20 YEARS Integrated Research and IRADe Action for Development

Proceedings

North-Eastern Regional Capacity Building Workshop

for

State Stakeholders

on

Resilient, Inclusive, & Environmentally Sustainable Power Sector

Date: July 2nd & 3rd 2024,

Venue: Hotel The Lily, Guwahati, Assam

Organised by :

Integrated Research and Action for Development

Central Electricity Authority

Proceedings

North Eastern Regional Capacity Building Workshop

for

State Stakeholders

on

Resilient, Inclusive, & Environmentally Sustainable Power Sector

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

Date: November 21st and 22nd , 2024

Venue: The Lily Hotel Guwahati, Assam

Proceedings Finalized by:-

Pankaj Batra, Senior Advisor, IRADe
Mohit Kumar Gupta, Senior Project Analyst, IRADe
Dr. Navpreet Saini, Senior Research Analyst, IRADe

Workshop Organisation Support:-

B. K. Sarkar, Chief Administrative Officer, IRADe
Naman Mehta, Administrative Officer, IRADe
Manju Verma, Administrative Officer, IRADe

Project Reference: ISEF-2023-IRADE-005

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 organize a 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 Northern Region State stakeholders at Lucknow in July 2024, the second one for the Eastern Region State stakeholders at Patna in October 2024. The third Workshop for the North Eastern Region State stakeholders was organized on November, 21st and 22nd November, 2024 at Guwahati, Assam. Over 48 representatives from most of the States of the North 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 in given in **Annexure II**.

The speakers were from the Central Electricity Authority, the Central Electricity Regulatory Commission, the Grid Controller of India, Indian Energy Exchange and GNA Energy, one of the two new OTC Platforms approved by CERC The Sessions were preceded by the Inaugural Session, with the senior most officers Assam Power Generation Corporation Limited , Assam Electricity Grid Corporation Limited (AEGCL), and Assam Energy Development Agency (AEDA), 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 Bibhu Bhuyan,** Managing Director, Assam Power Generation Corporation Limited , Government of Assam, **Shri Debajyoti Das**, Managing Director, Assam Electricity Grid Corporation Limited (AEGCL), Government of Assam, **Dr. Jaideep Baruah,** Director, Assam Energy Development Agency (AEDA), Government of Assam**.** 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, Indian Energy Exchange and GNA Energy.

Day-1, Thursday , 21st November 2024

1. Inaugural Session

Prof. Jyoti Parikh, Executive Director of IRADe

She said it was crucial for state stakeholders to know about the laws, rules, regulations, and guidelines established for the power sector. These frameworks were designed to ensure that power systems operate effectively and in compliance with established standards. It was equally important to understand and engage with the individuals who have proposed and designed the regulations for the power sector. Through capacity building workshops, the aim was to provide a clearer understanding of the purpose of these laws and regulations governing the power sector and to understand, how they could enhance not only individual performance, but also contribute to the broader success of the system. These frameworks were not merely about enforcing rules but also about understanding their deeper intent and impact. It was essential to understand the perspective of those engaged in the energy

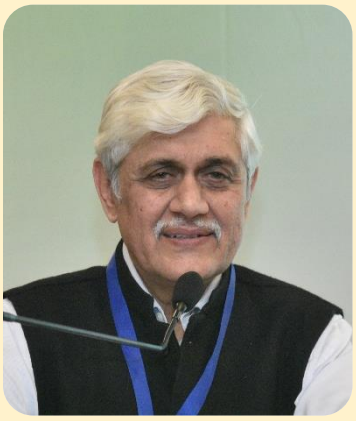
sector. All participants could ask questions, and also provide valuable feedback to the policy and regulation makers.

The Northeast (NE) region holds a unique position, not only due to its natural and cultural significance but also as a critical buffer zone bwtween South Asia and South-East Asia, as a part of the BIMSTEC Region. The region's strategic importance is growing, particularly as we move towards energy transition. She said that the Northeast region has substantial potential of hydro power, of about 40-50% and needs to to tap a greater portion of its potential. However, for this potential to reach a larger consumer base, the infrastructure needs to be further developed. This is where the power system plays a vital role, and the ongoing progress in this area is essential for improving access and delivery of energy.

The success of the energy transition relies on our collective effort, with each of us playing a vital part in the power sector. These capacity building workshops aim to equip state power sector stakeholder with valuable nuances of the laws and regulations, which can help improve performance and, more importantly, contribute to the performance of the system as a whole.

Lastly, she thanked all for being part of the workshop and she wished all participants gain valuable knowledge, and encouraged them to reach out with any questions or suggestions, and as we were eager to work together to continually improve the system.

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



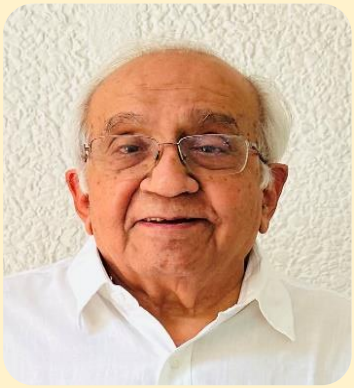
He welcomed all the participants to the Workshop. He mentioned that the growth rate in the NE region has accelerated and the region now has 220 KV lines, compared to the earlier 33 KV lines, and its growth will be driven by its scenic beauty and tourism potential. He stated that four states had sent their representatives for the Workshop. He welcomed the dignitaries seated on the dais. He stated that the Chief Secretary, Principal Secretary(Power), Secretary (Power), Chairperson, Assam Electricity Regulatory Commission and MD, APDCL, all had engagements, and hence could not make it to the Inaugural Session. He stated that this was the third in the series of Regional Workshop, being organized under the national Capacity Building Program organized by IRADe, jointly with CEA, at Guwahati, on Laws, Rules, Regulations, Guidelines, in the power sector, made by the Ministry of Power/CEA/CERC, but implemented by the States to a large extent, the first two being organized for the State stakeholders of Northern and Eastern Regions, in Lucknow and Patna in July and October respectively. He also stated that the next two Workshops for State stakeholders of the Western and Southern Regions, would be organized in January and February

respectively. This would be followed by a half-day Workshop for the State Secretaries and four webinars on four topics to be identified during the course of the Workshops. The authors of these regulations would present on all relevant topics, and informal discussions during the break times in the in-person Workshops would help clarify many doubts.

