



**Proceedings**  
**Eastern Regional Capacity Building Workshop**  
for  
**State Stakeholders**  
on  
**Resilient, Inclusive, & Environmentally**  
**Sustainable Power Sector**

**Date: October, 17<sup>th</sup> and 18<sup>th</sup> 2024,**  
**Venue: Hotel Maurya, Patna (Bihar)**

*Organised by :*

# **Proceedings**

## **Eastern Regional Capacity Building Workshop**

for

### **State Stakeholders**

on

## **Resilient, Inclusive, & Environmentally Sustainable Power Sector**

(Including Laws, Rules, Guidelines, Regulations related thereto)

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## Background

In the face of growing energy demands and the urgent need for sustainable development, the role of State stakeholders in the power sector has never been more critical. Most of the laws, policies, and regulations governing the power sector are formulated by the Central Government in consultation with the State Governments, while implementation is primarily conducted at the State level. With new recruitments in the States, the legacy does not necessarily get passed on to the new recruits. Therefore, it is crucial that the principles of the laws, policies, and regulations are informed to these new recruits as well as refreshed for the incumbent State stakeholders. In this direction, IRADe in collaboration with Central Electricity Authority (CEA) Ministry of Power, Government of India, has taken the initiative to organise series of capacity building workshops with the following objectives:

- Enhance knowledge and understanding of the State stakeholders regarding national laws, policies, and regulations governing the power sector.
- Deepen expertise in the technical, financial, legal, and regulatory aspects of power sector regulation.
- Equip State stakeholders with skills to analyse and address emerging trends and challenges in the sector.
- Foster best practices in stakeholder engagement and public consultation processes.
- Facilitate networking and knowledge exchange among the Central Electricity Regulatory Commission/ Central Electricity Authority, State, & other power sector stakeholders.

The Workshop on Resilient, Inclusive, & Environmentally Sustainable Power Sector (Including Laws, Rules, Guidelines, Regulations related thereto) was organized jointly by IRADe and the Central Electricity Authority, with the intention that most of the Laws, policies, regulations, Guidelines, Rules are made by the Central Government or the Central Electricity Regulatory Commission, but are to be implemented mainly by the States. Therefore, in order for the State stakeholders to use these efficiently, they may need to understand the nuances of these documents. The Program of Capacity Building would be through regional 2-day Workshops on important Rules and Regulations. The first of these Workshops was organized for the Eastern Region State stakeholders on October, 17<sup>th</sup> and 18<sup>th</sup>, 2024 at Patna, Bihar. Over 60 representatives from most of the States of the Eastern Region, including, the Ministry, Regulators and Renewable Development agencies participated in the Workshop. The agenda for the same is attached at Annexure-I. List of Participants is given in Annexure II. The speakers were from the Central Electricity Authority, the Central Electricity Regulatory Commission, the Grid Controller of India, and Indian Energy Exchange. The Sessions were preceded by the Inaugural Session, with the senior most officers of Bihar Electricity Regulatory

Commission (BERC), Bihar State Power Generation Company Ltd. (BSPGCL), and the Central Electricity Authority (CEA) participated.

The Inaugural Session started with the Welcome Address by **Dr. Jyoti Parikh**, Executive Director, IRADe, followed by a Setting the Context Presentation by **Shri Pankaj Batra**, Senior Advisor, IRADe. This was followed by Introductory Remarks by **Dr. Kirit Parikh**, Chairman, IRADe, **Shri Mahendra Kumar**, (IAS), Managing Director, Bihar State Power Generation Company Ltd. & MD SBPDCL, Govt. of Bihar, **Shri Amir Subhani**, Chairperson, Bihar State Electricity Regulatory Commission, Govt. of Bihar, and **Shri Ghanshyam Prasad**, Chairperson of the Central Electricity Authority (CEA). **Shri Pankaj Kumar Pal** (IAS), Secretary, Energy Department, Government of Bihar, could not attend due to a last moment meeting called by the Chief Minister. The details of the addresses are given below.

The Inaugural Session concluded with a Vote of Thanks by Dr. Navpreet Saini, Senior Research Analyst.

This was followed by two roundtables of the utilities and regulators/renewable development agencies respectively on the training needs of the State stakeholders.

Then there were technical Sessions on various important topics/regulations, presented by officers of the Central Electricity Authority, the Central Electricity Regulatory Commission, Grid Controller of India and the Indian Energy Exchange.

## **Day-1, Thursday , 17<sup>th</sup> October 2024**

### **1. Inaugural Session**

#### **Prof. Jyoti Parikh, Executive Director of IRADe**

Dr Jyoti Parikh welcomes attendees and key officials to the workshop, emphasizing the need for a resilient, inclusive, and environmentally sustainable power sector under the leadership of Shri Ghanshyam Prasad. She highlights the significant progress in India's power sector from small urban utilities to a national grid with complex transmission systems and a power market. The speaker acknowledges the new challenges of environmental compliance and social inclusivity, highlighting the achievement of electrifying all villages. The focus of the two-day workshop is to understand the fundamentals of power system planning to tackle future challenges such as innovations in tariff mechanisms, reducing emissions, managing consumer and demand-side changes, and dealing with intermittent renewable sources like solar and wind. The





workshop aims to equip participants with the knowledge to handle these complex issues, with the help of experts like Mr. Pankaj Batra, through lively discussions and expert lectures. The goal is to prepare for a power system that increasingly relies on storage solutions.

**Mr. Pankaj Batra, Senior Advisor at IRADe and Ex-Chairperson of CEA**

The participants from the Eastern region of India to a workshop on capacity building in the electricity sector, although noting the absence of representatives from Sikkim, Jharkhand, and the Andaman and Nicobar Islands. Key figures such as the Chairperson of the Central Electricity Authority and other regional officials are acknowledged. The emphasis is on understanding and implementing electricity laws, rules, and regulations effectively across states to enhance resource planning and adequacy. The speaker highlights the importance of resource adequacy,



acknowledging that infrastructure development requires advanced planning to ensure sufficient power generation and transmission. The workshop is part of a series covering different Indian regions, beginning with the Northern region and continuing with others in the coming months, with additional webinars and roundtables dedicated to specific topics and needs, especially focusing on the transition to renewable energy. Mr. Batra concludes by encouraging an enriching experience for all participants.

**Prof. Kirit Parikh, Chairman, IRADe,**

Dr. Kirit Parikh addresses the challenges and opportunities of India's energy transition amidst economic growth, focusing on achieving sustainability goals like Net Zero by 2070. He highlights the need for adaptive policies and regulations to accommodate the increasing share of renewable energy, considering the diverse issues faced by different states. Challenges such as fulfilling Renewable Portfolio Obligations (RPOs), financial stress due to power purchase agreements, and operational inefficiencies in coal-based plants are discussed. The speaker emphasizes the importance of consistency between state capabilities and central government regulations to facilitate effective implementation. He advocates for informed dialogue between the center and states to create regulations that consider state-specific constraints, leading to more effective and implementable policies. Additionally, the speech mentions solar generation capacity initiatives and improvements in hydropower generation, illustrating progress in renewable energy efforts.



**Shri Mahendra Kumar, (IAS), Managing Director, Bihar State Power Generation Company Ltd. & MD SBPDCL, Govt. of Bihar**

Shri Mahendra Kumar emphasized the need for enhanced efforts in renewable energy, particularly in the eastern region, which faces unique challenges compared to other parts of India. While the northern and western regions benefit from favorable solar radiation, the east has significant hydel potential but limited overall renewable resources. The speaker highlighted the region's distinctive consumer profile, with 90% of consumers on low-tension connections, leading to unique peak demand patterns, particularly in the evenings. Addressing climate change and achieving energy transition targets—such as sourcing 50% of energy from renewables by 2030 and reaching net-zero by 2070—were underscored as urgent goals. Initiatives like the PM Suri Ghar Yojana and Jal Jeevan Hariyali Abhiyaan are encouraging solar adoption, while challenges remain in grid integration and policy variability. The concept of solarizing agricultural feeders and expanding energy storage capacity, particularly through battery energy systems, was also mentioned as critical for meeting peak demands. The workshop served as a platform for stakeholders, including regulators and policy makers, to collaborate and work towards achieving the set targets for a sustainable energy future.



