDCs operate more effectively and efficiently, and ultimately better serve the nation.

LDCs must create and provide opportunities to their employees for continuous professional development, employees must be given exposure and networking opportunities to interact and network. LDCs must participate in national and international for a such as FOLD, NPSC etc. Mentorship must be provided to the new joiners in the organization in order to assimilate and socialize them to the culture. Reward and recognition mechanisms must be designed to recognize high performance individuals, motivate and reward them.

Behavioral Training on topics such as communication skills, leadership skills and skill based training on topics such as Data Analysis. It is important to develop strong values and ethics in the organization to develop high performance culture which empowers every employee.

Apart from Training and Certification, clearly defined procedures and protocols for handling different types of situations help create clearly defined goals for System Operators and enables them to do carry out their functions effectively. Established performance parameters for organisations, departments and individuals such as Key Performance

Indicators (KPIs), Annual Appraisal for System Operators help promote accountability and excellence. These create a positive work environment, where everyone is aware of their goals, roles and responsibilities and is responsible for outcomes.

Tools and processes must be established to ensure that there is communication and collaboration among all System Operators, especially among different shift groups, off-line studies, post-despatch functions. Special measures such as peer-to-peer learning sessions must be organised to ensure this.

Conclusion

Given the strategic and unique nature of LDC's operations, it is important to ensure sufficient bench strength for diverse functional areas and adequate talent pool for leadership roles at senior and top management. Optimal deployment of human resources is imperative for employee satisfaction and motivation across functions, regions and levels. Deployment of additional HR coupled with their capacity building as detailed above, is vital to effectively carry out the statutory/corporate roles and responsibilities at present and in the future to the satisfaction of all its stakeholders.

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List of Abbreviations

1. LDCs- Load Despatch Centres
2. VUCA- Volatile Uncertain Complex and Ambiguous
3. REMC- Renewable Energy Management Centre
4. FTE- Full Time Equivalent
5. ESCerts- Energy Saving Certificates
6. RPO- Renewable Purchase Obligation
7. HPO- Hydro Purchase Obligation
8. REC- Renewable Energy Certificate
9. PAT- Perform Achieve Trade
10. CISF- Central Industrial Security Force
11. PSDF- Power System Development Fund
12. CERC- Central Electricity Regulatory Commission
13. CEA- Central Electricity Authority
14. MoP- Ministry of Power
15. CERT-GO- Computer Emergency Response Team Grid Operator
16. IMS- Integrated Management System
17. IT- Information Technology
18. OT- Operational Technology
19. NOAR- National Open Access Registry
20. SCED- Security Constrained Economic Despatch
21. AGC- Automatic Generation Control
22. EV- Electric Vehicles
23. DAM- Day Ahead Market
24. RTM- Real Time Market
25. STATCOM- Static Synchronous Compensator
26. SVC- Static Var Compensator
27. HVDC- High Voltage Direct Current
28. UFR- Under Frequency Relays
29. ROCOF- Rate of Change of Frequency
30. SPS- Special Protection Schemes
31. RPC- Regional Power Committee
32. FOLD- Forum of Load Despatchers
33. MIS- Management Information System
34. STOA- Short Term Open Access
35. SCADA- Supervisory Control and Data Acquisition
36. ICT- Information Communication Technology
37. PMU-Phasor Measurement Unit
38. RTU-Remote Terminal Unit
39. EMS- Energy Management System
40. UPS- Uninterruptible Power Supply
41. DG- Diesel Generator
42. CISO- Chief Information Security Officer
43. PLCC-Power Line carrier Communication
44. GPRS- General Packet Radio Service
45. VSAT-Very Small Aperture Terminal
46. ISMS- Information Security Management System

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Annexure – I: Training and Certification Program for capacity building

1. System Operator Training Programmes

SN	Name of the Training Program	Level
1	Basic Level Programme on Power System Operation	Basic
2	Power Market	Specialist
3	Regulatory Framework in Power Sector	Specialist
4	Power System Logistics	Specialist
5	Power System Reliability	Specialist
6	RE source and Grid Integration	Specialist
7	Familiarization on Despatcher Training - Simulator	-
Cyber Security (Training cum Certification)		
8	Training and Certification Program on Cyber Security	Basic
9	Training and Certification Program on Cyber Security	Intermediate
10	Training and Certification Program on Cyber Security	Advance

2. System Operator Certification

SN	Name of the Certification	Level
1	Basic Level Power System Operation Certification	Basic
2	Advance Level Power System Reliability Certification	Specialist
3	Advance Level Regulatory Framework in Power Sector Certification	Specialist
4	Advance Level Market Operation	Specialist
5	Advance Level Power System Logistics Certification	Specialist

Annexure – II: Short Term Exposure Program

A Short-Term Exposure Programme to facilitate rotation of System Operators, to enhance cohesion and exposure among System Operators in LDCs is being implemented for all State Load Despatch Centres, Regional Load Despatch Centres and National Load Despatch Centre. The objective of this programme is to propagate best-practices, facilitate peer-to-peer learning from each other and propagate best-practices through hands on exposure of real time working of other LDCs. This will be beneficial for new and emerging SLDCs, where resource adequacy concerns for multi-tasking executives have been expressed. The planned exposure programme comprises of rotation of LDC officials to other LDCs for a duration of Two to Ten Days.

1. Modalities

- a. Rotational assignments will be done on reciprocity basis. Generally, the ratio of requirement and number of persons to be rotated will endeavoured to be kept as 1:1, however, in certain cases especially for emerging LDCs this can be relaxed.
- b. All LDCs will analyse their own requirement, work out number of officers they wish to post to other LDCs for exposure, clearly specifying periods of assignments in both cases. Each LDC can prepare an **Annual Rotation Plan** for – (i) officials they wish to rotate to other LDCs and (ii) officials they can host in their LDC, keeping in mind their Human Resource Adequacy.
- c. The host organization may design specific programme including a few class-room sessions to facilitate the learning delivery in share with the visiting organization beforehand.
- d. In order to leverage familiarity and already established sense of comfort, initially the rotation will be within the same region.
- e. The Rotation will be in the areas of System Operation, Market Operation, Logistics and REMC Functions.

- f. Any short-term assignment will be for a minimum period of 2 working days but not exceeding 10 working days in total.

2. Eligibility:-

- a. All LDC officials working in System Operation, Market Operation, Logistics and REMC functions will be eligible to be rotated to other LDCs.
- b. LDC officials should have minimum 1 year or regular service in an LDC before they can be considered for the exposure programme.

3. Execution

- a. LDCs can send their Annual Rotation Plan to the Forum of Load Despatchers (FOLD) Secretariat at the beginning of the Financial year.
- b. FOLD secretariat will compile requirements and assist in devising a Region-wise rotational plan on round-robin basis so that Human Resource adequacy is maintained at all Load Despatch Centres.
- c. This programme is focused on increasing capacity building of SLDCs, therefore, the focus must be on giving exposure to SLDC officials. However, to kickstart the programme, RLDCs and NLDC will start by posting their officers out to SLDCs and host officers from other LDCs in their region. FOLD Secretariat will coordinate the liasoning with LDCs, if require. Travel arrangement including accommodation & logistics will be done by respective LDCs.

- 4. TA/DA including accommodation expenses will be borne by the parent organization as per their rules. Host organization will not be obligated to provide any facility to the visiting officer.

Annexure to Short Term Exposure Programme:- Requirement Detail Format

Name of the LDC _____

Total number of Job Roles identified for officers from other LDCs _____

Details of the roles identified for officers from other LDCs

Sl. No.	Department	Area of the task/project	Proposed Assignment Details (To which the officer from LDCs will be deputed)	Proposed Period of the Assignment (Start Date & End Date)