He mentioned that the Workshop for the North-Eastern Region was customized to omit the flexibilization of thermal power plants, as the States had predominantly hydro and gas generating stations, and add Status of Hydro power plants in India, Challenges in Hydro Power Development and various incentives for hydro power plants, in addition to Long duration storage, in the form of Closed loop pumped storage hydro plants. Encouraging more pumped storage in the North-Eastern region would be highly beneficial, as it provides a storage solution for addressing the challenges of intermittent generation from sources like wind and solar power. Also, there would be a presentation on a new platform promoted by the CERC, the OTC (Over The Counter) Platform, which allowed customization of contracts between the buyers and sellers, as compared to standard contracts in the Power Exchange. If a buyer's requirement is for power over a specific period, like three or four days or just a few hours within a day, the platform will match them with sellers who have power available during those specific times. The platform operates based on custom-based contracts, adapting to the needs of both buyers and sellers.

Round tables would be held after the Inaugural Session to gather feedback on training needs from North-Eastern states, and specific state-level workshops will be arranged next year if needed. Requests from Bihar and West Bengal are already in place. The workshops will finish by April, with likely follow-up capacity building Workshops for individual States in the following year. He hoped that all participants would gain from the Workshop.

Prof. Kirit Parikh, Chairman, IRADe,



He mentioned that the Northeast has a huge renewable potential of 129 GW, of which only about 5 GW has been installed so far. The entire power sector is expected to undergo a transformation as India moves towards its net-zero targets, with the electricity sector playing a crucial role. For example, the rise in demand for electric vehicles will increase electricity consumption by about 25%. In this context, the Northeast can play a vital role. Currently, India imports power from Bhutan, which benefits greatly from this, and the Northeast holds similar potential to supply clean, renewable energy to the rest of the country and earn from it.

He added that the Northeast must carefully consider its economics and interests as the transformation in the power sector unfolds. There is a need for better integration of power transmission and exchange of power with the rest of the country. It is essential for the Center to understand the concerns of the States, and for the States to appreciate the Center's goals. The purpose of this Workshop is to foster that understanding, particularly regarding rules and regulations that may not fully address the states' challenges. For example, many states did not meet the renewable portfolio requirements due to being tied down by long-term Power Purchase Agreement, which would make buying new power costly. He hoped that all participants would find the Workshop useful and the country can, as a result, move forward in a unified direction while being sensitive to the states' constraints.

Shri Bibhu Bhuyan, Managing Director, Assam Power Generation Corporation Limited , Government of Assam

He thanked IRADe and CEA for holding this event, as there was a significant need to bridge the gap between policy-making in the power sector and its dissemination at the educational and state levels. There were numerous organizations and ministries involved in power sector policies, such as the Ministry of Power, MNRE (Minsitry of New & Renewable Energy), CEA, MOP&NG (Ministry of Petroleum & Natural Gas), Ministry of Coal, MOEFCC (Ministry of Environment, Forests and Climate Change), CERC and SERCs, and the National Power Committee. These bodies play a crucial role in shaping laws, regulations and business operations. As an institution, they have had limited exposure to the new laws and policies. The challenges on the ground must be considered when implementing policies. He highlighted the key issues in the region. Geographical and demographic factors, such as remote areas and limited access to electricity, play a role. The hydro potential is also limited, especially in Assam, which has just 620 MW of usable capacity, much of which has already been exploited. Additionally, solar potential was constrained due to forest cover and limited land availability. Rising gas prices added to the challenges. The way forward involved modernizing infrastructure, adopting cutting-edge technologies, and building a resilient, self-sufficient energy network. To address these issues, the evolving regulations, laws and available technologies must be understood. He added that one must balance affordability, sustainability, and profitability. New technologies, like energy storage and smart grids, could be adopted, but they require investment, which could raise tariffs. The question is whether consumers can absorb these costs.

For pumped storage, there were significant challenges. Pumped storage functioned like an electromechanical battery, using water lifted during off-peak hours and released during peak times. However, the cost involved is not only production cost, but also the costs of lifting, storage, and operational expenses. For example, if solar power is purchased at ₹2 per unit and the cost of lifting and storing water adds up, the total cost could be quite high. It was understood that Adani is going to generate power at ₹4 per unit, after using green energy, i.e. renewable plus storage, why would a consumer pay ₹5 per unit or more from pumped storage in North-Eastern Region? Additionally, financial proficiency was needed to understand the viability of projects, structure PPAs, and secure funding. To be competitive, financial aspects needed to be assessed carefully. This included understanding the costs associated with generation, which can be 30% higher in Northeast India compared to other regions like Gujarat due to geographical challenges. The stakeholders must possess financial competence to assess the same. A key issue for Northeast India is its reliance on gas-based power generation—31% of its generation depends on gas, compared to just 4% for the rest of the country. Subsidized or reasonably priced gas is critical for this region, making it necessary for the Ministry of Power and other stakeholders to address this issue.

While several organizations are working towards providing better services to consumers, transparency in communication, regular updates on policy changes, project progress, and effective management were crucial for ensuring inclusivity, transparency, and sustainable growth. Knowledge-sharing platforms were especially important for people in remote areas like the Northeast, where physical distance and other barriers existed. Having reforms to access this data in a simplified manner were critical. Conflict management was also an area of concern. This is a major reason for delays in many projects. For example, a thermal gas based plant that was supposed to be commissioned in 36 months to 40 months, took 13 years in Assam. The resulting aggregation of interest costs is added to the power generation costs. In many cases, due to inadequate knowledge of conflict information, delays occur. Conflicts were inevitable in projects, but effective mechanisms for resolving them quickly must be understood by all power engineers and commercial teams. Without this, projects would continue to face delays.