**Shri Amir Subhani, Chairperson, Bihar State Electricity Regulatory Commission, Govt. of Bihar**

Shri Amir Subhani highlighted the significant transformation of Bihar's power sector over the past two decades. Previously plagued by frequent outages and low per capita electricity consumption—only 82 units in 2002—Bihar now boasts a peak demand growth from 700 MW in 2005 to 8,000 MW in 2024, alongside near complete electrification with over 98% of households having access to electricity. The state has successfully reduced AT&C losses from 31% in FY 2017-18 to less than 20% this year, turning its utility companies from loss-making to profit-generating entities through targeted reforms. The Bihar Electricity Regulatory Commission (BERC) has played a critical role in establishing a regulatory framework aligned with national policies while addressing local needs. This includes implementing the Electricity Rights of Consumers Rules 2020 and promoting renewable energy through affordable tariff structures. However, challenges remain, particularly regarding the deployment of smart meters and maintaining grid stability amidst rising energy demand, expected to grow at 7.5% annually through



2033-34. The speaker emphasized the importance of balancing stakeholder interests, enhancing energy management, and ensuring financial sustainability. Moving forward, BERC is committed to strengthening Bihar's power infrastructure and supporting decentralized renewable generation, particularly for agricultural and rural consumers, all while contributing to national goals of sustainability and energy security. Shri Amir Subhani concluded by expressing gratitude to CEA and IRADe for organizing the workshop and looked forward to fruitful discussions on shaping the future of energy in the region.

### **Shri Ghanshyam Prasad, Chairperson, CEA**

Shri. Ghanshyam Prasad addressed the critical aspects of power sector planning, specifically focusing on generation, transmission, and distribution, and emphasized the importance of collaboration between state institutions and regulatory bodies. They acknowledged the progress made in ensuring 24/7 electricity supply to consumers and highlighted the need for a robust power purchase portfolio management strategy to optimize resources and minimize costs. The speaker discussed the significance of understanding capacity crediting



for different energy sources, pointing out that coal can provide consistent power while solar and wind depend on seasonal availability. They urged states to actively sell surplus power in the market, thereby relieving Fixed Cost burdens on distribution companies (DISCOMs). The integration of state and central grid codes was identified as essential for the smooth sale of surplus energy, and the necessity of understanding Generation Needs Assessment (GNA) was highlighted to avoid potential shortfalls in power draw even when surplus capacity exists nationally.

Shri. Ghanshyam Prasad also noted the importance of maintaining a dynamic resource adequacy plan that is updated annually to account for varying demands and renewable resources. They stressed a long-term vision in planning—at least ten years—to prevent repeated issues with under-capacity and stressed that a strategic transmission plan must align with anticipated growth in demand. The ongoing efforts in updating the National Electricity Policy, aiming for a vision that extends to 2047, were mentioned, emphasizing a forward-thinking approach to bridging current gaps in the power system. The speaker encouraged the incorporation of advanced technologies such as artificial intelligence and smart meters to enhance service delivery, alongside the exploration of battery storage solutions. They concluded by inviting collaboration and feedback from participants, assuring them that experts would be available to address queries and suggesting engagement in discussions to improve regulatory



frameworks. The overall message underscored the need for strategic planning, optimized resource management, and stakeholder engagement in shaping a resilient power sector for the future.



## 2. Presentation on Outline of Laws, Rules, Guidelines, Regulations of the Government of India/CERC

Mr Pankaj Patra explained the agenda and outlined the topics next two days workshop for Eastern Region state stakeholders focuses on power sector laws, policies, and regulations, primarily from the Ministry of Power and CERC, but emphasizing state-level implementation. This two-day workshop for Eastern Region stakeholders addresses crucial power sector issues, focusing on the implementation of Ministry of Power and CEA and CERC regulations at the state level. The sessions will include roundtables with regulators and other stakeholders, presentations by authors of key regulations and guidelines, and discussions on crucial topics.

Key themes include:

**Resource Adequacy Planning:** The importance of long-term planning to avoid costly power purchases from the exchange market during deficit periods is highlighted. This involves optimizing long-term, medium-term, and short-term contracts based on state-specific load curves and resource sharing among states.

**Grid Balancing and Stability:** Strategies for managing the intermittency of renewable energy sources (solar and wind) through hybrid projects, energy storage (pumped hydro and batteries), and demand response mechanisms are discussed.

**Ancillary Services and Demand Response:** The benefits of competitive bidding for ancillary services and the potential for cost savings through demand response, particularly with the increasing adoption of smart meters, are emphasized.

**Long Duration Storage:** The advantages of pumped hydro storage, especially its cost-effectiveness compared to battery storage, are highlighted.

**Flexibilization of Thermal Plants:** Modifying coal-based power plants to enhance flexibility and integrate with renewable sources is discussed.

**New Grid Code:** The 2023 grid code, including provisions for resource adequacy, grid operation, and cybersecurity, is presented.

**Power Exchange and Market:** The importance of power exchange mechanisms, including day-ahead, intraday, and bilateral contracts, for efficient power allocation and the utilization of surplus power is underscored.

**Safety and Communication:** The need for robust safety regulations and reliable communication systems for effective grid management is stressed.

The overall goal is to enhance the Eastern Region's power sector resilience, reliability, and cost-effectiveness through improved planning, technological advancements, and regulatory frameworks.



## Session 2: Round Table- Utilities and State Renewable Development Agencies

Mr. Pankaj Batra, Senior Advisor at IRADe and Ex-Chairperson of CEA moderated the sessions

**Mr. Arun Kumar Sinha, Member(Technical), Bihar State Electricity Regulatory Commission**

Mr Sinha stated that the conference aims to develop the capacity of the utilities, so as to improve consumer service delivery, which is the prime goal of every utility. Many rules and regulations are constantly evolving within the electricity sector, along with amendments, from the Central Electricity Authority (CEA), the Central Electricity Regulatory Commission (CERC), and state-level regulators. The sector is undergoing rapid transformation, demanding adequate responses. If a specific training program is held for Bihar, focusing on resource adequacy, implementation of Deviation Settlement Mechanism (DSM) strategies, navigating new regulations for tertiary services and SCED (Security Constrained Economic Dispatch) and SCUC (Security Constrained Unit Commitment) for optimizing portfolios, and managing unnecessary utility charges, this would be very beneficial. The resource adequacy framework (issued June 2023) requires planning and monitoring at the national (NLDC), interstate (RLDCs), and state (SLDCs) levels. This is a continuous process needing annual revisions due to the sector's dynamic nature. Training on these aspects is crucial. Resource adequacy planning demands accurate demand forecasting, leveraging tools like machine learning and artificial intelligence. In Bihar, the consumer-driven demand (90% domestic) necessitates understanding weather patterns and utilizing smart meter data (about 25% consumers presently have smart meters) for improved forecasting accuracy. Regional variations within Bihar (northern, central, southern) require localized weather forecasts for better accuracy. Integrating this data with industrial sector and other relevant information will improve forecasting and resource adequacy planning. Planning also has to be in line with global goals of net zero. Integration of renewables to the grid is an issue. Shifting of load to the daytime, when you have the maximum solar power, should be done.



### **Mr Debidas Bandopadhyay, Consultant , West Bengal Electricity Regulatory Commission**

Mr. Debidas Bandopadhyay, Consultant at the West Bengal Electricity Regulatory Commission, emphasized the importance of comprehensive resource planning at all stakeholder levels to ensure sustainable energy management. As a regulatory body, he highlighted the need for ongoing guidance and collaboration, suggesting a similar capacity-building program be conducted in Kolkata, ideally at the Commission office. He discussed the critical need for energy diversification, moving towards renewable sources like wind and hybrid options to reduce dependency on fossil fuels. With global energy demand projected to rise by 6% by 2036, he underscored the urgency of long-term planning—extending beyond immediate needs to a 10–15 year outlook. The planning should also consider the time-intensive nature of projects involving hydropower and solar energy.