**GUIDELINES FOR
DEPUTATION OF
WORKFORCE FROM
STATE LOAD
DESPATCH CENTRES
TO GRID-INDIA FOR
FIXED TERMS**

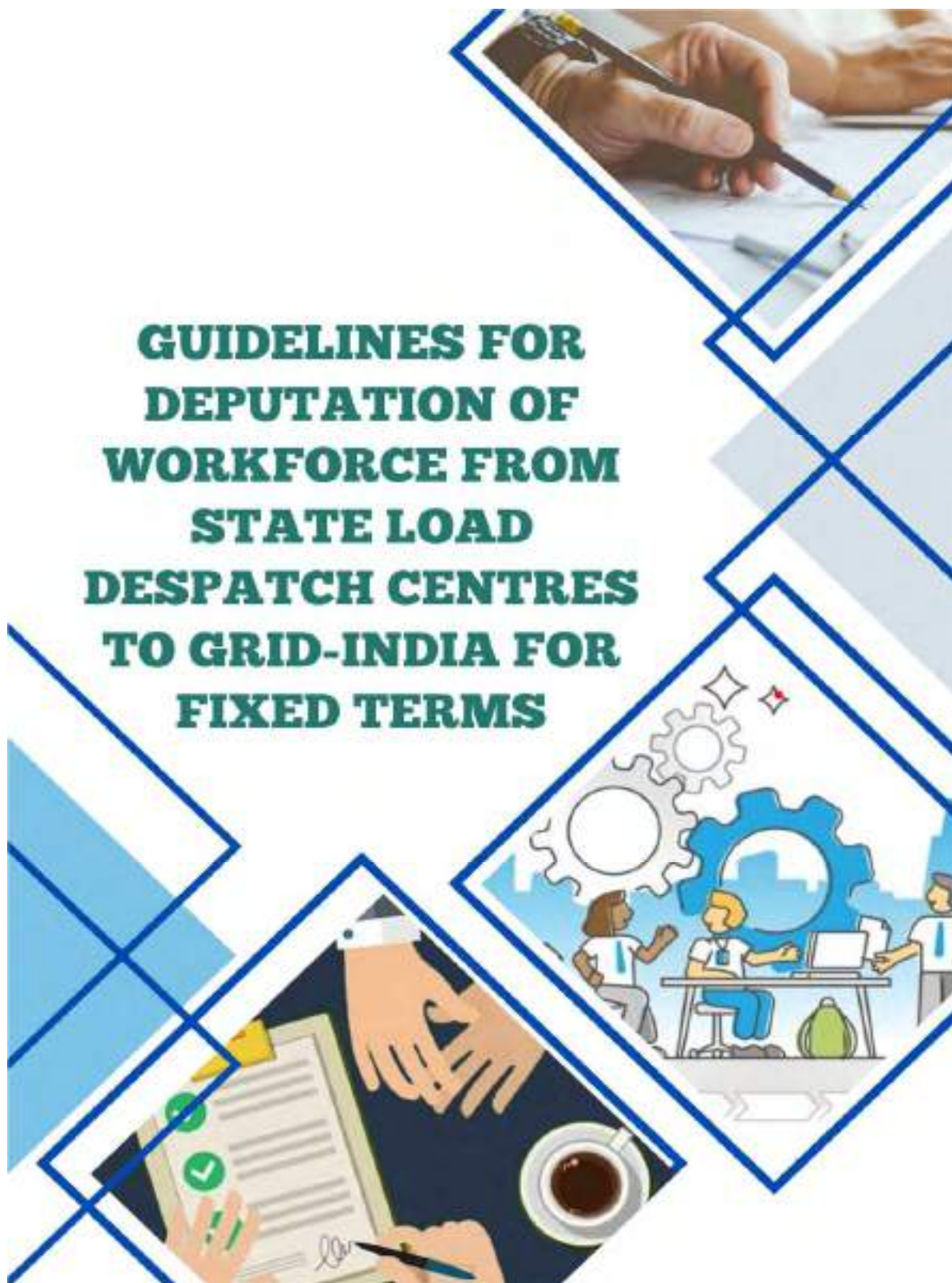


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A. Objective

1. Load Despatch Centres (LDCs) play a very important role in secure and reliable operation of the Grid. Grid Management has become challenging and complex. With such a vast size of the Grid, LDCs play an important role in facilitating the energy transition towards a sustainable and decarbonised electricity grid. Human Capital is the most important Asset in any organizational setup. Human Resource adequacy has a direct effect on performance and efficiency of all functions and activities. Since LDCs carry out mission critical activities on a 24X7 basis, the availability of trained human resources in the Load Despatch Centres is critical for reliable and efficient power supply. These guidelines have been formulated to strengthen the Load Despatch Centres by facilitating mobility of trained skilled human resources and thus, bolstering cooperation and cohesion.
2. To achieve these aims of improving cooperation across Load Despatch Centre (LDCs) and introducing cohesion in functions and propagating best-practices, a focused effort to enhance Human resource inter-change within LDCs is required. For this, Load Despatchers from SLDCs must be given adequate exposure and opportunities for career growth and learning. There should be regular exchange of Human Resources amongst the LDCs, especially SLDCs and Grid-India to facilitate better coordination, camaraderie and create a nation-wide Power System Operator talent pool.
3. In addition to the training and experience that load dispatchers receive during the recruitment process at the State Load Despatch Centre (SLDC), it is imperative to provide them with comprehensive exposure and prospects for career advancement and learning. Fostering a consistent exchange learning program between SLDCs and Grid-India thus becomes crucial. To support the developmental journey of SLDCs and enhance their learning experiences, Guidelines for Deputation of Workforce from SLDCs to GRID-INDIA for fixed terms have been drafted. Through this initiative, System Operators from SLDCs will get the chance to undergo training and hands-on work exposure at GRID-INDIA for a specified duration on fixed-terms deputation basis.

B. Methodology

1. A scheme has been formulated to provide an opportunity to eligible System Operators from State Load Despatch Centres (SLDCs) for exposure of working in Load Despatch Centres at Regional or National Level. The deputed officer will be given adequate training, work exposure etc. in Grid-India. The pay and perks of the officer during the period of deputation to GRID-INDIA will be as per applicable DPE guidelines.
2. Invitation for deputation from SLDCs will be sent annually by RLDCs and NLDC. Total workforce in Grid-India, which will be on deputation from SLDCs would be capped at 10% of the eligible technical executive strength in respective RLDCs/NLDC. Though, to start with this number may be kept as 1 % of the total eligible technical executive strength at a particular RLDC and may gradually be increased upto 10 % of the eligible technical executives of the RLDCs as the programme progresses. The officer on deputation from SLDCs will be given comprehensive exposure in the areas of System Operators, Market Operation and Logistics.
3. In order to ensure that there is uniformity across RLDCs and NLDC, the invitation to SLDCs for **deputation at RLDCs and NLDC will be for posts equivalent to the levels of E3 to E6 in Grid-India.**
4. The details Job description and responsibilities are given at Annexure.
5. The scheme is proposed to be rolled out by 2025, when mandatory certification of System Operators comes in to affect.
6. The System Operators from SLDCs will apply to Grid-India based on the annual vacancies released by RLDCs/NLDC. They will be shortlisted against the Job Description and thereafter selected through interview and other screening mechanisms, introduced as deemed fit.

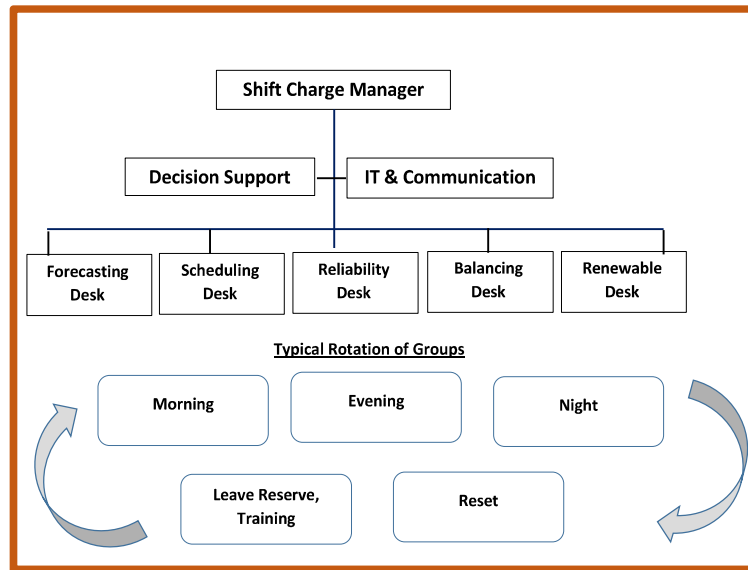
- 7. Duration of Deputation-** This exposure will be for a period of six months to three year on deputation basis.
- 8. Mode of Deputation:** Through notification floated by RLDCs and NLDC, inviting applications for willingness from SLDCs executives. Since the approach is to fill the gap in terms of staffing numbers, skill sets and to enhance mobility for strengthening the LDCs, the vacancies may be operated Region-wise (WR, NR, ER, SR & NER).
- 9. Mode of selection:** The selection will be done on merit basis (criteria for drawing the merit will be decided based on relevant factors) for the sanctioned vacancies for each region. The candidate meeting the criteria in the annexed job description will be further interviewed and assessed for suitability as required.
- 10.**Consent of concerned SLDC will be obtained by the applicant at the time of forwarding of application.

C. Functional Domains Identified for Deputation

1. System Operation

The System Operation (SO) function covers operational planning (including assessments, studies, crew management), real-time operation (including scheduling, forecasting, outage planning and reporting) and post despatch analysis (including reporting, MIS, feedback, and analytics) and all operational functions pertaining to REMC etc.