Regarding the energy mix, India's storage, nuclear, and hydro power capacities were slowly increasing. For example, in the national energy mix, storage accounted for 2%, nuclear 2%, hydro 7%, whereas solar would increase to 38%. While this is a national overview, the integration of renewable energy (RE) sources into the grid is still a challenge. In Northeast India, the green power share is currently small, but as it grows to 10-20%, maintaining grid stability would become difficult. Preparation for the same needed to be done now, as any delays would extend project timelines. India's per capita power consumption is 1,377 kWh, much lower than countries like Iceland (53,000 kWh),

China (7,000 kWh), and the USA (13,000 kWh). In the Northeast, per capita annual consumption is even lower, at 400 kWh, indicating underdevelopment and the need for progress. For decarbonization, the evolution of renewable energy integration must continue. India's future goal of achieving 450 GW of renewable power would require 30 GW of 4-hour battery storage. We needed to be ready for this challenge.

Gas-fired power stations are critical for grid stability, due to their quick response to power demand fluctuations, as compared to coal based plants. Gas stations can respond in 15 minutes, while coal plants cannot. This is why gas power stations are vital, and their role would only grow, as renewable energy penetration increased. Moving forward, understanding the use of platforms like OTC (Over-The-Counter) for energy trading and DSM (Demand-Side Management) will be important. For example, when there is excess power, we need to know how to manage the sale of this power through the OTC platform, while considering fixed costs and regulations. Also, when the next round of capacity building is held, these areas should be considered. Hope that this Workshop presents an opportunity to address these issues.

Shri Debajyoti Das, Managing Director, Assam Electricity Grid Corporation Limited (AEGCL), Government of Assam

Mr. Debajyoti Das, MD, AEGCL (Assam Electricity Grid Corporation Ltd.) stated that this Workshop aims to enhance the understanding of electricity laws, guidelines, policies, rules, regulations, and technologies for the entire North-Eastern region, including technical, commercial, and finance officials. Today's dynamic transcript emphasizes understanding the laws and odysseys governing the power sector. This is paramount, whether it is the implementation of the Electricity Act, national policies, Indian electricity grid code, or other regulations and guidelines. A clear understanding ensures accountability and efficiency across all areas. One of the most critical aspects of power sector management is addressing connectivity issues. In this context, the CERC issued Connectivity and GNA (General Network Access) regulations for interstate transmission system regulation 2022, replacing previous CERC guidelines on connectivity, long-term access, medium-term open access in inter-State Transmission and related matters regulations from 2009. Since the introduction of GNA, these regulations have undergone two amendments: the first in 2023 and the second in 2024.

He requested the engineers of AEGCL, who were also present, that while working in the field with contractors, they should follow the Central Electricity Authority (CEA) regulations 2023 concerning electric supply and safety. It has been observed that contractors often employ unskilled laborers who

do not meet the minimum competency requirements, such as permits to work, licenses or supervisory licenses. He had requested the distribution engineers to strictly monitor this and ensure that proper safety measures are followed, with licensed and skilled labourers. Accidents, especially in the federal divisions, have occurred due to negligence.

Regarding the quality of materials, they were adopting the best practices from PGCIL(Power Grid Corporation of India Ltd.). Recently, five groups of engineers visited the Powergrid facilities in Manesar, where they are remotely monitoring 275 substations. One week ago, he had visited a substation in Sikona, where he saw a 400/132 kV substation with 14 GIS (Gas Insulated Switchgear) circuits which was unmanned. These substations were running smoothly. They were planning to adopt these practices for their future substations. He said refineries were coming up with huge load requirements and applying for connecting to 220 KV substations and AEGCL is preparing for this. AEGCL has 82 number of grid substations, 9630 MVA transformer capacity and 5395 km transmission lines, and able to handle 2900 MW. BY 2030, AEGCL would be able to handle 4200 MW load. Thirty numbers traction sub-stations are going on in Assam and 550 MW of load of industries and traction load would be coming on the grid.

The Powergrid engineers were also engaged in substation optimization, and AEGCL were now prepared to handle the increased load. Regarding the new substations, there was a substation in the upcoming distribution system, handling about 550 MW of load, which would be crucial for the growing demand. He informed that for the first time they have installed underground cables at various locations in Guwahati and also had underground cable fault locator machinery for the underground networks. They were currently using digital fault locator machines to better monitor the underground cables, which would also be very beneficial for the city's distribution system. They have also installed monopoles instead of the conventional towers along the Guwahati Airport Road, which were installed to handle clearance issues in the 132 kV and 220 kV lines. The monopoles weigh 28 tons for 132 kV and 35 tons for 220 kV lines. This method is being adopted as part of their ongoing project for improving the power transmission network. They were also implementing renovation and modernization of protection systems sub-stations, which was done after the regional blackouts in 2012.

He appreciated the opportunity of so many professionals coming to impart knowledge in the Workshop. He requested all participants to make use of this opportunity.

Dr. Jaideep Baruah, Director, Assam Energy Development Agency (AEDA), Government of Assam

He informed that they have started implementing reasonable energy solutions in the state, particularly solar energy, and have assessed the biomass potential. They are also exploring the potential of micro and mini hydro, and are working on pilot demonstration projects with the aim to contribute to the renewable energy scenario in Assam, in line with the 2070 goals of net zero of the Government of India. APGCL has also ventured into solar energy generation. The Government of Assam has introduced an ambitious plan for solar potential, with plans to set up solar power plants with a capacity of 1000 MW. AEDA has already set up a floating solar plant in Morigaon District and is planning 19 more such plants. Additionally, the Government of Assam has decided to set up a mega coal-based power plant.

He mentioned the need for a policy discussion on how to utilize national wetlands, considering whether it should be ecosystem-friendly or whether we should rely on artificial poles constructed for solar power. Along with hydropower and coal power, we need to focus on small yet important possibilities, particularly when thinking about green power and sustainable energy generation. Utilizing lakes, ponds, and wastelands is going to be a big challenge in the future. These issues need to be discussed and will require capacity building.

Furthermore, he added that since the PM-Suryaghar scheme is to be implemented by DISCOMs, with a target of 245 MW in Assam, they have started developing a model village for PM-Suryaghar. With this, there will be a large number of users, and a significant need for skilled workers to maintain all the systems. For this, SNA (State Nodal Agency) can play a critical role in developing human resources. When DISCOMs begin producing power, there will be a need for electricians, and at the household level, technical knowledge will be required as well, which needs further discussion. The role of SNAs across the country is being redefined. The SNA should be more innovative, particularly as new ideas like floating solar systems emerge. Another area of focus is decentralized power generation, which will require capacity building. More such Workshops are needed to establish a strong policy framework and capacity vision .