Mr. Bandopadhyay noted the potential cost efficiencies of battery storage at distribution load centers, which could reduce the need for network expansions. Additionally, he cautioned that current transmission planning, such as the 220 kV networks, should anticipate future demands, thus requiring advanced planning. Regarding power purchase agreements, he called for a re-evaluation of the typical 3–5 year planning horizon, encouraging a longer-term approach to accommodate projected growth in data centers, AC loads, and industrial demands. This adjustment, he suggested, would better inform tariff and regulatory decisions.

In conclusion, he emphasized the value of interactive sessions like today's to stay abreast of national and international trends and reiterated his request for a similar workshop in Kolkata to support ongoing regulatory initiatives.

### **Mr. Manas Ranjan Mohanty, OSD (Engineering), Odisha Electricity Regulatory Commission**

Mr. Mohanty highlighted the regulator's commitment to delivering reliable and cost-effective power supply to consumers. He stressed the need for alignment and synchronization among various regulatory frameworks—such as Acts, rules, regulations, and policies—stating that central and state-level regulations should be harmonized for smoother implementation. For example, he pointed out the 2023 Grid Code and GNA (General Network Access), noting that ambiguity in state-level adaptation of GNA has delayed amendments to the Grid



Code in Odisha. He urged that national regulations be framed with states' requirements in mind, making them easily applicable and adaptable for stakeholders.

On resource adequacy, Mr. Mohanty shared that the Odisha Electricity Regulatory Commission has drafted its resource adequacy paper, which is open for stakeholder feedback and will be finalized soon. He further noted Odisha's progress in green energy promotion, driven by recent policies to add renewable sources. Tata, which has recently obtained a distribution license in Odisha, was commended for significantly reducing AT&C losses and improving overall operational efficiency.

Mr. Mohanty also highlighted advancements in the state's transmission utility. Transmission planning has been approved for the period from 2024-25 to 2028-29, with a directive for a minimum 10-year forward-looking plan. This, he noted, would ensure that transmission infrastructure supports resource adequacy objectives without hindrance.

In conclusion, Mr. Mohanty emphasized Odisha's dedication to sustainable energy development, efficient operations, and proactive regulatory planning to meet future energy needs effectively.

### **3. Session 2-Roundtable of State Electricity Regulatory Commission:**

#### **Shri Prashant Kumar, ESE, Bihar Renewable Energy Development Agency, Bihar**

Shri Prashant Kumar shared an update on Bihar's renewable energy efforts, specifically the installation of rooftop solar (RTS) systems on government buildings across the state. The initiative, which began in 2022, aims to cover approximately 16,000 government buildings with a total installed capacity of 138 MW. Bihar is prioritizing solar energy as the primary renewable resource, as wind energy potential in the state is minimal according to MNRE guidelines.



Shri Kumar highlighted several challenges in implementing these RTS projects, particularly around net metering. Issues include complex agreements between beneficiaries, implementing agencies, and DISCOMs, as well as coordination challenges in meter testing. To address these, he emphasized the need for capacity-building and awareness programs. He also called for clear protocols and standard operating procedures (SOPs) to facilitate smoother coordination among the four key stakeholders: BREDA, DISCOMs, beneficiaries, and implementing agencies. Consistent regulatory enforcement of these SOPs would support a streamlined and efficient RTS implementation process in Bihar.

He also mentioned that some practical difficulties that arose were blowing of fuse, breakdown of lines, non-cleaning of panels. Therefore, Standard Operating Procedures need to be made and informed to the consumers. Capacity Building should be done in these areas.

### Shri Nirmal Kanti Biswas, Dy. Addl. CE, West Bengal State Electricity Distribution Company Limited

Shri Nirmal Kanti Biswas provided an update on West Bengal's solar energy initiatives. The state currently operates a 10 MW ground-mounted solar plant and recently commissioned a 111.5 MW ground-mounted solar project in Midnapore district, with plans to add another 100 MW at the same location. Additionally, a floating solar power station is under the final stage of construction over the dam at the Purulia Pump Storage Project, which will soon add 10 MW to the state's solar capacity.



Shri Biswas highlighted key challenges, such as the rapid advancement of module and inverter technology, which can lead to installed systems becoming quickly outdated. This presents issues for maintenance and power generation, as outdated or damaged components become difficult to replace efficiently. Land availability for solar projects also remains a significant constraint in the state. Despite these challenges, West Bengal sees great potential in solar energy, including the opportunity to earn carbon credits

### Shri K. C. Nanda, GM (Regulatory Affairs & Strategy), TPWODL, Odisha

Shri K. C. Nanda discussed the status and challenges of renewable energy development in Eastern India, focusing on Odisha's progress under the PM Kusum and PM Surya Ghar schemes. These initiatives are designed to boost solar adoption, the PM Kusum scheme for farmers, by providing financial support for solar installations.



Under the PM Kusum scheme, component A enables individual farmer/farmer cooperatives, etc. to set up solar plants up to 2 MW, with power fed to the grid within a 5 km radius. However, low declared prices have posed challenges in attracting developers. In this component of the KUSUM Scheme, which is grid connected solar power plants, a feed-in tariff fixed by the State Electricity Regulatory Commission would be given. Presently, the price is Rs. 3.08 per unit, whereas an application has been filed, where farmers want a price of Rs. 4.40. In component B, standalone solar pumps have been installed, in which around 4,000 solar pumps have been installed in Odisha. Component C1 (Individual Pump Solarization) enables individual farmers to install solar plants up to twice the size of their pump capacity, though financing remains a barrier due to high upfront costs not fully covered by central and state incentives. The CFA (Central Financial Assistance) is 30%, SFA (State Financial Assistance) is 30%, and the individual farmer has



to bear 40%. Also, the 30% CFA and SFA is on the benchmark price or bid discovered price, whichever is lower, whereas the price discovered is actually higher than the benchmark price, because of the supporting structure. For these plants, Odisha has implemented a gross metering arrangement, enabling farmers to earn Rs. 3.60 per unit generated, offsetting their consumption costs, which is @Rs. 1,50 per unit, thus providing additional income. Also, the interest on loan taken by the farmer and the AMC (Annual Maintenance Contract) charge will be considered in the ARR (Annual Revenue Requirement) of the Distribution Company.

Additionally, Odisha is exploring community solar models, such as shared solar plants outside village boundaries, to serve people without sufficient rooftop space or financial means to install individual systems. Shri Nanda proposed that these community plants, funded by a combination of central, state, and distribution company support, could provide free or low-cost electricity to rural populations.

Odisha's regulatory model aims to reduce barriers for farmers and low-income households, demonstrating a scalable approach to renewable energy integration with government and regulatory support.

He also mentioned that 330 MW of large scale solar PV of 5 to 50 MW has been added in Odisha in the last 3-4 years. The only thing that is to be done for solar panels is that they have to be cleaned with water, to see that it is generating properly.

## **Session on Resource Adequacy**

### **Ms. Ammi Ruhama Toppo, Chief Engineer, CEA**

Ms. Ammi Toppo delivered an insightful presentation on resource adequacy and the regulations surrounding it. She began by outlining the key roles and responsibilities assigned at various levels in the energy sector, including distribution utilities and central organizations such as CEA and the National Load Dispatch Centre (NLDC). Emphasizing the importance of accurate load forecasting, she introduced a case study on Bihar's resource adequacy plan to illustrate this point.



Ms. Toppo explained the policy framework as mandated by the Ministry of Power under the National Electricity Amendment Rule 2022, which stipulates that resource adequacy guidelines must be developed by the Ministry of Power in consultation with CEA. Similarly, Distribution licensees are required to align their resource adequacy plans with state commission regulations and secure necessary approvals. The operational planning responsibilities are divided between the NLDC, which oversees national planning, and State Load Dispatch Centres, which handle state-level planning.



Central to her presentation was the role of the CEA in publishing long-term national resource adequacy plans (LTN WP), including essential planning reserve margins (PRM) and reliability indices like energy not served and loss of load probability. The CEA also calculates each state's contribution to national peak demands and assesses the capacity credit for various power-generating technologies. Ms. Toppo noted the complexities involved in evaluating capacity credit for renewable and non-dispatchable sources compared to conventional plants.