Figure 1- Organogram of Real-time shift operation

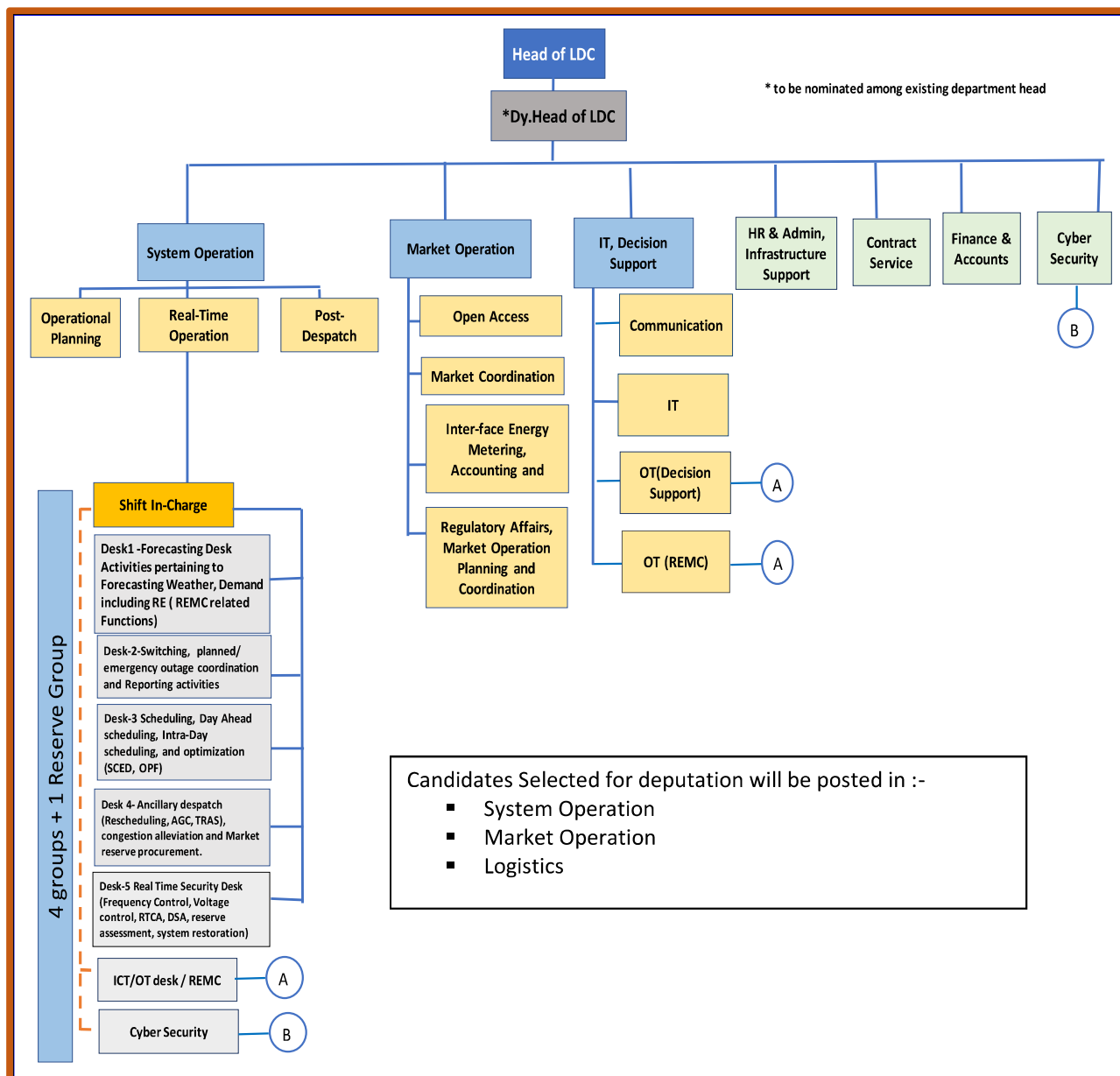


2. Market Operation

The Market Operation (MO) function covers open access administration, day ahead market, real-time market, energy accounting and settlement activities, regulatory functions etc. Market Operation function is an evolving Dynamic Function, which is changing due to various regulatory initiatives and reforms. Market Operation has been organized under 4 divisions - Open Access, Market Coordination, Inter-face Energy Metering, Accounting and Settlement, Regulatory Affairs.

3. Logistics

Logistics functions is essential to maintain situational awareness and support decision making in real-time. Technology plays an increasingly important role in Grid Management and will continue to increase in scope and importance. Logistics has e been organised in 4 divisions which are:- i. Operation Technology; ii. Renewable Energy Management Centres; iii. Information Technology; iv. Communication.



D. Annexure: Job Description and Responsibilities

1. Responsibilities

The System Operator plays a crucial role in the operation and management of a power system. The primary responsibility is to ensure the reliable and secure operation of the electrical grid. They continuously monitor the system's parameters, including voltage, frequency, and line flows, and take appropriate actions to balance electricity supply and demand. The selected System Operators will be posted in the following areas of the Load Despatch centres - SO, MO and Logistics. He/she is responsible for the efficient operation and management of a power system, and for achieving the corporate objectives.

2. Eligibility

- **Age & Experience:** Upper age limit (in years) and minimum no. of years of experience as on date of Notification

Level	*Upper Age Limit (in years)	Minimum no. of Years of Post Qualification Experience (excluding trainee period) as system Operators in SLDC (in years)
E3	32	3
E4	35	6
E5	38	9
E6	41	12

* Age relaxation as per govt.norms

- **Qualification:**

- Graduate in Electrical /Computer Engineering/ IT/Electronics & Communication (Full time).
- Valid certification as per Power System Operator Training and Certification framework conducted by NPTI (presently).

- **Experience:**

The applicant should have worked three to twelve years (depending on the position notified) as System Operator (excluding training period) in SLDCs in executive cadre as on the date of notification.

- **Pay Scale:** The pay of the officer on deputation will be as per DPE guidelines.

E. Terms used:

LDCs	- Load Despatch Centres
RLDCs	- Regional Load Despatch Centres
SLDCs	- State Load Despatch Centres
ER	- Eastern Region
NER	- North-Eastern Region
NR	- Northern Region
SR	- Southern Region
WR	- Western Region
SO	- System Operation
MO	- Market Operation
REMC	- Renewable Energy Management Centres
RES	- Renewable Energy Source
OT	- Operation Technology

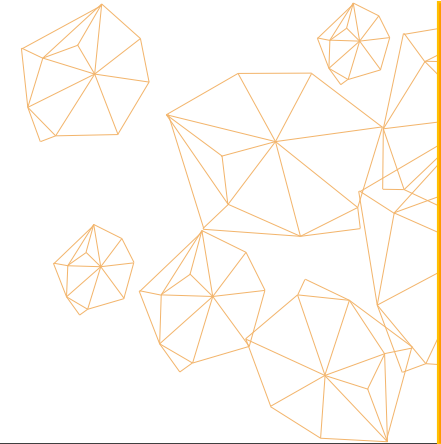
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ONGC TRIPURA POWER COMPANY LIMITED
ओएनजीसी त्रिपुरा पावर कम्पनी लिमिटेड

Blending Proposal



**Gas Blending at OPC Palatana Station
for
Maximizing Availability for Beneficiaries**

Gas Supply Position in India



Plant	Installed Capacity (MW)	Domestic Gas Allocated (MMSCMD)	Gas Supplied (MMSCMD)	RLNG Imported (MMSCMD)	RLNG Used (MMSCMD)	% Gas/RLNG Supplied
Central Sector North Region	2344	9.08	0	2	0.7	6.3
Central Sector Western Region	3280	17.41	0	1.75	0.58	3
Central Sector NE Region	1253	5.30	5.1	0	0	96
State Sector North Region	2704	8.74	2.53	0.8	0.75	35
State Sector Western Region	2850	7.85	1.14	0.5	0	14
State Sector South Region	661	3.30	1.46	0	0	45
State Sector NE Region	466	2.46	1.96	0	0	80
Total	13558	54.14	12.19	5.05	2.03	24

➤ CEA Gas Supply Data for FY 22-23

ONGC Tripura Power Company Ltd.

Gas Generation NE Vs Rest of India



FY 23-24	Installed Capacity (MW)	Gas Based Capacity (MW)	% of Gas Capacity
All India	417668	24824	6 %
NE Region (Central Sector)	3472.6	1152.6	33.19 %

- Source MoP Website and REA by NERPC
- As compared to Rest of India, NE Region is significantly dependent on Gas based generation
- NE Region has the highest Gas Supply in India to both Central and State Sector projects
- NE Region is the only area in India where gas stations are operating at good PLFs

Gas Station Performance FY 23-24



Region	Monitored Capacity (MW)	Target (Mus)	Actual Generation (Mus)	PLF %
Northern	5995	9035	7266	13.88
Western	10806	8380	12155	12.81
Southern	6482	4050	2145	3.77
Eastern	80	0	0	0
North Eastern	1665	10535	9728	66.52
All India	25028	32000	31295	14.26

- Source CEA Report on Energy Generation Programme and PLF of Gas Stations
- NE Region with lowest monitored gas capacity is providing highest PLF for Gas Stations
- Palatana FY 23-24 generation – 4575 MUS (Gross), 4383 Mus (Net Export)
- Nearly 50% the total gas MUs generation (including state generation) in NE comes from Palatana

Palatana Performance



FY	PAF %	PLF %
14-15	77.29	77.52
15-16	56.03	54.58
16-17	66.76	65.17
17-18	66.05	62.8
18-19	74.69	73.28
19-20	62.66	60.58
20-21	81.45	79.52
21-22	64.9	64.19
22-23	77.58	77.03
23-24	70.95	70.78
24-25	59.73	59.15
Average	68.76	67.54

- Apart from Gas reservoir issues in FY 15-16, Palatana has been operating successfully
- PAF and PLF of Palatana have been very close signifying high demand of Palatana Power by beneficiaries
- Depressed gas supply in FY 24-25
- Fuel supplier exploring supply from new gas wells but future remains uncertain
- OTPC has been exploring alternative gas options
- Palatana cash flows severely strained and need to look for alternative gas supply options to stay operational and solvent
- Gas Supply offer received from GAIL

Offer from GAIL



- GAIL has offered upto 0.3 MMSCMD alternative fuel gas to OTPC via Indhradhanush Gas Grid Ltd (IGGL) network/GAIL Network/ONGC Network.
- Alternative gas shall be at a price determined as per MoPNG-PPAC (Petroleum Planning and Analysis Cell) notification for new domestic gas pricing dated 7th April 2023.
- As per the notification, gas from new wells or well interventions in nomination fields shall be at a premium of 20% on APM prices plus taxes and duties.
- The allocation shall be for 3-5 years with suitable take or pay obligations
- The monthly gas prices under the policy shall be determined and published dynamically by PPAC each month. (sample enclosed)
- Landed price for additional 0.3 MMSCMD of gas from GAIL to OTPC under the policy is expected to be USD 12/MMBTU (including marketing margin, Tripura VAT and Road Cess).