2. Panel Discussion - Utilities and State Renewable Development Agencies

This session focused on the need or requirements or the new area where capacity building is required.

Panellists: Bibhu Bhuyan, Jaideep Barua

Moderator: Mr. Pankaj Batra

Key takeaways:

Shri Bibhu Bhuyan said training is required regarding RE integration and its implication on grid as they were not aware of its future challenges when the power from these feeds into the grid. He emphasized on following areas.

1) cost and technology to make RE integration more affordable.
2) Selection on Transmission lines: The RE generating plants are facing challenges to evacuate power due to transmission lines. Now the Government of India is preparing green corridors to carry only green power. To build transmission lines, the availability of material is also a challenge. In India transmission line building companies are already booked for at least three years. Therefore, advance planning is required.
3) Transmission congestion: There is a problem to evacuate power from Upper Assam to lower Assam, i.e. intra-State transmission, as well as inter-state exchange due to transmission lines. In this Power Grid's role would become crucial and they need to come up with a master plan.

4) Adoption of AI: It can help in power sector to reduce costs, make it more efficient as well as plant level assessment. This can also be helpful in financial modelling to check the Techno commercial viability.
5) Regulation and norms: Basic principle behind all regulation and norms is to provide quality power at affordable prices to the consumers. All three areas i.e. generation. transmission and distribution should be made aware about the rationale of all the rules, regulations and norms.
6) Cyber-security: It can have serious implications at every level, for example meter data manipulation and data security at all levels, and should be taken more seriously and capacity building is required.

Shri Jaideep Barua: With increasing Focus on RE (Renewable Energy) power, the Govt. of India has approved an intense program for RE implementation. Some RE goals are over ambitious and it's difficult to for states to achieve, therefore, some relaxation is required. They started with the Distributed Renewable Energy (DRE), like rooftop solar PV, in Assam in 2016-17. With DRE implementation, pressure from the grids can be reduced. In Assam significant power demand is coming from primary health centres. For such demands, DRE can be used in an innovative way. In the PM Kusum scheme, there are four components. For one of these components, the focus is on installing solar panels in barren lands, which is difficult in Assam. That also includes sale and purchase of power. To achieve long term goals, the existing issues needs to be addressed and for this purpose a proper policy framework and regulations are required.

3. Panel Discussion Session 2

Panellists: Representative for North East states

Moderator: Mr. Pankaj Batra

Key issues highlighted for capacity building:

- Nagaland focused on communication system as they are facing major challenges in integrating their communication systems, including voice and data communication, metering and teleprotection, the technology for the same.
- Arunachal Pradesh focused on cyber-security, as they are going for smart meters and they will need a complete workshop on cyber security to counter theft.
- Tripura focused on the need of rules and technologies regarding RE integration particularly for state regulators as they are the key players in RE integration. Also, capacity building for the Distribution Companies on the rules/regulations of Rooftop solar PV is required.
- All departments from Assam electricity (generation and transmission) focused on the need of capacity building on General Network Access (GNA) Regulations, grid codes, effect of renewables on the power factor, awareness about new technologies and cost estimation, whether SF6 gas circuit breakers would get phased out due to its adverse impact on the environment, etc
- APDCL (Assam Power Distribution Company Ltd.) is installing smart meters approx. 20 lakhs are already installed. The issue is of consumers bypassing the smart meters. The challenge is how to detect theft. The other issue is, that there is a willingness to shift towards renewable energy, but the tariff of renewables is going down and the tariff charged to consumers is

increasing; so the Distribution Company loses if they encourage rooftop solar PV. Therefore, there is challenge for distribution companies, and therefore how it to be promoted.

- APGCL (Assam Power Generating Company Ltd.) wanted training in Artificial Intelligence and the different technologies in renewables.

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

Mr Pankaj Batra, Sr. Advisor, IRADe, explained the agenda and outlined the topics for the next two days in the Workshop for North-Eastern Region state stakeholders, He mentioned that the Workshop would focus on power sector laws, policies, and regulations, made by the Ministry of Power, CEA and CERC, but primarily meant for state-level stakeholders. The sessions will include roundtables with the ministries, regulators and other State stakeholders, followed by presentations by authors of key regulations, rules and guidelines, and discussions on the same.

Key themes include:

Resource Adequacy Planning: The importance of long-term planning to avoid costly power purchases from the exchange market during deficit periods was 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 were would be presented.

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, would be presented.

Power Trading and Over-the-Counter (OTC) Market

The OTC platform simplifies power trading by directly connecting buyers and sellers. It offers flexibility in trading durations, which would be as per requirement of buyers and sellers. , andTherefore, these would be customized to the requirements of both and would provide an alternative to power exchanges, which operate through standard contracts such as day-ahead, intra-day, contingency, weekly, and monthly contracts.

Hydropower & Pumped Storage

Northeast India has a hydro-dominated energy mix, making hydropower a key component of the region's electricity supply. CEA would present on incentives for hydro power, Pumped storage systems which are classified into two types: river-based, which diverts water from a river, and off-river (closed-

loop), which uses a stream, such as the Purulia Pumped Storage in West Bengal. Long-duration hydro storage plays a crucial role in maintaining grid stability, with pumped hydro, especially closed loop pumped storage being a cost-effective solution compared to battery storage.

New Grid Code: The 2023 grid code would be presented by CERC, including provisions for resource adequacy, grid operation, and cybersecurity.

Power Exchange and Market: A presentation on the functioning of the power exchange would be made by the predominant power exchange in the country. The importance of power exchange mechanisms, including day-ahead, intraday, and bilateral contracts, for optimal utilization of power resources in the country, through transfer of power from surplus areas to deficit areas would be presentaed.

Safety and Communication: The need for robust safety regulations and reliable communication systems for effective grid management was mentioned. Presentations would also be made on the safety regulations and Communication Regulations made by CEA.