She elaborated on the responsibilities of distribution utilities, which include preparing comprehensive long-term resource adequacy plans, factoring in demand forecasts, and ensuring power reliability through a mix of long-term, medium-term, and short-term contracts. This strategic mix is crucial to managing market uncertainties and meeting peak demands effectively. The presentation underscored the need for meticulous demand forecasting, identifying crucial inputs such as forecasted peak and energy demands, solar and wind generation profiles, as well as technical and financial parameters. Ms. Toppo stressed the significance of considering emerging technologies, like electric vehicles, which can alter demand patterns significantly.

Furthermore, she discussed the importance of reliability evaluation, employing techniques like Monte Carlo or stochastic simulations to account for uncertainties in demand and energy generation. These assessments help in determining the potential variability in supply and demand, ensuring plans can meet specified reliability criteria.

The case study of Bihar was a focal point of the presentation, illustrating the state's demand patterns, energy consumption distribution, and future planning needs. She stated that they had done a resource adequacy study of Bihar. The total contracted capacity of Bihar, as in January 2024 was 9000 MW, out of which the thermal capacity was 72%, and RE is 27%, consisting of solar and hydro power. It was observed that the peak demand comes for only a few hours in a month. So, for meeting the peak demand, Bihar should not go for long term contracts, but medium or short term contracts. The analytical model for the studies shows that the peak demand for Bihar comes in the months of June to August, which is also the peak wind generation season. Also, during the day, Bihar's peak comes in the evening, whereas the peak wind generation also comes during the evening. Therefore, the model has recommended tying up wind generation contracts, which can be sourced from other wind rich States, since Bihar does not have wind potential within the State. The model showed how much additional capacity Bihar has to tie up yearwise. By analyzing existing and projected capacities, including adherence to Renewable Purchase Obligations (RPO), the study highlighted the necessity of securing new wind and solar contracts that align with Bihar's demand profile.

Ms. Toppo concluded by emphasizing the ongoing need for preparation and adaptability in resource planning, given the variabilities in gestation periods and policy changes. She reinforced the importance of maintaining adequate capacity planning margins to meet both local and national demands, ensuring a reliable energy supply network. Her comprehensive overview provided valuable insights into the complex landscape of resource adequacy and the critical roles various stakeholders play in maintaining energy reliability and efficiency

**Presentation on Grid balancing, Grid stability due to intermittent generation. Ancillary Services Regulations – Mr. Alok Pratap Singh, Chief Manager, ERLDC Grid Controller of India**

Mr. Alok Pratap Singh, presented the challenges of integrating renewable energy (RE) into India's power grid, particularly in light of the country's ambitious target to achieve over 500 GW of non fossil-fuel capacity by 2030. He emphasized the significant renewable generation capacity located in the northern, western, and southern regions, so the eastern region may not be able to understand the challenges of renewable integration. To facilitate the smooth integration of RE, policymakers are implementing various laws and regulations, especially as India's energy transition roadmap forecasts that non-fossil fuel-based generation will reach 500 GW, with wind and solar contributing approximately 400 GW.



Mr. Singh highlighted the impressive achievements of states like Karnataka and Tamil Nadu, where Karnataka met 132% of its demand through instantaneous RE generation and Tamil Nadu fulfilled 77% of its needs with renewable sources. He presented frequency profiles from 2004-05 to 2022-23, noting initial fluctuations, stabilization post-2015, and increased volatility due to rapid RE integration, exacerbated by the lack of inertia from inverter-based resources. This situation leads to severe frequency dips during generation losses and contributes to grid imbalances, particularly when constant demand coincides with declining generation due to daily solar variability.

The presentation delved into the three types of ancillary services necessary for frequency control: primary, secondary (Automatic Generation Control or AGC), and tertiary. Primary control, which is automatic and mandatory, involves governors in generators, while the AGC adjusts set points over longer periods of about 15 to 30 minutes, based on area control error calculations. Mr. Singh highlighted the complications in power flows and the necessity for improved forecasting and planning to avoid congestion, given that reverse flows can occur during peak solar generation hours. He also addressed voltage variation issues at RE(Renewable Energy) pooling stations, which arise from the lack of inertia and synchronous support from inverter-based RE generators, which may cause voltage instability in the grid.

Moreover, Mr. Singh discussed compliance with Low Voltage Ride Through (LVRT) and High Voltage Ride Through (HVRT) standards, outlining how many plants currently fail to adhere to these requirements, thus increasing stability risks. He emphasized the critical need for effective policies, regulations, and adherence to standards to manage the challenges of renewable energy integration. Mr. Singh encouraged collaboration among stakeholders to explore solutions that ensure grid stability amid the transition to a greater share of renewable energy, stressing that successful implementation of ancillary services is vital for maintaining the reliability of the power grid.

### **Session on Tackling intermittency, Long duration storage, Flexibilizing thermal power plants**

#### **Presentation on Closed Loop Pumped Hydro Storage - Mr. Shravan Kumar, Chief Engineers, CEA**

Mr. Shravan Kumar, Chief Engineer of the Central Electricity Authority (CEA), presented an in-depth analysis on the need for pumped storage projects (PSP), focusing on the concept of off-stream closed-loop PSPs. His presentation covered several aspects, including the current power scenario, projected needs by 2032, advantages of PSP over battery storage, and the types of PSP available. He emphasized the necessity for PSP in managing the integration of renewable energy sources (RE) and addressing energy storage requirements as per the National Electricity Plan (NEP). Currently, India's power capacity stands at 453 GW, with a peak demand of 250 GW, achieved in May 2024. Looking forward to 2032, the country aims to increase its RE capacity share to 64%, reducing thermal power to 34%, and adding 900 GW in capacity.



Mr. Kumar highlighted key benefits of PSP compared to batteries, particularly the longer lifespan of PSP infrastructure (up to 100 years), with replacement of the electromechanical equipment, low resource dependency, and reduced environmental hazards. However, he noted that PSPs have high initial costs, long gestation periods, and complex clearance requirements, which present challenges for rapid deployment.

Different types of PSPs were discussed, including conventional, off-stream, closed-loop, and open-loop systems. Off-stream PSPs, where reservoirs are not located on natural water streams, present fewer environmental complications and are gaining traction due to faster execution potential. The presentation showcased the current PSP status in India, with 8 operational projects totaling 4.7 GW, and several under construction or in various stages of investigation. Mr. Kumar noted that while India has significant PSP potential (around 181 GW across 161 sites), off-stream sites hold promise for accelerated development.

He outlined multiple initiatives by the Government of India to facilitate PSP development, including streamlined clearance processes, reduced timelines for project approval, single-window clearance cells, and online systems for submission and monitoring of Detailed Project Reports (DPRs). The government has also issued guidelines promoting private sector participation, project performance guarantees, and financial support mechanisms. Regulatory initiatives such as energy storage obligations and provisions for ancillary services monetization are underway to enhance PSP viability.

Mr. Kumar further explained the detailed clearance and approval process for PSPs, which closely resembles that for hydro projects. He highlighted recent simplifications in environmental and forest clearance processes, designed to reduce administrative burdens and expedite project initiation. The Session concluded with a call for continued collaboration among stakeholders to achieve India's ambitious PSP targets and secure energy reliability for the future.

### **Presentation on Flexibilizing thermal power plants – Mr. Narender Singh, Chief Engineer, CEA**

Mr. Narender Singh highlighted the critical need for enhancing flexibility in thermal power plants to adapt to the evolving energy landscape, especially as renewable energy (RE) sources are increasingly integrated into the grid. He emphasized the urgency of addressing climate change, citing global warming impacts, such as heat waves in India, rising ocean temperatures, and extreme weather events. He argued that energy production, particularly CO<sub>2</sub> emissions from power generation, is central to climate concerns, necessitating shifts toward more sustainable energy practices.



India has committed to several climate goals, including reducing emission intensity, increasing forest cover, achieving 50% electric capacity from renewables by 2030, and reaching Net Zero by 2070. Mr. Singh noted that while the first three goals are achievable, Net Zero poses a significant challenge for India's developing economy, requiring early and substantial efforts to reduce CO<sub>2</sub> emissions.