Effect on Palatana Tariff



- The existing fuel supplier has indicated a gas supply of 2.18 - 2.38 MMSCMD from existing wells.
- Based on existing gas supplies upto 2.38 MMSCMD and GAIL's offer of 0.3 MMSCMD additional gas at USD 12/MMBTU, the blending of gas at Palatana at various combinations shall effect the power tariff as below:

Gas from Existing Arrangement (MMSCMD)	PAF with existing gas	Alternate Gas Arrangement (MMSCMD)	Blending Ratio	PAF After blending	Blended Cost ECR (Rs/Unit)	Existing FC (Rs/Unit)	Total Blended Tariff (Rs/Unit)
2.38	68 %	0.15	6.30 %	72 %	2.46	1.28	3.74
2.38	68 %	0.30	12.61 %	80 %	2.63	1.28	3.91
2.38	68 %	0.50	21.01 %	85 %	2.98	1.28	4.26

Effect on Palatana Tariff



Gas from Existing Arrangement (MMSCMD)	PAF with existing gas	Alternate Gas Arrangement (MMSCMD)	Blending Ratio	PAF After blending	Blended Cost ECR (Rs/Unit)	Existing FC (Rs/Unit)	Total Blended Tariff (Rs/Unit)
2.18	62 %	0.15	6.88 %	66 %	2.49	1.28	3.77
2.18	62 %	0.30	13.76 %	72 %	2.78	1.28	4.06
2.18	62 %	0.50	22.94 %	80 %	3.01	1.28	4.29

- Palatana Tariff shall stay within a range Rs 3.74 per unit (blending of 0.15 MMSCMD) to Rs 4.29 per unit (blending of 0.5 MMSCMD) depending on alternate gas blending.
- Palatana tariff shall still be very competitive to other thermal (coal and gas) stations in NE region.

Tariff Comparision



- Despite blending of gas at a high price, Palatana tariff shall continue to remain very attractive and cheapest of the thermal station in NE region. Even below the APPC of beneficiary states.
- A tariff comparision with other comparable projects in NE region is depicted below:

Project	Fixed Cost (Rs/Unit)	ECR (Rs/Unit)	Total Tariff (Rs/Unit)
Bongaigaon Thermal	2.40	3.43	5.83
Assam Gas Based Power Plant (Kathalguri)	2.65	4.60	7.25
Agartala Gas Based Power Station	2.18	4.39	6.57
Rokhia GTPS	0.67	5.90	6.57
Baramura GTPS	1.26	5.90	7.16
Average Power Purchase Cost of NE States	-	-	Above 4.5 – 5
Palatana (after blending 0.5 MMSCMD additional gas)	1.28	2.98	4.26
Palatana (after blending 0.3 MMSCMD additional gas)	1.28	2.63	3.91

Palatana Current Tariff



Year	Amount (Rs Cr)	Energy (MUs)	Rate Monthly (Rs./kWh)
Apr-2024	96.17	282.06	3.41
May-2024	103.64	285.37	3.63
Jun-2024	92.45	271.55	3.40
Jul-2024	82.57	244.04	3.38
Aug-2024	88.37	270.98	3.26
Sep-2024	99.10	278.21	3.56
Oct-2024	104.82	308.68	3.40
Nov-2024	108.27	310.06	3.49
Dec-2024	109.51	324.98	3.37
FY-2024-2025	884.89	2,575.93	3.44

- Palatana Normative Tariff
 - ECR – Rs 2.105 per unit
 - FC – 1.28 per unit
 - Total – Rs 3.30 per unit
- Palatana Actual Landed Tariff
 - Varies for each state
 - Rs 3.44 per unit average
- Variation due to
 - Scheduled Energy
 - Spread of AFC over schedule
 - Plant parameters

Blended Tariff Impact



- Though GAIL has offered 0.3 MMSCMD, we are seeking approval for upto 0.5 MMSCMD
 - To avoid repetitive approvals
- Blended Tariff at 0.3 MMSCMD blending shall be:
 - Around Rs 3.91 per unit at blending of 2.38 MMSCMD + 0.3 MMSCMD
 - Present Palatana landed tariff Rs 3.44 per unit
 - Increase of around **45-55 paisa per unit**
- Blended Tariff at 0.5 MMSCMD blending shall be:
 - Around Rs 4.26 per unit at blending of 2.38 MMSCMD + 0.5 MMSCMD
 - Present Palatana landed tariff Rs 3.44 per unit
 - Increase of around **75-85 paisa per unit**
- Actual blended tariff expected to be better than above estimates
 - Better SHR
 - Low AUX
 - Temperature parameters

Market Scenario



FY	IEX MCP At Regional Periphery (Rs/Unit)	Landed Price for NE state (Rs/Unit)	Bilateral Market Prices (CERC Market Report) (Rs/Unit)
22-23	6.06	6.31	5.21
23-24	5.17	5.42	7.56
24-25	4.46	5	6.7
Palatana Blended Tariff (0.5 MSMCMD)	4.26	4.26	4.26
Palatana Blended Tariff (0.3 MMSCMD)	3.91	3.91	3.91

- Palatana blended tariff shall still be cheaper than the prevailing market prices
- Also cheaper than APPC of most NE states

MUs Impact



State	Allocation (%)	Allocation (MW)	Before Blending	After Blending		Increase in Mus per month (with 2.38 + 0.3)	Increase in Mus per month (with 2.38 + 0.5)
			MUS per month at 68% PAF (with 2.38 MMSCMD Gas)	MUs per month at 80% PAF (with 2.38 + 0.3 MMSCMD blended gas)	MUs per month at 85% PAF (with 2.38 + 0.5 MMSCMD blended gas)		
Assam	33.058	240	117.60	138.35	147.00	20.75	29.40
Tripura	26.997	196	96.04	112.99	120.05	16.95	24.01
Meghalaya	10.882	79	38.71	45.54	48.39	6.83	9.68
Manipur	7.162	52	25.48	29.97	31.85	4.50	6.37
Mizoram	5.785	42	20.58	24.21	25.72	3.63	5.14
Arunachal Pradesh	3.03	22	10.78	12.68	13.47	1.90	2.69
Nagaland	7.162	52	25.48	29.97	31.85	4.50	6.37
Total	94.076	684	334.67	393.73	418.34	59.06	83.67

Financial Impact



State	Increase in Mus per month @2.68 (with 2.38 + 0.3)	Increase in Mus per month @2.88 (with 2.38 + 0.5)	Increase in Tariff per month @2.68 (Rs Crores)	Increase in Tariff per month @2.88 (Rs Crores)
Assam	20.75	29.40	7.48	13.19
Tripura	16.95	24.01	6.11	10.78
Meghalaya	6.83	9.68	2.46	4.34
Manipur	4.50	6.37	1.62	2.86
Mizoram	3.63	5.14	1.31	2.31
Arunachal Pradesh	1.90	2.69	0.69	1.21
Nagaland	4.50	6.37	1.62	2.86
Total	59.06	83.67	21.28	37.55

Proposal



- Being a single plant company, it is essential for OTPC to arrange for alternate gas to stay operational.
- In view of this the forum is requested kindly to:
 - Allow Palatana to source upto 0.5 MMSCMD of alternative fuel gas for blending with existing fuel supplies and to operate Palatana at a good PAF for the benefit of the beneficiary states.
 - Allow sourcing this 0.5 MMSCMD of additional gas at a price as notified by MoPNG/PPAC as per its latest guidelines for a period of 3 years.
 - Allow sourcing this gas for at least a period of 3 years from signing of GSPA
- Your kind support is solicited to keep operating Palatana station successfully and maintaining the solvency of OTPC.