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

Session on Resource Adequacy

Ms. Ammi Ruhama Toppo, Chief Engineer, CEA

Ms. Ammi Toppo, Chief Engineer (IRP) at the Central Electricity Authority (CEA), provided an overview of resource adequacy guidelines and related regulations. She emphasized the importance of demand forecasting by utilities, highlighting the guidelines issued by the Ministry of Power (MoP) in June 2023 under the Electricity Amendment Rules, 2022. These guidelines mandate annual assessments of resource adequacy for generation planning over a 10-year rolling period. State commissions must frame regulations ensuring distribution licensees prepare resource adequacy plans for the respective State and secure necessary approvals. The National Load Dispatch Center (NLDC) and Regional Load Dispatch Centers (RLDCs) play key roles in short-term operational planning, while state-level authorities must conduct annual reviews and impose penalties for non-compliance. The long-term national resource adequacy plan (LT-NRAP) projects capacity needs for the next decade, determining the required planning reserve margin (PRM) and reliability metrics. Each state's share in the national peak demand and the capacity credit of different generation technologies has to be worked out and would be published by CEA in the National Resource Adequacy Plan. The framework specifies contract proportions—75-80% long-term, 10-20% medium-term, and 10-15% short-term—to ensure

national peak demand is met without over-reliance on short-term markets. Additionally, Ms. Topo discussed demand forecasting methodologies, emphasizing the need for accurate projections considering unrestricted demand, weather factors, and emerging trends such as electric vehicles and data centers. The presentation underscored the necessity of balancing generation capacity with projected demand, while maintaining system reliability through adequate reserves and compliance with regulatory frameworks.

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's presentation on grid balancing and stability highlighted the challenges posed by integrating variable renewable energy (RE) sources like solar and wind into India's power grid. With RE penetration expected to rise from 200 GW to 500 GW by 2030, the grid faced increasing frequency fluctuations due to intermittent generation. Historical data indicated significant improvements in frequency stability post-2012, but recent trends show increased deviations due to large-scale RE tripping. The presentation discussed how inertia from conventional synchronous generators helped resist frequency changes, while inverter-based RE lacked this stabilizing effect. To manage grid stability, primary, secondary, and tertiary frequency controls—such as governor response, Automatic Generation Control (AGC), and ancillary services—were crucial. AGC, implemented at the national level, adjusts generator setpoints in real-time to stabilize frequency. However, state-level participation remained limited. Challenges included high frequency during peak solar hours, ramping limitations of thermal plants, and compliance issues like Low Voltage Ride Through (LVRT) and power factor regulations for RE plants. Mr. Singh emphasized the need for enhanced flexibility, better compliance monitoring, and increased state participation in ancillary services to ensure grid reliability in the face of growing RE integration.

Presentation on OTC Regulations – New flexible trading platform by CERC -Mr. Mayank Sharma, GNA Energy

Mr. Mayank Sharma from GNA Energy delivered an insightful presentation on OTC (Over-the-Counter) platforms and their role in transforming India's power market. He provided a historical perspective, highlighting the evolution of the power sector since the Electricity Act of 2003 and the regulatory developments leading to the introduction of OTC platforms under the Power Market Regulations, 2021. These platforms, which went live in 2024, following CERC guidelines, aimed to digitize and streamline the OTC market, offering greater transparency, data accessibility, and advanced analytics for market participants.

OTC platforms serve as neutral digital marketplaces where generators, trading licensees, and open-access consumers can list and view power procurement requirements. Unlike power exchanges, OTC platforms do not facilitate execution, clearing, or negotiation, but instead provide structured data, predictive insights, and customizable procurement options. They help address market gaps such as over-reliance on long-term PPAs, limited customizable contracts, and fragmented data affecting decision-making.

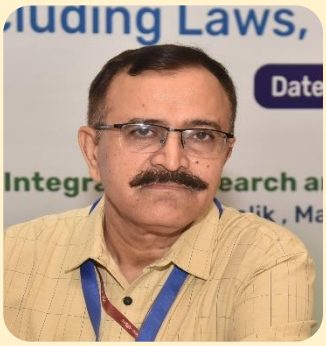
Mr. Sharma emphasized that OTC platforms are regulated by CERC and must maintain strict neutrality, cybersecurity, and risk management protocols. He also highlighted use cases such as demand forecasting, real-time procurement optimization, and enhanced market access for smaller players. States like Madhya Pradesh and Assam have already recognized the potential of OTC platforms, incorporating them into their regulatory frameworks.

In conclusion, Mr. Sharma underscored the benefits of OTC platforms, including increased transparency, informed decision-making, and broader market participation, ultimately contributing to a more efficient and data-driven power procurement process in India.

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, presented an in-depth analysis on the need for pumped storage projects (PSP), focusing on the concept of off-stream closed-loop PSPs. In his presentation at the North-Eastern Region Capacity Building Workshop, Mr. Shravan Kumar highlighted the importance of closed-loop pumped storage projects (PSPs) in addressing intermittency and long-duration energy storage. He emphasized that while the North-Eastern Region currently has limited PSPs, their expansion is crucial for the country's future energy landscape, as PSPs can complement renewable energy (RE) sources like solar and wind. By 2032, India's total



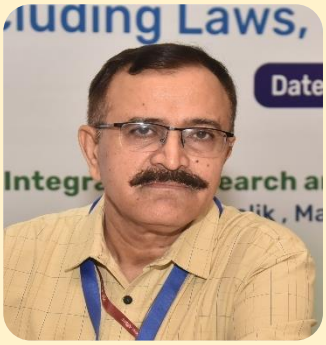
installed capacity is projected to reach 900 GW, with RE contributing 64%. Consequently, storage solutions such as PSPs will be essential, requiring an estimated 411 GWh of storage by 2032.

Mr. Kumar compared PSPs with battery storage, highlighting PSPs' longer lifespan (up to 100 years), lower environmental impact, and reliance on indigenous resources, whereas batteries require frequent replacement and are dependent on imports. He explained the classification of PSPs, distinguishing between conventional, open-loop, and closed-loop off-stream PSPs, with the latter gaining traction among developers due to minimal environmental impact. He provided an overview of PSP projects in India, mentioning that while 4.7 GW is operational, several projects are under construction or in the planning phase, with a target of 70 GW by 2032.