He discussed the integration of renewables into the power grid, a process complicated by the variable and intermittent nature of solar and wind energy. He highlighted the need for flexible power generation to balance demand across different times of day, pointing out that thermal plants currently meet over 70% of India's energy needs. Since other flexible sources, such as hydropower, gas, and pumped storage, are limited in capacity, thermal plants offer the greatest potential for flexibility.

Mr. Singh outlined the flexibility requirements for thermal plants, including minimum load levels, faster start-up times, and enhanced ramp rates to match renewable generation patterns. To achieve this, plants need upgrades, particularly in control systems and maintenance practices. For some plants,

flexibility can be achieved with minimal investment by re-evaluating operations and maintenance. However, lowering minimum load to 40% would require more substantial capital investments to ensure safety and mitigate wear due to flexible operation.

Presently, the minimum technical load mandated by the Central Regulator, the CERC, is 55%. A phased plan was introduced for achieving 40% minimum technical load in the Eastern region, with different timelines and phases for plant upgrades. Mr. Singh urged all utilities to follow the phasing plan, stressing that the power sector has a responsibility to support India's climate goals by facilitating renewable integration. He concluded by emphasizing the sector's role in creating a sustainable future for upcoming generations.

With this, the first day of the Workshop concluded, with the various Sessions followed by Q&A for each Session.



## Day-2, Friday, 18<sup>th</sup> October 2024

Day 2 started with recapitulation of the first day Proceedings, where **Mr. Pankaj Batra**, Senior Advisor, IRADe, explained the salient points of the previous day's proceedings, and went on to give a preview of the second day's program

### **Presentation on New Grid Code 2023 -Mr. Alok Pratap Singh, Chief Manager, ERLDC Grid Controller of India**

Mr. Alok Pratap Singh provided a comprehensive overview of its objectives and scope, emphasizing its critical role in modernizing and streamlining grid operations to meet evolving energy demands during the presentation on the New Grid Code 2023. He outlined the key chapters of the code, starting with the Resource Planning Code, which focuses on ensuring resource adequacy for both short-term and long-term planning, addressing challenges like demand-supply mismatch and fostering investments. He then discussed the Connection Code, which sets standardized protocols for integrating new power system elements, ensuring seamless grid connectivity.



The Protection Code was highlighted for its role in establishing robust mechanisms to isolate faulty equipment, coordinate system-wide protection protocols, and implement regular audits for system reliability. Moving to the Commissioning and Commercial Operation Code, Mr. Singh elaborated on the procedures for trial operations, declaration of commercial operation dates (COD), and testing requirements for new generating units.

The Operating Code introduced standards for maintaining grid stability through adequate reserves, inertia requirements, and frequency response mechanisms. In the Scheduling and Dispatch Code, he addressed critical aspects of resource allocation and real-time grid operations, including Security Constrained Unit Commitment (SCUC) for optimal generation scheduling.

Cybersecurity was another pivotal topic, with the Cyber Security Code detailing guidelines to safeguard the grid against potential cyber threats, ensuring compliance across all stakeholders in the power sector. Finally, the Monitoring and Compliance Code was presented as a framework to enforce accountability through self-audits, performance monitoring, and regulatory oversight, ensuring adherence to the new grid standards.

Mr. Singh's presentation underscored the New Grid Code 2023 as a forward-looking framework that not only codifies best practices but also prepares India's grid for future challenges, supporting a reliable, resilient, and sustainable energy ecosystem.

## **Presentation on Grid operation – Mr. Alok Pratap Singh, Chief Manager, ERLDC, , Grid Controller of India**

Mr. Alok Pratap Singh delivered an insightful presentation on grid operations, emphasizing key aspects essential for maintaining stability and efficiency in power systems. He began by discussing frequency and voltage control, highlighting the critical role of these parameters in ensuring grid reliability. Mr. Singh elaborated on strategies to mitigate issues like Fault-Induced Delayed Voltage Recovery (FIDVR), caused primarily by the stalling of single-phase induction motors during voltage dips, which pose significant challenges in urban load centers.

He then addressed transmission capacity and transfer capability, including Total Transfer Capability (TTC), Available Transfer Capability (ATC), and Transmission Reliability Margin (TRM). These metrics are crucial for assessing and optimizing the power transfer across interconnected networks, considering constraints such as thermal limits, voltage stability, and credible contingencies. He also explained the methodology for determining transfer capabilities, as outlined in the current regulatory provisions, and the need for regular assessments and updates to adapt to evolving grid conditions.

The presentation further explored transmission congestion, outlining its impact on operational efficiency and reliability. Mr. Singh discussed approaches to alleviate congestion through network adjustments, outage management, and real-time monitoring. Lastly, he covered angular stability, emphasizing its importance as a grid monitoring tool. Angular separation monitoring provides valuable insights into power flow patterns and helps ensure system integrity during disturbances, preventing cascading failures.

Mr. Singh concluded with recommendations for long-term and short-term planning to enhance grid stability, such as implementing special protection schemes (SPS) and under-voltage load-shedding mechanisms. His presentation provided a detailed roadmap for addressing operational challenges and reinforcing the resilience of India's power grid.

## **Presentation on Connectivity Regulations and General Network Access, Mr. Rajesh Kumar, Chief General Manager, Central Transmission Utility of India Limited**

The presentation by Mr. Rajesh Kumar covered several key topics on Connectivity Regulations and General Network Access. The session began with an explanation of Connectivity, focusing on the criteria for granting connectivity to the Inter-State Transmission System (ISTS). Entities such as generating stations (including renewable energy systems), energy storage systems (ESS), and bulk consumers (with 50 MW capacity



and above) are eligible. The procedure includes detailed steps for application, interconnection studies, and compliance with technical standards.

The presentation highlighted the Long-Term Access (LTA), Medium-Term Access (MTOA), and Short-Term Open Access (STOA) products under the existing transmission framework. LTA involves long-duration contracts requiring ISTS augmentation, MTOA uses margins in existing systems, while STOA leverages surplus capacity for short-term needs. These products prioritize grid discipline and enable power transfer flexibility.

A significant focus was given to the General Network Access (GNA) regulations introduced in 2022. GNA allows flexibility for power transfer from any point to any point on the ISTS network, moving beyond the rigid point-to-point access model. The eligibility covers state utilities, distribution licensees, bulk consumers, and traders engaged in cross-border electricity trade. Deemed GNA was also discussed, where existing LTA capacities were transitioned seamlessly into GNA, ensuring continuity.

The session elaborated on the provisions of GNA, such as enabling energy storage systems, dual connectivity, transfer of connectivity rights, and auxiliary power drawal. GNA applications involve system studies, rigorous approval processes, and obligations like payment of transmission charges. Additionally, timelines for granting GNA and relinquishment conditions were explained to ensure network reliability and cost accountability.

The presentation outlined the evolution of transmission regulations, the shift to GNA for enhanced flexibility, and the streamlined procedures for ensuring efficient and equitable access to the transmission network, thus supporting India's evolving power sector needs.

### **Presentation on Functioning of Power Exchange: Mr Ravi Seth (Vice President-Business Development NR & ER), IEX**

Mr. Ravi Seth presentation covered key concepts and features of the power market, particularly focusing on the operations of Power Exchanges in India. It began with an overview of Types of Markets in the Power Exchange, such as Day-Ahead Market (DAM), Real-Time Market (RTM), Term-Ahead Market (TAM), as well as long-duration contracts outside the exchange, highlighting their roles in demand-supply balancing and short-term power trading. He then delved into the Bid Matching Mechanism, which uses closed double-sided auctions and continuous matching processes to ensure fair price discovery and efficient trade execution.



The presentation also discussed Prudential Norms for the Establishment of Power Exchanges, which set financial and operational criteria to ensure the integrity and sustainability of exchanges. It introduced the Settlement Guarantee Fund (SGF), a crucial financial safeguard that guarantees the timely settlement of trades, mitigating default risks.

The Management of Power Exchange focused on governance and regulatory oversight, ensuring compliance with Central Electricity Regulatory Commission (CERC) guidelines. This was complemented by the Risk Management by Power Exchange, which includes measures for price volatility control, settlement assurance, and financial prudence to minimize trading risks.