Thank You

Annexure-2.16



Loc no. 18 of 132KV Jiribam-Loktak





Loc No. 52 of 132KV Jiribam-Loktak



Loc No. 129 of 132KV Jiribam-Loktak



400KV DC SILCHAR-IMPHAL TL LOC NO 306

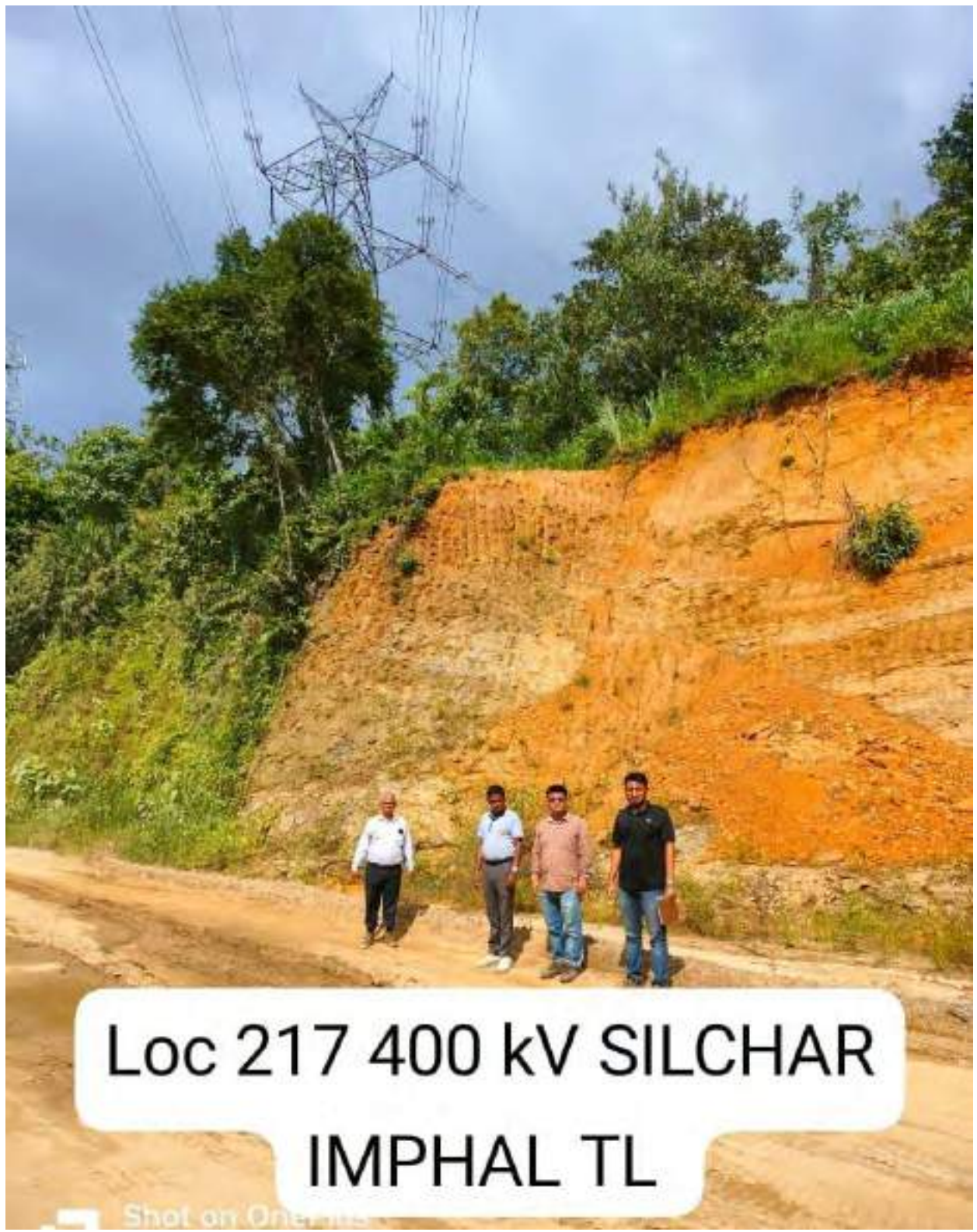




Loc 201 400 kV SILCHAR

LOC NO 336 OF 400KV D/C SILCHAR-IMPHAL LINE





Loc 217 400 kV SILCHAR
IMPHAL TL



Re: Fw:

From nasim mallick <nasim.mallick@stltech.in>

Date Thu 2/6/2025 5:57 PM

To Kaushal Suman {कौशल सुमन} <k.suman@powergrid.in>

Cc Tanay Jaiswal {तनय जायसवाल} <tanay@powergrid.in>; Rahul Kumar Shakya {राहुल कुमार शाक्य} <rshakya@powergrid.in>; Naga Pavan Kalyan Kumar {नागा पवन कल्याण कुमार} <Pavan.naga@powergrid.in>; Mandyam Dinesh Sai {} <dineshsai@powergrid.in>; Shiv Kumar Gupta {एस.के. गुप्ता} <shivkumar@powergrid.in>; H S Kaushal {एच.एस. कौशल} <hsk@powergrid.in>

Dear sir,

It is P K Bari (state) node which is Fibcom SDH

BR//

Nasim Mallick

On Thu, Feb 6, 2025 at 5:41 PM Kaushal Suman {कौशल सुमन} <k.suman@powergrid.in> wrote:

Sir

Kindly confirm whether the details provided in trailing mails are for P K Bari (State) or P K Bari(ISTS).

Regards

From: Tanay Jaiswal {तनय जायसवाल} <tanay@powergrid.in>

Sent: Thursday, February 6, 2025 4:10 PM

To: Kaushal Suman {कौशल सुमन} <k.suman@powergrid.in>

Cc: Rahul Kumar Shakya {राहुल कुमार शाक्य} <rshakya@powergrid.in>; Naga Pavan Kalyan Kumar {नागा पवन कल्याण कुमार} <Pavan.naga@powergrid.in>; Mandyam Dinesh Sai {} <dineshsai@powergrid.in>

Subject: Fw: Fw:

Dear Sir,

This is for info pls.

सादर धन्यवाद / Thanks & Regards,



Tanay Jaiswal Engineer Trainee (UNMS & Metering)

Central Transmission Utility of India Ltd.

(A wholly owned subsidiary of POWERGRID)

5th - 10th Floor, Ircon International Tower-1,

Sector-32, Gurugram, Haryana - 122003

Mobile: +91-8176876372

From: nasim mallick <nasim.mallick@stltech.in>

Sent: Thursday, February 6, 2025 3:52 PM

To: Tanay Jaiswal {तनय जायसवाल} <tanay@powergrid.in>

Subject: Re: Fw:

You don't often get email from nasim.mallick@stltech.in. [Learn why this is important](#)

Dear sir, plz find the attached snaps

On Thu, Feb 6, 2025 at 3:29 PM nasim mallick <nasim.mallick@stltech.in> wrote:

Dear sir,

Plz find the details

Port Availability (STM-16)				
Location	OEM	Card Name	Available Port	Remark
Silchar	Fibcom	simx16m_8-1-11	4 Nos	STM-16 sfp required
		simx16m_8-1-13	4 Nos	STM-16 sfp required
		sim16-1-24	8 Nos	STM-16 sfp required
	Comtel	XS A:XIO16_4	2 Nos	STM-16 sfp required
		XS B:XIO16_4	2 Nos	STM-16 sfp required
		TS5:SMS16	1 No	STM-16 sfp required
		TS6:SMS16	1 no	STM-16 sfp required
PK bari	Fibcom	simx16m_8-1-11	2,7	sfp available in the mentioned port
		simx16m_8-1-13	7,8	sfp available in the mentioned port

Silchar to NERLDC (Shillong) STM-16 Continuous Path	
Location	OEM
Silchar	Fibcom
badarpur	Fibcom
Khliehriat	Fibcom
Shillong	Fibcom
Shillong_25	Fibcom
Shillong_new_35	Fibcom

PK_Bari to NERLDC (Shillong) STM-16 Continuous Path	
Location	OEM
PK_Bari	Fibcom
RC_Nagar	Fibcom
Kumarghat	Fibcom
badarpur	Fibcom
Khliehriat	Fibcom
Shillong	Fibcom
Shillong_25	Fibcom
Shillong_new_35	Fibcom

On Thu, Feb 6, 2025 at 11:34 AM Tanay Jaiswal {तनय जायसवाल} <tanay@powergrid.in> wrote:

Dear Sh Nasim,

As discussed, Pls follow the trailing mail and provide the necessary information and Screenshot for the same may be shared.

सादर धन्यवाद / Thanks & Regards,



Tanay Jaiswal Engineer Trainee (UNMS & Metering)
Central Transmission Utility of India Ltd.
 (A wholly owned subsidiary of POWERGRID)
 5th - 10th Floor, Ircon International Tower-1,
 Sector-32, Gurugram, Haryana - 122003
 Mobile: +91-8176876372

From: Mandyam Dinesh Sai {} <dineshsai@powergrid.in>

Sent: Thursday, February 6, 2025 11:26 AM

To: Tanay Jaiswal {तनय जायसवाल} <tanay@powergrid.in>; Naga Pavan Kalyan Kumar {नागा पवन कल्याण कुमार} <Pavan.naga@powergrid.in>

Subject:

Dear sir

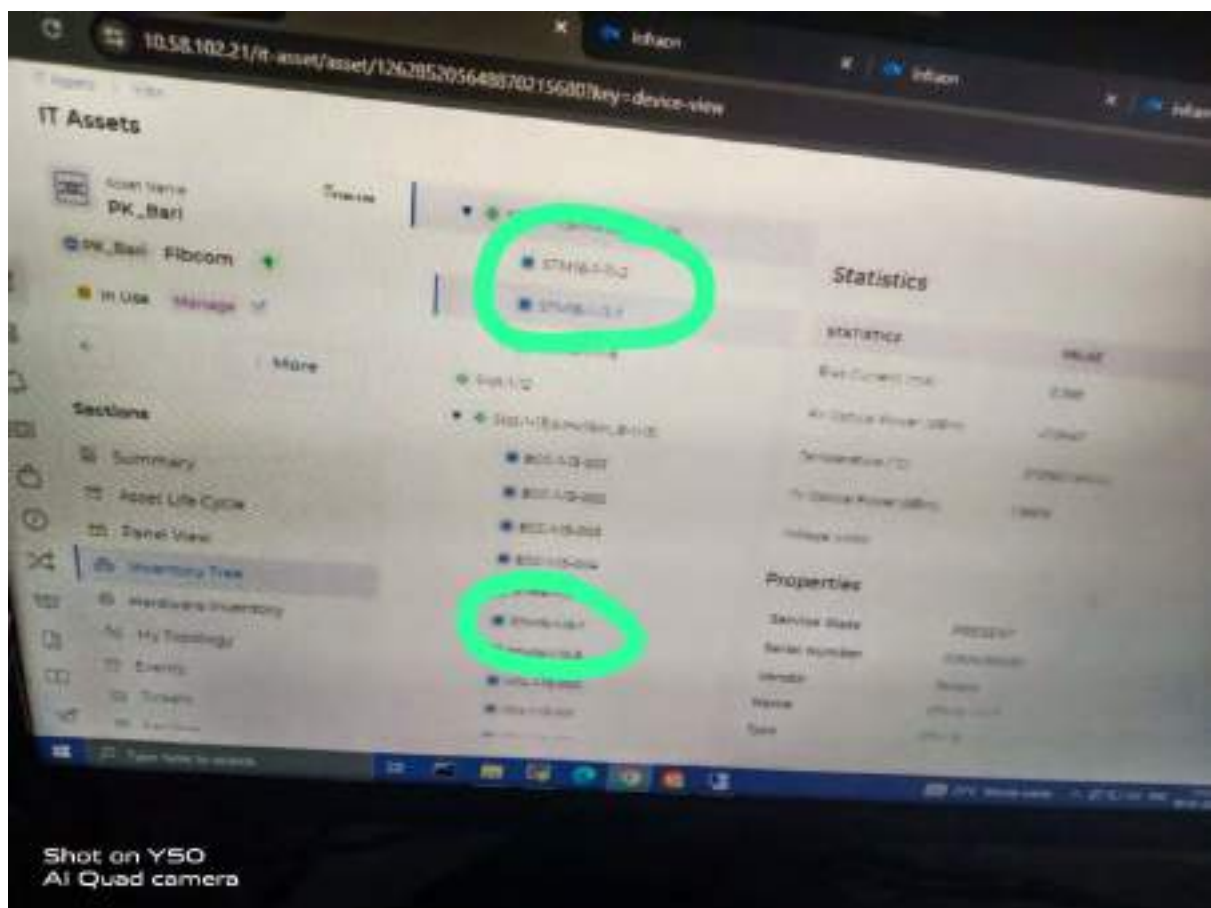
OPGW (STM-16) is planned between **silchar** to **pkbari (state)** through hallaikandi dhullavchera dharmanagar