The government has introduced policy measures to streamline PSP development, including a single-window clearance system, relaxed environmental regulations, financial incentives, and budgetary support for infrastructure. He also discussed financing options, including funding through PFC, REC, and IREDA, along with possible viability gap funding (VGF) for high-tariff projects. Regulatory guidelines are evolving to ensure smoother approval processes and competitive bidding for PSP allocations.

Mr. Kumar concluded by urging states and regulators to support PSP adoption, given their critical role in India's transition to a renewable-dominated energy mix and the country's commitment to achieving net-zero emissions.

Presentation on Incentives for Hydro Power Plants by Government of India- Mr. Shravan Kumar, Chief Engineers, CEA



Mr. Shravan Kumar, Chief Engineer, CEA, delivered a comprehensive session on the incentives provided by the Government of India for hydro power plants, highlighting various policy measures to promote hydro development. He emphasized that hydropower plays a crucial role in energy security, grid stability, and renewable energy integration, yet its share in the energy mix has declined over the years. To reverse this trend, the Government of India introduced a series of incentives and reforms to boost hydropower investment and development.

Key measures include the recognition of large hydropower projects (above 25 MW) as renewable energy sources, the introduction of Hydro Purchase Obligations (HPO) within Renewable Purchase Obligations (RPO), and tariff rationalization to ensure long-term financial viability. Additionally, the loan repayment period for hydro projects has been extended from 12 to 18 years, and the useful life of projects increased to 40 years to reduce initial tariff burdens. The government has also approved

budgetary support for flood moderation components and enabling infrastructure, such as transmission lines, railway sidings, and road access to project sites.

Further incentives include Central Financial Assistance (CFA) for equity participation in North Eastern states, with a grant of up to ₹750 crore per project, and waivers on Inter-State Transmission System (ISTS) charges for hydro projects, including pumped storage plants (PSPs). Mr. Kumar also highlighted efforts to streamline project clearances, facilitate CPSU-led development of stalled projects, and resolve disputes through independent expert committees. He concluded by stressing the need for state governments' cooperation in land acquisition, clearances, and financial structuring to accelerate hydro power growth in India.

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

Day-2, Friday, 22nd November 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

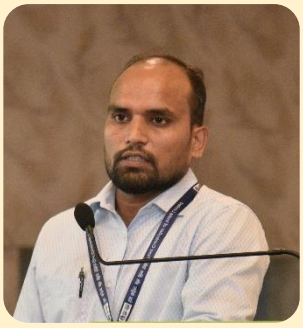
Presentation on New Grid Code 2023 - Mr. Awdhesh Yadav, Chief (Engineering, CERC)

Mr. Awdhesh Yadav, Chief (Engineering, CERC), delivered an insightful session on the New Grid Code 2023, emphasizing its crucial role in strengthening India's power grid. He outlined key regulatory provisions, highlighting the Indian Electricity Grid Code (IEGC) 2023 as a comprehensive framework ensuring reliability, security, and efficiency in grid operations. He discussed the structural evolution from the IEGC 2010, incorporating new chapters on Resource Planning, Cybersecurity, Monitoring, and Compliance.

A significant focus was placed on Resource Adequacy Planning, stressing demand forecasting, generation adequacy, and transmission capacity assessments. Mr. Yadav elaborated on the Connection Code, detailing procedural enhancements for integrating new grid elements. The Protection Code was also covered as an additional Chapter, outlining advanced security mechanisms and audit processes to ensure grid stability.

Another key highlight was the Scheduling and Dispatch Code, introducing Security Constrained Unit Commitment (SCUC) and Security Constrained Economic Dispatch (SCED) for optimal resource utilization. Additionally, he emphasized the new Cybersecurity provisions, ensuring robust measures against cyber threats. The session concluded with a discussion on compliance monitoring, reinforcing the importance of adherence to grid standards. Mr. Yadav's session provided a holistic overview of the regulatory enhancements shaping the future of India's electricity grid.

Presentation on Grid operation – Mr. Sachin Kumar Singh, Manager (System Operation), NERLDC, Grid Controller of India



Mr. Sachin Kumar Singh delivered an insightful presentation on on Grid Operation, highlighting the critical aspects of transmission congestion and transfer capability in real-time operations. He explained the fundamental difference between Transfer Capability and Transmission Capacity, emphasizing that transfer capability is dynamic, probabilistic, and dependent on system conditions, unlike transmission capacity, which is a static design parameter.

Mr. Singh elaborated on the regulatory provisions under the Indian Electricity Grid Code (IEGC) 2023, which mandates periodic assessment and declaration of Total Transfer Capability (TTC), Available Transfer Capability (ATC), and Transmission Reliability Margin (TRM) at state, regional, and inter-state levels. He discussed the methodology for assessing transfer capability, considering thermal, limits and voltage limits, and how credible contingencies like transmission element outages affect grid reliability.

The session also covered real-time congestion challenges, showcasing case studies from the North-Eastern region, where limiting constraints impact power flow across different states. He stressed the need for accurate forecasting, proactive planning, and periodic revisions to ensure smooth grid operations. Concluding the session, Mr. Singh emphasized the way forward, recommending enhanced coordination between SLDCs, RLDCs, and NLDC, regular TTC/ATC assessments, and the integration of advanced system analytics for better grid management.

Presentation on Connectivity Regulations and General Network Access, Mr. Awdhesh Kumar Yadav, Chief (Engineering), CERC

Mr. Awdhesh Kumar Yadav, Chief (Engineering), CERC, delivered an insightful session on Connectivity Regulations and General Network Access (GNA), outlining the regulatory framework governing seamless access to the Inter-State Transmission System (ISTS). He highlighted the CERC Connectivity and GNA Regulations, 2022, which provide a structured mechanism for granting

connectivity, ensuring efficient transmission planning and operational flexibility for market participants.

Mr. Yadav elaborated on the GNA framework, which replaces the traditional transmission access mechanisms, enabling a more dynamic and demand-driven approach to power transfer. He discussed the eligibility criteria, application procedures, and compliance requirements for entities seeking connectivity, including generators, transmission licensees, and bulk consumers. A key focus was on the assessment of Available Transfer Capability (ATC) and Total Transfer Capability (TTC), which determines access feasibility while maintaining grid security and stability.