Further, the presentation explained the Point of Connection (POC) Mechanism for Sharing Transmission Charges and Losses, which allocates transmission costs fairly based on power flow. It also covered Open Access Charges, enabling buyers to access transmission networks while bearing relevant costs, fostering competition in power procurement.

The Presentation also explained Deviation Settlement Mechanism (DSM), which ensured grid discipline by penalizing deviations from scheduled power, maintaining grid stability and efficiency. These interconnected topics provided a comprehensive understanding of the power market's structure, operational mechanisms, and risk management frameworks.

**Ms. Rishika Sharan, Chief Electrical Inspector, Govt of India & Chief Engineer, CEA**

The presentation by Ms. Rishika Sharan, addressed the alarming frequency of electrical accidents in India, which average between 12,000-14,000 annually, resulting in over 5,000 fatalities. The presentation emphasised the critical need for stringent safety practices across various sectors, including hospitals, malls, residential buildings, and industrial sites. It outlined the provisions of the Central Electricity



Authority (CEA) Safety and Electric Supply Regulations, 2023, highlighting the roles and responsibilities of electrical safety officers and inspectors. Key aspects included mandatory training for engineers, periodic inspections, and adherence to updated safety standards. The presentation also highlighted new safety measures, such as requirements for earthing, fire retardant cables, and protective equipment, aimed at preventing accidents and fires. Additionally, it discussed the implementation of awareness programs, safety regulations for renewable energy installations, and the recognition of the efforts of linemen through initiatives like "Lineman Diwas". The overarching goal was to enhance electrical safety and minimise accidents through comprehensive regulations and proactive safety practices.



**Presentation on CEA Communication Regulations: Ms. Priyam Srivastava, Deputy Director, CEA**

The presentation by Ms. Priyam Shrivastav focused on the Central Electricity Authority (CEA) regulations for technical standards in communication systems used in power system operations, published in 2020. These regulations aim to ensure reliable, secure, and efficient data exchange critical for the smooth functioning of the power grid. Key areas covered include requirements for design, planning, and cyber security, alongside the centralised monitoring and functional requirements of wideband communication networks, PLCC, cellular, VSAT, and RF communication. The presentation emphasised the need for interoperability, redundancy, and stringent performance metrics, such as low latency and quick switchover times, to maintain high reliability. Detailed technical specifications and standards for various communication interfaces, as well as the roles and responsibilities of system users, planners, and operators, were also discussed. The ultimate objective was to facilitate a stable, reliable, and secure operation, monitoring, and protection of the power grid, with a strong focus on maintaining high standards and adopting new technologies where necessary.





### Annexure I: Agenda

<b>Day 1 – Thursday, 17<sup>th</sup> October 2024, Kautilya Hall, Hotel Maurya , Patna (Bihar)</b>	
<b>10.00-10.30 Hrs</b>	<b>Registration</b>
<b>10.30 -11.40 Hrs.</b>	<b>Inaugural Session</b>
10.30 -10.35 Hrs.	Welcome Address by <b>Dr. Jyoti Parikh</b> , Executive Director, IRADe
10.35 – 10.40 Hrs.	Context Setting by <b>Shri Pankaj Batra</b> , Senior Advisor, IRADe & Ex Chairperson, CEA
10.40 – 10.45 Hrs.	Introductory Remarks by <b>Dr. Kirit Parikh</b> , Chairman, IRADe & Former member, Planning Commission
10.45 - 10.55 Hrs	Special Remarks by Guest of Honour, <b>Shri Mahendra Kumar</b> , (IAS), Managing Director, Bihar State Power Generation Company Ltd. & MD SBPDCL, Govt. of Bihar
10.55 - 11.05 Hrs.	Special Remarks by Guest of Honour, <b>Shri Amir Subhani</b> IAS (Retd.), Chairperson, Bihar State Electricity Regulatory Commission, Govt. of Bihar
11.05 – 11.15 Hrs	Special Remarks by Guest of Honour, <b>Shri Pankaj Kumar Pal</b> (IAS), Secretary, Energy Department, Government of Bihar
11.15 - 11.25 Hrs.	Inaugural Address by Chief Guest, <b>Shri. Ghanshyam Prasad</b> , Chairperson, CEA/Member CEA,
11.25 -11.30 Hrs.	Vote of thanks by <b>Dr. Navpreet Saini</b> , Senior Research Analyst, IRADe
<b>11.30-12.00 Hrs.</b>	<b>Group Photograph &amp; Tea</b>
<b>12.00-12.30 Hrs.</b>	<b>Presentation on Outline of Laws, Rules, Guidelines, Regulations of the Government of India/CERC – Shri Pankaj Batra</b> , Senior Advisor, IRADe & Ex-Chairperson, CEA
<b>12.30-13.00 Hrs.</b>	<b>Roundtable of Secretaries on Capacity Building Requirements for Eastern Region’s State</b> <b>Shri Pankaj Kumar Pal</b> (IAS), Secretary, Energy Department, Government of Bihar <b>Shri Avinash Kumar</b> (IAS), Additional Chief Secretary -Department of Energy, Government of Jharkhand <b>Shri Hemant Sharma</b> (IAS), Principal Secretary, Energy Department, Government of Odisha <b>Shri Shantanu Basu</b> (IAS), Secretary Department of Power, Government of West Bengal <b>Shri T.T. Lepcha</b> (IAS), PCE-cum-Secretary (Power), Government of Sikkim <b>Ms. Ranjana Deswal</b> , (IAS), Secretary Power Department, U.T Administration, A. & N. Islands
<b>13.00 -13.30 Hrs.</b>	<b>Roundtable of Regulators on Capacity Building Requirements For Eastern Region’s State</b> <b>Shri Arun Kumar Sinha</b> , Member(Technical), Bihar State Electricity Regulatory Commission <b>Shri Atul Kumar</b> , Member (Technical), Jharkhand State Electricity Regulatory Commission <b>Shri Gajendra Mohapatra</b> , Member/Officiating Chairperson, Odisha Electricity Regulatory Commission <b>Dr. M.V. Rao</b> , Chairperson, West Bengal Electricity Regulatory Commission <b>Mr. K.B. Kunwar</b> , Chairperson, Sikkim State Electricity Regulatory Commission
<b>13.30 -14.00 Hrs.</b>	<b>Roundtable of Renewable Energy Development Agencies on Capacity Building Requirements for Eastern Region’s State</b> <b>Shri K. K. Verma</b> , Director, Jharkhand Renewable Energy Development Agency <b>Shri Saidutta Biplab Keshari Pradhan</b> (IAS), Additional Secretary, Energy Department, Govt. of Odisha & Chief Executive, Odisha Renewable Energy Development Agency <b>Shri Barun Kumar Ray</b> (IAS), Additional Chief Secretary, Non-Conventional &Renewable Energy Sources Department, West Bengal
<b>14.00 -14.30 Hrs.</b>	<b>Lunch Break &amp; Networking</b>
<b>14.30 -15.30 Hrs.</b>	<b>Resource Adequacy and laws/Guidelines /Regulations related thereto –</b> <b>Ms Ammi Ruhama Toppo</b> , Chief Engineer (IRP), CEA <ul style="list-style-type: none"> <li>➤ Demand Forecasting</li> <li>➤ Power Generation Resource Planning</li> <li>➤ Renewable Generation/Energy Storage Planning</li> <li>➤ Power Trading/Power Exchange in India</li> <li>➤ Q&amp;A</li> </ul>