Following inputs are required for the same :

1. **STM-16** Port availability at **PK bari and silchar** for all available port.
2. All the nodes (**STM-16**) between **PK BARI and NERLDC(shillong)** for continuous path of STM-16 Connectivity
3. All the nodes (**STM-16**) between **SILCHAR and NERLDC(shillong)** for continuous path of STM-16 Connectivity

दावात्याग : यह ईमेल पावरग्रिड के दावात्याग नियम व शर्तों द्वारा शासित है जिसे <http://apps.powergrid.in/Disclaimer.htm> पर देखा जा सकता है। Disclaimer: This e-mail is governed by the Disclaimer Terms & Conditions of POWERGRID which may be viewed at <http://apps.powergrid.in/Disclaimer.htm>

दावात्याग : यह ईमेल पावरग्रिड के दावात्याग नियम व शर्तों द्वारा शासित है जिसे <http://apps.powergrid.in/Disclaimer.htm> पर देखा जा सकता है। Disclaimer: This e-mail is governed by the Disclaimer Terms & Conditions of POWERGRID which may be viewed at <http://apps.powergrid.in/Disclaimer.htm>



i) Transformer:

MVA Rating of Transformers	Voltage Rating	Total Installed unit in POWERGRID	Installed State	Spare Required as per CERC report	Available Spare (As per RPC Approved)	Qty Proposed for procurement	Location/State of spare requirement
3Ø-315MVA	400/132/33kV	1 No-Silchar	Assam, Silchar	1	0	1	Assam, Silchar
3Ø-160MVA	220/132kV	06 Nos 02-Balipara 02- Dimapur 02- Kopili	Assam-Balipara Nagaland-Dimapur Assam-Balipara	2	1(Assam- Balipara)	1	Nagaland , Dimapur
3Ø-100MVA	220/132kV	02 Nos 01 No-Dimapur 01 No- Salakati	Nagaland-Dimapur Assam-Salakati	2	1(Nagaland- Dimapur)	1	Assam, Salakati
3Ø-50MVA	132/33kV	04 Nos 02- Imphal 02- Nirjuli	Manipur- Imphal Arunachal Pradesh	2	1 (Arunachal Pradesh - Nirjuli)	1	Manipur, Imphal
	TOTAL:					4	
	Tentative Cost						43.94 Cr

ii) **Reactors:**

MVAr Rating of Reactors	Voltage Rating	Total Installed unit in POWERGRID	Installed State	Spare Required as per CERC report	Available Spare (As per RPC Approved)	Qty Proposed for procurement	Location/State of spare requirement
3Ø-125MVAr#	420kV	06 Nos 01-Silchar 01-Imphal 01 – Balipara 01 – BNG 02- Mariani	Assam-Silchar Manipur-Imphal Assam-Balipara Assam-Bongaigaon Assam-Mariani	2	1(Assam-Silchar)	1	Manipur, Imphal
3Ø-63MVAr*	420 kV	22 Nos 06- Balipara 06-Bongaigaon 04-Silchar 02- Imphal 04- BNC	Assam-Balipara Assam- Bongaigaon Assam-Silchar Manipur- Imphal Assam- BNC	2	1(Assam-Balipara)	1	Manipur, Imphal
3Ø-50MVAr*	420 kV	9 Nos 02- Balipara 04- Bongaigaon 02- Silchar 01-Misa	Assam- Balipara Assam-Bongaigaon Assam-Silchar Assam-Misa	1	0	1 * proposed to be replaced with 63 MVAr	Assam-Misa
3Ø-31.5MVAr	245kV	01-Mokukchung	Nagaland-Mokukchung	1	0	1	Nagaland,Mokukchung
3Ø-20MVAr	245kV	01-Mariani	Assam-Mariani	1	0	1	Assam, Mariani
3Ø-20MVAr	132kV	3		3	0	3	Manipur- Imphal

		01 No- Imphal 01 No- Aizwal 01 No- Kumarghat	Manipur-Imphal Mizoram-Aizwal Tripura- Kumarghat				Mizoram- Aizwal Tripura-Kumarghat
	TOTAL:						8
	Tentative Cost						50.0 Cr

- Quantity considered for both 125MVAR & 80MVAR reactors in Manipur. In case of failure of existing 80MVAR reactor, replacement can be done with 125MVAR.

* - Quantity considered for both 50MVAR & 63MVAR reactors. In case of failure of existing 50MVAR reactor, replacement can be done with 63MVAR.

- 01 In view of the above, it is requested for approval for procurement of cold spare transformers & reactors of various ratings as per CERC committee recommendation as mentioned above. The Tariff for the investment made is to be shared by constituents as per the provisions of CERC Regulation.

Annexure -5.1

Responsibility of Users as per IEGC			
Sr. No.	Clause	Description	Responsibility
1	5.2.(i)	Demand Forecasting:	DISCOM
2	5.3.a.(i)	Assess the existing generation resources and identify the additional generation resource requirement to meet the estimated demand	STU
3	5.3.a.(ii)	Prepare generation resource procurement plan.	DISCOM
4	5.4.a	Transmission resource adequacy assessment	CTU
5	5.4.b	Transmission resource adequacy assessment	STU
6	7 (1)	All Users connected to or seeking connection to the grid shall comply with all the applicable regulations as enacted or amended from time to time,	Transmission Utility/Generator/DISCOM
7	8.2	Preparation a detailed procedure covering modalities for first time energization and integration of new or modified power system element and submit for approval of the Commission.	NLDC
8	9(1)	In case of users seeking connectivity to the ISTS under GNA Regulations, Connectivity Agreement shall be signed between such users and CTU. In case of multiple transmission licensees connected at same station, the Site Responsibility Schedule including the responsibility for operation & protection coordination and data sharing among the licensees, shall be specified in the Connectivity Agreement.	Transmission Utility/Generator/DISCOM
9	11 (1) 11(2)	Reliable speech and data communication systems shall be provided to facilitate necessary communication, data exchange, supervision and control of the grid by the NLDC, RLDC and SLDC in accordance with the CERC (Communication System for Inter State Transmission of Electricity) Regulations, 2017 and the CEA Technical Standards for Communication.	Transmission Utility/Generator/DISCOM
10	13 (1) & 13(2)	All users connected to the integrated grid shall provide and maintain effective protection system having reliability, selectivity, speed and sensitivity to isolate faulty section and protect element(s) as per the CEA Technical Standards for Construction, the CEA Technical Standards for Connectivity, the CEA (Grid Standards) Regulations, 2010, the CEA Technical Standards for Communication and any other applicable CEA Standards specified from time to time. Back-up protection system shall be provided to protect an element in the event of failure of the primary protection system.	Transmission Utility/Generator/DISCOM
11	13.3	develop the protection protocol and revise the same, after review from time to time, in consultation with the stakeholders in the concerned region, and in doing so shall be guided by the principle that minimum electrical protection functions for equipment connected with the grid shall be provided as per CEA Standards	RPC
12	14.1	review of the protection settings, assess the requirement of revisions in protection settings and revise protection settings in consultation with the stakeholders of the respective region, from time to time and at least once in a year.	RPC
13	14(2)	All users connected to the grid shall: (a) furnish the protection settings implemented for each element to respective RPC in a format as prescribed by the concerned RPC; (b) obtain approval of the concerned RPC for (i) any revision in settings, and (ii) implementation of new protection system; (c) intimate to the concerned RPC about the changes implemented in protection system or protection settings within a fortnight of such changes; (d) ensure correct and appropriate settings of protection as specified by the concerned RPC. (e) ensure proper coordinated protection settings	Transmission Utility/Generator/DISCOM