Addressing the challenges in implementation, he emphasized the role of Load Despatch Centers (LDCs) in assessing and declaring GNA margins to facilitate smooth power transactions. He also discussed regulatory measures for congestion management and transmission capacity optimization. Concluding the session, Mr. Yadav underscored the significance of GNA in enhancing open access, fostering competition, and ensuring a more resilient and efficient power market in India.

Presentation on Functioning of Power Exchange: Mr. Dhruv Dhiman, Vice President -Business Development, IEX

Mr. Dhruv Dhiman provided a comprehensive overview of the functioning of power exchanges, emphasizing their role in ensuring a transparent, competitive, and efficient electricity market in India. He highlighted the evolution of power markets, noting that India's exchange-based transactions still have significant room for growth compared to developed economies. The Indian Energy Exchange (IEX) has been instrumental in deepening market participation by offering a nationwide, automated trading platform for electricity, renewables, and certificates.

Mr. Dhiman elaborated on key market segments, including the Day-Ahead Market (DAM), Real-Time Market (RTM), Green Term-Ahead Market (GTAM), and Ancillary Services. He explained the bid-matching process, price discovery mechanisms, and the clearing and settlement framework, which ensures secure and reliable transactions. The discussion also covered regulatory oversight by CERC, ensuring fair market practices and adherence to Deviation Settlement Mechanism (DSM) regulations.

Addressing market trends, he showcased the growth of power exchange trading volumes, the role of cross-border electricity trading, and emerging opportunities such as peer-to-peer (P2P) trading and Contracts for Difference (CfDs). He concluded by highlighting IEX's initiatives, including the IEX

Academy for capacity building, and the launch of PowerX, India's first electricity price index, aimed at providing market participants with strategic insights for better decision-making

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

Smt. Rishika Sharan, Chief Engineer, CEA, delivered an insightful session on the CEA (Measures Relating to Safety and Electric Supply) Regulations, 2023, emphasizing the importance of electrical safety in generation, transmission, distribution, and end-use of electricity. She highlighted that India records approximately 12,000–14,000 electrical accidents annually, resulting in significant loss of human and animal lives. The revised safety regulations of 2023 aim to mitigate such risks through enhanced safety provisions, mandatory training, and stricter compliance measures.

The session covered key regulatory provisions under the Electricity Act, 2003, which empower the CEA to specify safety guidelines. She elaborated on the new chapters introduced in the 2023 regulations, covering areas like renewable energy installations, EV charging stations, and HVDC systems. Specific safety mandates include earthing requirements, protective equipment, fire prevention measures, and compliance inspections. She also discussed the designation of Electrical Safety Officers (ESO) and the need for mandatory training and certification for engineers, supervisors, and technicians to enhance safety in operations.

Smt. Sharan also emphasized public awareness initiatives like "Safety Starts from School" and "Lineman Diwas", which promote electrical safety culture. She concluded by urging strict compliance with safety standards, regular audits, and capacity-building efforts, reinforcing the vision of an accident-free power sector in India.

The Workshop concluded by closing remarks by Shri Pankaj Batra, Sr. Advisor, IRADe, summing up briefly the topics in the Workshop, and thanking all the power sector organizations who could make it in person, noting that majorly, the participants were from various State power sector stakeholders from the host State Assam.

Annexure I: Agenda

Day 1 – Thursday, 21st November 2024	
09.30 -10.00 Hrs.	**Registration**
10.00 -11.50 Hrs.	**Inaugural Session**
10.00 -10.05 Hrs.	Welcome Address by **Dr. Jyoti Parikh**, Executive Director, IRADe
10.05-10.10 Hrs.	Context Setting by **Shri Pankaj Batra**, Senior Advisor, IRADe & Ex Chairperson, CEA
10.10-10.15 Hrs.	Introductory Remarks by **Dr. Kirit Parikh**, Chairman, IRADe & Former member, Planning Commission
10.15-10.25 Hrs	Special Remarks by Guest of Honour, **Shri Bibhu Bhuyan,** Managing Director, Assam Power Generation Corporation Limited , Government of Assam
10.25-10.35 Hrs	Special Remarks by Guest of Honour, **Shri Debajyoti Das,** Managing Director, Assam Electricity Grid Corporation Limited (AEGCL), Government of Assam
10.35-10.45 Hrs.	Special Remarks by Guest of Honour, **Shri Rakesh Kumar,** IAS, Managing Director, Assam Power Distribution Company Limited , Government of Assam
10.45 -10.55 Hrs.	Special Remarks by Guest of Honour, **Shri Ghanshyam Das**, IAS, Secretary, Power (Electricity) Department, Government of Assam
10.55 -11.05 Hrs.	Special Remarks by Guest of Honour, **Dr. Krishna Kumar Dwivedi,** IAS **,** Principal Secretary, Power (Electricity) Department, Government of Assam
11.15 -11.25 Hrs.	Special Remarks by Guest of Honour, **Shri Kumar Sanjay Krishna,** (Retd. IAS) Chairperson, Assam Electricity Regulatory Commission, Government of Assam
11.25 -11.35 Hrs.	Special Remarks by Guest of Honour, **Dr. Ravi Kota, IAS**, Chief Secretary & Chairman , Assam Energy Development Agency , Government of Assam
11.35 -11.45 Hrs.	Inaugural Address by Chief Guest, **Shri Jishnu Barua,** Chairperson, Central Electricity Regulatory Commission,
11.45 -11.50 Hrs	Vote of thanks by **Ms. Navpreet Saini**, Senior Research Analyst, IRADe
11.50-12.00 Hrs	**Group Photograph & Tea**
12.00-12.30 Hrs.	**Presentation on Outline of Laws, Rules, Guidelines, Regulations of the Government of India/CERC – Shri Pankaj Batra,** Senior Advisor, IRADe & Ex-Chairperson, CEA