15.30 -16.30 Hrs.	<b>Grid balancing, Grid stability due to intermittent generation. Ancillary Services Regulations</b> – <b>Mr. Alok Pratap Singh</b> , Chief Manager, ERLDC Grid Controller of India ➤ Issues relating to tackling intermittency of variable renewable generation ➤ Grid stability, frequency control, voltage control ➤ Demand Response ➤ Ancillary Services Regulations ➤ Q&A
16.30-17.00 Hrs.	<b>Tea</b>
17.00-18.00 Hrs.	<b>Tackling intermittency, Long duration storage incentive for hydro power plants Flexibilizing thermal power plants</b> – ➤ Closed Loop Pumped Hydro Storage - <b>Mr. Shravan Kumar</b> , Chief Engineers, CEA ➤ Flexibilizing thermal power plants – <b>Mr. Narender Singh</b> , Chief Engineer, CEA Q&A
<b>Day 2 – Friday, 18<sup>th</sup> October 2024, Kautilya Hall, Hotel Maurya , Patna (Bihar)</b>	
10.00 -10.15 Hrs.	<b>Recapitulation and introduction to the forthcoming Sessions – Shri Pankaj Batra</b> , Senior Advisor, IRADe & Ex-Chairperson, CEA
10.15-11.15 Hrs.	<b>New Grid Code 2023 – Mr. Alok Pratap Singh</b> , Chief Manager, ERLDC Grid Controller of India ➤ Objective & Scope ➤ Resource Planning Code ➤ Connection Code ➤ Protection Code ➤ Commissioning and Commercial Operation Code ➤ Operating Code ➤ Scheduling and Dispatch Code ➤ Cyber Security ➤ Monitoring and Compliance Code ➤ Miscellaneous ➤ Q&A
11.15-11.30 Hrs.	<b>Tea</b>
11.30-12.30 Hrs.	<b>Grid operation – Mr. Alok Pratap Singh</b> , Chief Manager, ERLDC, , Grid Controller of India ➤ Frequency and voltage control ➤ Transmission Capacity and Transfer Capability, TTC. ATC and RM ➤ Transmission Congestion ➤ Angular Stability ➤ Q&A
12.30-13:30 Hrs.	<b>Connectivity Regulations and General Network Access</b> <b>Mr. Rajesh Kumar</b> , Chief General Manager, Central Transmission Utility of India Limited ➤ Connectivity ➤ Long Term Access, Medium Term Access, Short Term Open Access ➤ Provision of General Network Access ➤ Q&A
13.30-14:30 Hrs.	<b>Lunch Break &amp; Networking</b>
14:30-15.30 Hrs.	<b>Functioning of Power Exchange:</b> <b>Mr Ravi Seth</b> (Vice President – Business Development NR & ER), IEX ➤ Types of markets in the Power Exchange, and their features ➤ Bid Matching mechanism ➤ Prudential Norms for establishment of Power Exchange ➤ Settlement Guarantee Fund (SGF) ➤ Management of Power Exchange ➤ Risk Management by Power Exchange ➤ POC mechanism of sharing of transmission charges & losses ➤ Open Access charges ➤ Deviation Settlement Mechanism ➤ Q&A
15.30-16.30 Hrs.	➤ <b>CEA Measures Relating to Safety and Electric Supply Regulations</b> <b>Smt. Rishika Sharan</b> , Chief Engineer, CEA <b>CEA Communication Regulations – Ms. Priyam Srivastava</b> , Deputy Director, CEA
16.30-17.00 Hrs.	<b>Closing remarks &amp; Vote of thanks</b> <b>Shri Pankaj Batra</b> , Senior Advisor, IRADe & Ex-Chairperson, CEA
17.00 Hrs.	<b>Tea</b>

## About Central Electricity Authority of India (CEA)

The Central Electricity Authority of India advises the government on policy matters and formulates plans for the development of electricity systems. It is a statutory organization constituted under section 3 of Electricity Supply Act 1948, which has been superseded by section 70 of the Electricity Act 2003.

CEA vision to ensure reliable 24×7 power supply of adequate quality to all consumers in the country.

Central Electricity Authority seeks to achieve the vision by performing its statutory function by providing technical support base to all stakeholders in the power sector, to support Ministry of Power for forming policies in the power sector, to make technical standards & regulations, to carry out project monitoring, to disseminate power sector information, to upgrade skills of human resources in the power sector of the country.

### Central Electricity Authority of India (CEA)

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## About Integrated Research and Action for Development (IRADe)

Integrated Research and Action for Development (IRADe) is an independent advanced research institute which aims to conduct research and policy analysis to engage stakeholders such as government, non-governmental organizations, corporations, academic and financial institutions. Energy, climate change, urban development, poverty, gender equity, agriculture and food security are some of the challenges faced in the 21st century. Therefore, IRADe research covers these, as well as policies that affect them.

IRADe's focus is effective action through multi-disciplinary and multi-stakeholder research to arrive at implementable solutions for sustainable development and policy research that accounts for the effective governance of techno-economic and socio-cultural issues. Being Asia Center for Sustainable Development, we have been carrying out policy research and its implementation for enabling socio-economic growth and charting pathways for sustainable development in South-Asia.

IRADe was established under the Society's Act, in 2002 at New Delhi. It is certified as a Research and Development Organization by the Department of Scientific and Industrial Research (DSIR), Ministry of Science and Technology (MoST). It has also been selected as a Center of Excellence by the Ministry of Urban Development (MoUD) for urban development and climate change. In addition, it provides expertise to other ministries, national and international institutions and partners with other reputed organizations.

### Integrated Research and Action for Development (IRADe)

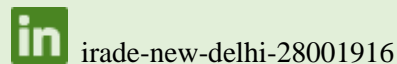
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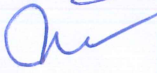

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**Eastern Regional Capacity Building Workshop for State Stakeholders on Resilient, inclusive, and environmentally sustainable power sector (Including Laws, Rules, Guidelines, Regulations related thereto)**

Date: October 17th and 18th, 2024 Venue: Hotel Maurya, Patna, Bihar

S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 17 <sup>TH</sup> October	Signature DAY 2 18 <sup>TH</sup> October
1	Shri Ghanshyam Prasad	Chairperson	CEA, Govt of India				
2	Shri Shri Pankaj Kumar Pal (IAS),	Secretary,	Energy Department, Government of Bihar				
3	Shri Mahendra Kumar, (IAS)	Managing Director,	Bihar State Power Generation Company Ltd. & MD SBPDCL, Govt. of Bihar				
4	Shri Amir Subhani IAS (Retd.),	Chairperson	Bihar State Electricity Regulatory Commission, Govt. of Bihar				
5	Shri Avinash Kumar (IAS)	Additional Chief Secretary	Department of Energy, Government of Jharkhand				
6	Shri Hemant Sharma (IAS)	Principal Secretary,	Energy Department, Government of Odisha				
7	Shri Shantanu Basu (IAS)	Secretary	Department of Power, Government of West Bengal				
8	Shri T.T. Lepcha (IAS)	PCE-cum-Secretary (Power),	Department of Power Government of Sikkim				
9	Ms. Ranjana Deswal, (IAS)	Secretary Power Department,	U.T Administration, A. & N. Islands				
10	Shri K. K. Verma,	Director,	Jharkhand Renewable Energy Development Agency				
11	Shri Saidutta Biplab Keshari Pradhan (IAS)	Additional Secretary,	Energy Department, Govt. of Odisha				



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12	Shri Barun Kumar Ray (IAS)	Additional Chief Secretary	Non-Conventional & Renewable Energy Sources Department, West Bengal				
13	Shri Arun Kumar Sinha	Member (Technical),	Bihar State Electricity Regulatory Commission	members@bserc	9955055886		
14	Shri Atul Kumar,	Member (Technical)	Jharkhand State Electricity Regulatory Commission	@bihar.nic.in			
15	Shri Gajendra Mohapatra,	Member/Officiating Chairperson,	Odisha Electricity Regulatory Commission				
16	Dr. M.V. Rao,	Chairperson,	West Bengal Electricity Regulatory Commission				
17	Mr. K.B. Kunwar,	Chairperson,	Sikkim State Electricity Regulatory Commission				
18	Dr. Kirit Parikh	Chairman	IRADe				
19	Dr. Jyoti Parikh	Executive Director	IRADe	jparikh@iradi.org			
20	Mr. Pankaj Batra	Senior Advisor	IRADe, Ex Chairperson CEA				
21	Ms Ammi Ruhama Toppo	Chief Engineer (IRP)	CEA				
22	Mr. Mr. Alok Pratap Singh,	Chief Engineer	ERLDC, Grid Controller of India				
23	Mr. Shravan Kumar	Chief Engineer	CEA	shravan@nic.in	9968140405		
24	Mr. Narender Singh	Chief Engineer	CEA	narender.singh@gnrc.in	9650947799		