14	14.3.a, 14.3.b	maintain a centralized database and update the same on periodic basis in respect of their respective region containing details of relay settings for grid elements connected to 220 kV and above (132 kV and above in NER). carry out detailed system studies, once a year, for protection settings and advise modifications / changes, if any, to the CTU and to all users and STUs of their respective regions.	RPC
15	15(1), 15(2), 15(4), 15(5), 15(6) and 15(7)	Protection Audit (Internal & Third Party) and deficiency rectification. Submission to RPC, RLDC or SLDC as the case may be. Annual audit plan by 31st Oct. Protection Indices every month	Transmission Utility/Generator/DISCOM
16	16.2	perform regular load flow and dynamic studies and mock testing for reviewing SPS parameters & functions, at least once in a year.	RLDC or NLDC, as the case may be, in consultation with the concerned RPC(s)
17	16(3) & 16(4)	The users and SLDCs shall report about the operation of SPS immediately and detailed report shall be submitted within three days of operation to the concerned RPC and RLDC in the format specified by the respective RPCs. The performance of SPS shall be assessed as per the protection performance indices	Transmission Utility/Generator/DISCOM
18	17(1)	All users shall keep the recording instruments (disturbance recorder and event logger) in proper working condition.	Transmission Utility/Generator/DISCOM
19	19(6) & 19(7)	Start-up power shall not be used by the generating station for construction activities; The onus of proving that the interchange of infirm power from the unit(s) of the generating station is for the purpose of pre-commissioning activities, testing and commissioning, shall rest with the generating station, and the concerned RLDC shall seek such information on each occasion of the interchange of power before COD. For this, the generating station shall furnish to the concerned RLDC relevant details, such as those relating to the specific commissioning activity, testing, and full load testing, its duration and the intended period of interchange. The generating station shall submit a tentative plan for the quantum and time of injection of infirm power on day ahead basis to the respective RLDC.	Generator
20	20 (1)	The details of the generation station shall be furnished by each regional entity generating station to the concerned RLDC, RPC and the beneficiaries of the generating station, wherever identified, prior to notice of	Generator
21	21(1)	The generating company proposing its generating station or a unit thereof for trial run or repeat of trial run shall give a notice of not less than seven (7) days to the concerned RLDC. Repeat trial run is to take place within forty eight (48) hours of the failed trial run, fresh notice shall not be	Generator
22	21(2)	The transmission licensee proposing its transmission system or an element thereof for trial run shall give a notice of not less than seven days to the concerned RLDC, CTU, distribution licensees of the region and the	Transmission Utility
23	22(1), 22(2), 22(3)	TRIAL RUN OF GENERATING UNIT	Generator
24	23	TRIAL RUN OF INTER-STATE TRANSMISSION SYSTEM	Transmission Utility
25	24(1) and 24(2)	DOCUMENTS AND TESTS PRIOR TO DECLARATION OF COMMERCIAL OPERATION	
26	24(3)	Documents and Tests Required for Thermal (coal/lignite) Generating Stations:	Thermal Generator
27	24(4)	Documents and Tests Required for Hydro Generating Stations including Pumped Storage Hydro Generating Station:	Hydro Generator
28	24(5)	Documents and Test Required for Gas Turbine based Generating Stations	Gas Generator

29	24(6)	Documents and Tests Required for the Generating Stations based on wind and solar resources	Wind and Solar Generator
30	24(7)	Documents and Tests Required for Energy Storage Systems	Energy Storage
31	24(8)	Documents and Tests Required for HVDC Transmission System or SVC or STATCOM	Transmission Utility
32	26	DECLARATION BY GENERATING COMPANY AND TRANSMISSION LICENSEE regarding meeting CEA regulations, standards. Installation of main plant and auxiliary system, emergency supply, etc.	Transmission Utility/Generator
33	27	DECLARATION OF COMMERCIAL OPERATION (DOCO) AND COMMERCIAL OPERATION DATE (COD)	
34	28(7)	Every generating station, and transmission substation of 110 kV and above shall have a control room manned by qualified operating personnel round the clock. Alternatively, the same may be operated round the clock from a remotely located control room, subject to the condition that such remote operation does not result in a delay in the execution of any switching instructions and information flow: Provided that a transmission licensee owning a transmission line but not owning the connected substation, shall have a coordination centre functioning round the clock, manned by qualified personnel for operational coordination with the concerned load despatch centres and equipped to carry out the operations as directed by concerned load despatch centres	Transmission Utility/Generator
35	28(8)	ESS and Bulk Consumers, which are regional entities shall have coordination centres functioning round the clock and manned by qualified personnel for operational coordination with the concerned load despatch	ESS and Bulk Consumers
36	29(4)	Except in an emergency, or when it becomes necessary to prevent imminent damage to critical equipment, no user shall suddenly reduce its generating unit output by more than 100 (one hundred) MW without prior permission of the respective RLDC.	Generator
37	29(5)	Except in an emergency, or when it becomes necessary to prevent imminent damage to critical equipment, no user shall cause a sudden variation in its load by more than 100 (one hundred) MW without the prior permission of the respective RLDC.	Generator
38	29(6)	All generating units shall have their automatic voltage regulators (AVRs), Power System Stabilizers (PSSs), voltage (reactive power) controllers (Power Plant Controller) and any other requirements in operation, as per the CEA Technical Standards for Connectivity. If a generating unit with a capacity higher than 100 (hundred) MW is required to be operated without its AVR or voltage controller in service, the generating station shall immediately inform the concerned RLDC of the reasons thereof and the likely duration of such operation and obtain its permission.	Generator
39	29(7), 29(8)	The tuning of AVR, PSS, Voltage Controllers (PPC) including for low and high voltage ride through capability of wind and solar generators or any other requirement as per CEA Technical Standards for Connectivity shall be carried out by the respective generating station:– at least once every five (5) years;– based on operational feedback provided by the RLDC after analysis of a grid event or disturbance; and– in case of major network changes or fault level changes near the generating station as reported by NLDC or RLDC(s), as the case may be. – in case of a major change in the excitation system of the generating station. Power System Stabilizers (PSSs), AVRs of generating units and reactive power controllers shall be properly tuned by the generating station as per the plan and the procedure prepared by the concerned RPC.	Generator
40	29(12)	All distribution licensees, STUs and bulk consumers shall provide automatic under-frequency relays (UFR) and df/dt relays for load shedding in their respective systems to arrest frequency decline that could result in grid failure as per the plan given by the RPCs from time to time.	Distribution licensees

41	29(18)	All defence mechanisms shall always be in operation and any exception shall be immediately intimated by the concerned user to the concerned RLDC and SLDCs along with the reasons and the likely duration of such exception. The concerned user shall also obtain permission from the concerned RLDC or SLDC, as applicable.	User/RLDC/SLDC
42	30(3)	All users shall adhere to their schedule of injection or drawl, as the case may be, and take such action as required under these regulations and as directed by NLDC or respective RLDCs or respective SLDCs so that the grid frequency is maintained and remains within the allowable band	Generator/SLDCs
43	30(10)(d), 30(10)(g), 30(10)(h), 30(10)(i), 30(10)(j), 30(10)(k), 30(10)(l), 30(10)(m)	Primary control/ Governor action The generating stations and units thereof shall have electronically controlled governing systems or frequency controllers in accordance with the CEA Technical Standards for Connectivity and are mandated to provide PRAS. The generating stations and units thereof with governors shall be under Free Governor Mode of Operation. Drop settings -3 to 6 % (for thermal generating units and WS Seller) or 0-10% (for hydro generating units) Primary response as per Table-4	Generator
44	30(10)(n)	Each control area shall assess its frequency response characteristics and share the assessment with the concerned RLDC along with high resolution data of at least 1 (one) second for regional entity generating stations and energy storage systems and 10 (ten) seconds for the state control area	Generator/SLDCs
45	30(11)(j)	The SRAS Providers shall start responding to SRAS signals within thirty (30) seconds of receipt of the signal and shall be capable of providing the entire SRAS capacity obligation within fifteen (15) minutes and sustaining it at least for the next thirty (30) minutes.	Generator
46	30(11)(w)	All thermal generating stations having a capacity of more than 200 MW and hydro generating stations having a capacity of more than 25 MW shall make arrangements to enable automatic operation of the plant from the appropriate load despatch centre by integrating the controls and telemetering features of their system into the automatic generation control in accordance with the CEA Technical Standards for Construction and the CEA Technical Standards for Connectivity. The communication system shall be established in accordance with the CEA Communication Regulations.	Thermal Generator
47	30(12)(j) 30(12)(l)	Tertiary reserves to be provided by the TRAS provider shall be capable of providing TRAS within fifteen (15) minutes of despatch instructions from RLDC or SLDC, as the case may be, and shall be capable of sustaining the service for at least the next 60 minutes. The modalities for information exchange and timelines in respect of tertiary reserves shall be as per detailed procedure prepared by NLDC	Generator
48	30(11)(x)	All renewable energy generating stations and ESS shall be equipped with the facility to control active power injection in accordance with the CEA Connectivity Standards and the communication system shall be established in accordance with the CEA Technical Standards for Communication.	Renewable Engery
49	31(2)(f) 31(2)(h)	The entities such as bulk consumers or distribution licensees that are directly connected to ISTS shall estimate and furnish such a demand estimate to the concerned RLDC	Bulk consumers or distribution licensees
50	32(2)(d) 32(3)(f)	Protection relay related outages, auto-re-closure outages and SPS testing outages shall be planned on a monthly basis with the prior permission of the concerned RPC, which shall consult the concerned RLDC & NLDC. All users, CTU and STUs, licensees shall follow the annual outage plan. If any deviation is required, the same shall be allowed only with the prior permission of the concerned RPC, which shall consult the concerned RLDC and NLDC	All users, CTU and STUs, licensees

51	32(3)(g)	Each user shall obtain the final clearance from NLDC or the concerned RLDC, prior to the planned outage of any grid element. The clearance shall also be obtained from SLDC for a grid element of the State Control areas.	Transmission Utility/Generator/DISCOM
52	34(3)	Detailed procedures for restoration post partial and total blackout of each user system within a region shall be prepared by the concerned user in coordination with the concerned SLDC, RLDC or NLDC, as the case may be. The concerned user shall review the procedure every year and update the same. The user shall carry out a mock trial run of the 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. Diesel generator sets and other standalone auxiliary supply source to be used for black start shall be tested on a weekly basis and the user shall send the test reports to the concerned SLDC, RLDC and NLDC on a quarterly basis.	SLDC/RLDC/NLDC
53	34(4)	Simulation studies shall be carried out by each user in coordination with RLDC for preparing, reviewing and updating the restoration procedures considering the following: (a) Black start capability of the generator; (b) Ability of black start generator to build cranking path and sustain island; (c) Impact of block load switching in or out; (d) Line/transformer charging; (e) Reduced fault levels; (f) Protection settings under restoration condition.	Generator with RLDC
54	34(5)	The thermal and nuclear generating stations shall prepare themselves for house load operation as per design. The concerned user and SLDC shall report the performance of house load operation of a generating station in the event where such operation was required	thermal and nuclear generating stations
55	35(5)(b)	Any planned operation activity in the ISTS system [such as generating unit synchronization or de-synchronization, transmission element opening or closing (including breakers), protection system outage, SPS outage and testing etc.] shall be done by taking operational code from RLDC or NLDC, as the case may be. The operational code shall have validity period of sixty (60) minutes from the time of issue. In case such operation activity does not take place within the validity period of the code, the entity shall obtain a fresh operational code from RLDC or NLDC, as the case may be.	Transmission Utility
56	37(2)	Post Despatch Analysis: Event Reporting	
57	38(2)	Daily and monthly reports covering the performance of the regional grid shall be prepared by each RLDC based on the inputs received from SLDCs and users. Data submission for preparation of reports (Generation MUs, drawl, etc.)	RLDC/SLDC
58	39(1), 39(2), 39(3)	REACTIVE POWER MANAGEMENT	
59	39(8)	Reactive power facility shall be in operation at all times and shall not be taken out without the permission of the concerned RLDC or SLDC	RLDC/SLDC

60	40(1) and 40(2)	<p>PERIODIC TESTING</p> <p>There shall be periodic tests, as required under clause (3) of this Regulation, carried out on power system elements for ascertaining the correctness of mathematical models used for simulation studies as well as ensuring desired performance during an event in the system</p> <p>(a) The owner of the power system element shall be responsible for carrying out tests as specified in these regulations and for submitting reports to NLDC, RLDCs, CEA and CTU for all elements and to STUs and SLDCs for intra-State elements.</p> <p>(b) All equipment owners shall submit a testing plan for the next year to the concerned RPC by 31st October to ensure proper coordination during testing as per the schedule. In case of any change in the schedule, the owners shall inform the concerned RPC in advance.</p> <p>(c) The tests shall be performed once every five (5) years or whenever major retrofitting is done. If any adverse performance is observed during any grid event, then the tests shall be carried out even earlier, if so advised by SLDC or RLDC or NLDC or RPC, as the case may be.</p> <p>(d) The owners of the power system elements shall implement the recommendations, if any, suggested in the test reports in consultation with NLDC, RLDC, CEA, RPC and CTU.</p>	Transmission Utility/Generator
61	40(3)	Testing requirements	
62	45(2)	The regional entity generating stations and the entities participating in Ancillary Services must be capable of receiving the load set point signals from the RLDCs or the NLDC as per CEA Technical Standards for Connectivity, or in terms of Ancillary Service Regulations, as applicable.	Generating stations
63	45(5)(a)	<p>Requirement for Commencement of Scheduling:</p> <p>(a) The following documents shall be submitted to the respective RLDC by the seller or the buyer, as the case may be, before commencement of the scheduling of transactions under GNA or T-GNA, as the case may be:</p>	Seller or buyer
64	45(6)	<p>Adherence to Schedule:</p> <p>Each regional entity shall regulate its generation or demand or both, as the case may be, so as to adhere to the schedule of net injection into or net drawl from the inter-State transmission system</p>	Regional entity (SLDCs and Generator)
65	45(8)(a), 45(8)(b)	Declaration of Declared Capacity by Regional entity generating stations	
66	45(9)(a)	Ramping Rate to be Declared for Scheduling.(i) Coal or lignite fired plants shall declare a ramp up or ramp down rate of notless than 1% of ex-bus capacity corresponding to MCR on bar per minute;(ii) Gas power plants shall declare a ramp up or ramp down rate of not less than3% of ex-bus capacity corresponding to MCR on bar per minute;(iii) Hydro power plants shall declare a ramp up or ramp down rate of not less than10% of ex-bus capacity corresponding to MCR on bar per minute;(iv) Renewable Energy generating stations shall declare a ramp up or ramp downrate as per CEA Connectivity Standards.	Generator

67	45(11)(d), 45(11)(e), 45(11)(f)	<p>Scheduling of WS seller and ESS by QCA:</p> <p>(d) QCA registered with the concerned RLDC shall, on behalf of wind, solar or renewable hybrid generating stations or Energy Storage System shall:</p> <p>(i) Coordinate and facilitate scheduling of power with the concerned RLDC; and;</p> <p>(ii) Undertake commercial settlement of deviations with the concerned RLDC in accordance with the DSM Regulations.</p> <p>(iii) Submit a copy of the consent to the concerned RLDC certifying that QCA shall undertake all operational and commercial responsibilities on behalf of generating stations as per the CERC Regulations.</p> <p>(e) The concerned wind, solar or renewable hybrid generating stations including energy storage systems shall indemnify the RLDC for any act of commission or omission on the part of QCA including compliance with the Grid Code and settlement of its financial liability in the pooled account.</p> <p>(f) Contract between the generating stations and QCA shall invariably contain provisions for internal dispute resolution, and any disputes arising between the generating stations and QCA shall be settled in accordance with the said mechanism</p>	QCA
68	45(12)	Minimum turndown level for regional entity thermal generating stations:	Generator
69	45(15)	<p>For meeting its power requirements during non-generation hours, whether before or after COD, a generating station, including renewable energy generating station, shall enter into a valid contract with a seller or distribution licensee or through power exchange:</p> <p>Provided that where the generating station including a renewable energy generating station is unable to enter into a contract for the drawl of power during non-generation hours, it may draw power from ISTS on payment of deviation charges as per the DSM Regulations.</p>	Generator
70	46(4)(i), 46(5) ©	<p>SCUC46(4)(i) All the generating stations identified under SCUC shall be available on bar, and in the event of such stations or units thereof being on Unit Shut Down (USD), the time to start a unit under different conditions such as HOT, WARM and COLD and minimum time for which it shall be brought on bar, shall be as specified in the Detailed Procedure to be prepared by NLDC and approved by the Commission. 46(5)(c) All regional entity generating stations shall declare DC for 'D' day within 2 hours of announcement by NLDC, for consideration under three day ahead SCUC.</p>	Generator
71	47(2), 49(10)	<p>In case a generating station, or unit thereof, opts to go under unit shut down (USD) or in the event of forced outage, the generating company owning such generating station or unit thereof shall fulfil its obligation to supply electricity to its beneficiaries who had made requisition from the said generating station prior to it going under USD,</p> <p>In the event of forced outage of a generating station or unit thereof, the generating company owning the generating station or unit thereof shall fulfil its supply obligation to the beneficiaries which made requisition from such generating station or unit thereof,</p>	Generator
72	47(3)	In case of emergency conditions, for reasons of grid security, a generating station or unit thereof, which is under USD may be directed by NLDC to come on bar, and in such event the generating station or unit thereof shall come on bar under hot, warm and cold conditions as per the time period to be specified in the detailed procedure under subclause (i) of clause (4) of Regulation 46 of these regulations.	Generator and NLDC
73	48	<p>SCHEDULING FROM ALTERNATE SOURCE OF POWER BY A GENERATING STATION</p> <p>(1) A generating station may supply power from alternate source in case of (i) USD in terms of clause (1) of Regulation 47 of these regulations or (ii) forced outage of unit(s) or (iii) a generating station other than REGS replacing its scheduled generation by power supplied from REGS irrespective of whether such identified sources are located within or outside the premises of the generating station or at a different location.</p>	Generator

74	49	PROCEDURE FOR SCHEDULING AND DESPATCH FOR INTER-STATE TRANSACTIONS	
75	49(12)	Energy Metering and Accounting: operation and periodic calibration of IEM shall be done by the respective entity. The installation, operation, calibration and maintenance of Interface Energy Meters (IEMs) with automatic remote meter reading (AMR) facility shall be in accordance with the CEA Metering Regulations 2006. (c) The installation, operation, and maintenance of additional communication links, if any, required for the purpose of AMR facility shall be in accordance with CEA Communications Regulations. (d) Access to such metering data to the concerned RLDC and SLDC(s) shall be in accordance with the CEA Metering Regulations 2006. (e) Entities in whose premises the IEMs are installed shall be responsible for (i) monitoring the healthiness of the CT and PT inputs to the meters, (ii) taking weekly meter readings for the seven day period ending on the preceding Sunday 2400 hrs and transmitting them to the RLDC by Tuesday noon, in case such readings have not been transmitted through automatic remote meter reading (AMR) facility (iii) monitoring and ensuring that the time drift of IEM is within the limits as specified in CEA Metering Regulations 2006 and (iv) promptly intimating the changes in CT and PT ratio to RLDC.	Transmission Utility/Generator/DISCOM
76	49(13)	Inspection of Records: The operational logs and records of the regional entity generating stations and inter-State transmission licensees shall be available for inspection and review by the RLDCs and RPCs.	RLDC/RPC
77	51	CYBER SECURITY AUDIT All users, NLDC, RLDCs, SLDCs, CTU and STUs, power exchanges, QCAs, SNAs, shall conduct Cyber Security Audit as per the guidelines mentioned in the CEA (Cyber Security in Power Sector) Guidelines, 2021 and any other guidelines issued by an appropriate Authority.	All users, NLDC, RLDCs, SLDCs, CTU and STUs, power exchanges, QCAs, SNAs



Pic 1: Year 2018 [530 Mtrs from Loc no 125]



Pic 2: Year 2024 [175 Mtrs from Loc no 175]

Annexure-6.6