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S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 17 <sup>TH</sup> October	Signature DAY 2 18 <sup>TH</sup> October
25	Mr. Rajesh Kumar	Chief General Manager	Central Transmission Utility of India Limited	rajesh.kumar@powergrid.in	9811397471		
26	Mr. Mr Ravi Seth	Vice President Business Development NR & ER	IEX		99530 87440	Ravi	Ra
27	Smt. Rishika Sharan	Chief Engineer	CEA				
28	Ms. Priyam Srivastava	Deputy Director	CEA		9717650473		
29	Mr. Mohit Kumar Gupta	Sr. Project Analyst	IRADe				
30	Dr. Navpreet Saini	Sr. Research Analyst	IRADe				
31							
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1	Abdesh Kumar Singh	Director, Operations	Bihar State Power Holding Company Limited	als.lapune@gmail.com	9264922770		
2	Aditya Kashyap	PwC Consultant	Bihar State Power Holding Company Limited	adhye.kashyap@pwc.co	7670277822		
3	Arun Kr. Chaudhary	Chief Engineer, SLDC	Bihar State Power Holding Company Limited	so.dept@bspcl.bihar.gov.in			
4	Arun Kumar Sinha	Member (Technical)	Bihar Electricity Regulatory Commission				
5	Arvind Kumar	GM Revenue	South Bihar Power Distribution Company Limited	gm.arvind72@gmail.com	7763813977		
6	Ashok Kumar	Consultant	Bihar State Power Holding Company Ltd				
7	Atul Singh	PwC Consultant	Bihar State Power Holding Company Limited	atul.singh@pwc.co	975287242		
8	Avinash Kumar	Joint Director (Distribution)	Bihar Electricity Regulatory Commission		9794176767		
9	Deepak Kumar	Chief Engineer, Commercial	North Bihar Power Distribution Company Limited	deepak.kumar@nbpdc.com	9254437179		
10	Deepak Kumar	Deputy Director (Distribution)	Bihar Electricity Regulatory Commission	deepak.kumar@bereg.com	7461875707		
11	Dipak Kumar	Director, Project	South Bihar Power Distribution Company Limited	debi@sbpowergrid.com			
12	I. C. Yadav	Director, Project	North Bihar Power Distribution Company Limited	ishwar.choudhary@nbpdc.com	7776381507		
13	Jayant Dubey	ESE, Commercial	North Bihar Power Distribution Company Limited	dubey.jayant@gmail.com	7320920541		
14	Jayjit Ray	GM Revenue	North Bihar Power Distribution Company Limited		776381507		



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19	Nadeem Ahmad	ESE, PMC	Bihar State Power Holding Company Limited	nadeem786@gmail.com	7763814046	Nadeem	Nadeem
20	Nitish Chandra	Senior Manager (Revenue),	Bihar State Power Holding Company Ltd.	90cmdcel@gmail.com	7671574509	Nitish	Nitish
21	Parshuram Singh Yadav	Hon'ble Member (Legal)	Bihar Electricity Regulatory Commission		9431089998	Parshuram	Parshuram
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25	Ravi Shankar Prasad	ESE, STU	Bihar State Power Holding Company Ltd	eechappal@gmail.com	7091027887	Ravi	Ravi
26	S K P Singh	Consultant	Bihar State Power Holding Company Ltd	sudhakar@gmail.com	94316-22034	SKP	SKP
27	Sunil Agrawal	Director, Project	Bihar State Power Holding Company Limited			Sunil	Sunil
28	Vijay Kumar	Director, Operations	South Bihar Power Distribution Company Limited		7763814627	Vijay	Vijay



Eastern Regional Capacity Building Workshop for State Stakeholders on Resilient, inclusive, and environmentally sustainable power sector (Including Laws, Rules, Guidelines, Regulations related thereto)

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S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 17 <sup>TH</sup> October	Signature DAY 2 18 <sup>TH</sup> October
42	Prashant kw	EEE BRED A	BREDA	prashant66888@gmail.com	7566982513		
43	Srimalya Ghosal	AM	Gnid-India	sghosal@gnid-india.in	9038711099		
44	Smit Kr Gupta	EE SLDC	BSPTCL	smit200821@tda	7763817717		
45	ARVIND KUMAR	EE SLDC	BSPTCL	arvind.kumar@tda	7763817717		
46	Manish Kr. Mishra	EEE	BREDA	manish.npti078@gmail.com	7903914218		
47	Goutam Lohia	Joint VP				9811899714	
48	Mansher	Industry	Industries	Acansha@gmail.com	991069102		
49	Rajeev Royan	CE (E)	BHPCL	bshpklrt@gmail.com	9524296243		
50	T.P. Khan	A.E (E/M)	BSHPCL	tariquest@gmail.com	9430554029		
51	Ritkumar	AE	BSMPC	Ritkumar20@gmail.com	9409601527		
52	Alka Kiran	A.E	BSHPCL	alkakiran123@gmail.com	8789712616		
53	Archana Kumari	J.E	BSHPCL	veshshvri25archana@gmail.com	9538396592		
54	Shorav Kumar	AEE	BSPHCL	Pmcl.bsphcl@gmail.com	9264449860		
55	Md Fateh Ali	AEE	NBPDCL	Pmcl.bsphcl@gmail.com	7783815713		
56	Soumya	Event			7061983484		



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S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 17 <sup>TH</sup> October	Signature DAY 2 18 <sup>TH</sup> October
29	Biswarup Sadhukhan	Addl. CE	West Bengal State Electricity Distribution Company Limited	biswarup.sadhukhan@yahoo.in	7439642147		
30 *	Chandrasekhar Sengupta	Addl. CE	West Bengal State Electricity Distribution Company Limited	Sengupta.ChandraShekhar@gmail.com	7076055787	Chandra Shekhar Sengupta	Chandra Shekhar Sengupta 18/10/2024
31	Nirmal Kanti Biswas	Dy. Addl. CE	West Bengal State Electricity Distribution Company Limited	n.kbiswas123@gmail.com	9733975487		
32	Partha Roy	Addl. CE	West Bengal State Electricity Distribution Company Limited	roypartho39@gmail.com	9474304552		
33	Ramesh Ch Madhu	Addl. CE	West Bengal State Electricity Distribution Company Limited	madhure97@gmail.in	9434208644		
34	Shrinibasa Rout	Addl. CE	West Bengal State Electricity Distribution Company Limited	Srout9387@gmail.com	700669294		
35	Shyamal Kanti Das	Addl. CE	West Bengal State Electricity Distribution Company Limited	SKd_Seb@yahoo.co.in	7003562227		
36	Tapas Halder	Addl. CE	West Bengal State Electricity Distribution Company Limited	tapas.halder@wbsecl.in	8900793502		
37	K C Nanda	GM ( Regulatory Affairs & Strategy)	TPWODL, Odisha kcnanda@tpwwesternodisha.com	kcnanda@tpwwesternodisha.com	9437057053		
38	Manas Ranjan Mohanty	OSD (Engineering),	Odisha Electricity Regulatory Commission	manas.mohanty@oerc@gmail.com	9861385038		
39	Srikant Sharma	Deputy Director ,(Engineering)	Odisha Electricity Regulatory Commission				
40	Vidyadhar Wagle	Chief Regulatory, Western Region	Tata Power, Odisha				
41	Debidas Bandyopadhyay	Consultant (RA)	WBERC	debidas1234@gmail.com	9051264447		



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S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 17 <sup>TH</sup> October	Signature DAY 2 18 <sup>TH</sup> October
57	Julie Kumari	AEE/Commercial	SBPDCL	cecom.sbpdcl@ gmail.com	77638149 46		
58	CHANDER KR	A.O (Commercial)	SBPDCL	kapsinc@gmail.	7091596050		
59	Alka Kiran	A.E	BSPHCL	alkakiran23 @gmail			
60	Vineet Kr	Ad/PMC	BSPHCL		8709115268		
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