12.30-13.00 Hrs.	**Roundtable of Secretaries on Capacity Building Requirements for North-Eastern Region's State** **Dr. Krishna Kumar Dwivedi,** IAS , Principal Secretary, Department of Power (Electricity), Government of Assam **Shri R K Sharma**, IAS, Secretary, Power Department, Government of Arunachal Pradesh **Dr. Sailesh Kumar Chourasia**, IAS, Secretary , Power Department, Government of Manipur **Shri. Sanjay Goyal,** IAS, Commissioner & Secretary, Power Department, Government of Meghalaya **Shri K. Lalrinzuali,** IAS, Secretary, Power & Electricity Department, Government of Mizoram **Smt. Asangla Imti,** IAS, Commissioner & Secretary, Power Department, Government of Nagaland **Shri Abhishek Singh**, IAS, Secretary, Power Department, Government of Tripura
13.00 -13.30 Hrs.	**Roundtable of Regulators on Capacity Building Requirements for North Eastern Region's State** **Shri Kumar Sanjay Krishna,** (Retd. IAS) Chairperson, Assam Electricity Regulatory Commission, Government of Assam **Shri. R.K. Joshi,** Chairperson, Arunachal Pradesh State Electricity Regulatory Commission, Government of Arunachal Pradesh **Shri. Rengthanvela Thanga,** Chairperson, Joint Electricity Regulatory Commission for the States of Manipur & Mizoram **Shri Chandan Kumar Mondol,** Chairperson, Meghalaya State Electricity Regulatory Commission Govt. of Meghalaya **Shri Khose Sale,** Chairperson, Nagaland State Electricity Regulatory Commission, Govt. of Nagaland **Chairperson/ Member**, Tripura Electricity Regulatory Commission, Govt. of Tripura
13.30 -14.00 Hrs.	**Roundtable of Renewable Energy Development Agencies on Capacity Building Requirements for North Eastern Region's State** **Dr. Jaideep Baruah,** Director**,** Assam Energy Development Agency (AEDA), Government of Assam **Shri Marbom Bam**, Director, Arunachal Pradesh Renewable Energy Development Agency (APEDA), Government of Arunachal Pradesh **Shri P.M. Sangma,** Member Secretary-cum-Director, Meghalaya New and Renewable Energy Development Agency (MNREDA), Government of Meghalaya **Shri N. Praveen Singh,** Director, Manipur Renewable Energy Development Agency (MANIREDA), Government of Manipur **Shri Ngursailova Sailo**, Director, Zoram Energy Development Agency, Government of Mizoram **Shri Lhouchalie Viya**, IAS, Commissioner & Secretary, Directorate of New and Renewable Energy, Govt. of Nagaland **Shri M Debbarma,** Director General & CEO, Tripura Renewable Energy Development Agency (TREDA), Govt. of Tripura
14.00 -14.30 Hrs.	**Lunch Break & Networking**
14.30 -15.20 Hrs.	**Resource Adequacy and laws/Guidelines /Regulations related thereto –** **Ms Ammi Topo,** Chief Engineer (IRP), CEA ➢ Demand Forecasting ➢ Power Generation Resource Planning ➢ Renewable Generation/Energy Storage Planning ➢ Power Trading/Power Exchange in India ➢ Q&A
15.20 -16.10 Hrs.	**Grid balancing, Grid stability due to intermittent generation. Ancillary Services Regulations –** **Mr. Alok Pratap Singh, 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
16.10-16.20 Hrs.	**Tea**
16.20-17.00 Hrs.	**OTC Regulations – New flexible trading platform by CERC -Mr. Mayank Sharma,** GNA Energy

17.00-18.00 Hrs.	**Tackling intermittency, long duration storage, incentive for hydro power plants -** **Mr. Shravan Kumar**, Chief Engineers, CEA ➢ Closed Loop Pumped Hydro Storage ➢ Incentives for hydro power plant given by Government of India ➢ Q&A
Day 2 - Friday, 22nd November 2024	
10.00 -10.15 Hrs.	**Recapitulation and introduction to the forthcoming Sessions –** **Shri Pankaj Batra,** Senior Advisor, IRADe & Ex-Chairperson, CEA
10.15-11.15 Hrs.	**New Grid Code 2023 – Mr. Awdhesh Yadav,** Chief (Engineering, CERC) ➢ 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.	**Tea**
11.30-12.30 Hrs.	**Grid operation - Mr. Sachin Kumar Singh,** Manager (System Operation), NERLDC ➢ Frequency and voltage control ➢ Transmission Capacity and Transfer Capability, TTC. ATC and RM ➢ Transmission Congestion ➢ Angular Stability ➢ Q&A
12.30-13:30 Hrs.	**Connectivity Regulations and General Network Access –** **Mr. Awdhesh Kumar Yadav,** Chief (Engineering), CERC ➢ Connectivity ➢ Long Term Access, Medium Term Access, Short Term Open Access ➢ Provision of General Network Access ➢ Q&A
13.30-14:30 Hrs.	**Lunch Break & Networking**
14:30-15.30 Hrs.	**Functioning of Power Exchange:** **Mr. Dhruv Dhiman,** Vice President -Business Development **,** 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.	➢ **CEA Measures Relating to Safety and Electric Supply Regulations** **Smt. Rishika Sharan,** Chief Engineer, CEA
16.30-17.00 Hrs.	**Closing remarks & Vote of thanks Shri Pankaj Batra,** Senior Advisor, IRADe & Ex-Chairperson, CEA
17.00 Hrs.	**Tea**

Annexure 2: List of Attendees

Integrated Research and Action for Development

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

Date: November 21st and 22nd, 2024 Venue: The Lily Hotel, Guwahati, Assam

S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 21st November	Signature DAY 2 22nd November
1	Shri Jishnu Barua	Chairperson	Central Electricity Regulatory Commission				
2	Dr. Ravi Kota	Chief Secretary & Chairman	Assam Energy Development Agency, Government of Assam				
3	Dr. Krishna Kumar Dwivedi IAS	Principal Secretary	Power (Electricity) Department, Government of Assam				
4	Shri Ghanshyam Dass IAS	Secretary	Power (Electricity) Department, Government of Assam				
5	Shri Kumar Sanjay Krishna	Chairperson	Assam Electricity Regulatory Commission, Government of Assam				
6	Shri Rakesh Kumar IAS	Managing Director	Assam Power Distribution Company Limited, Government of Assam				
7	Shri Bibhu Bhuyan	Managing Director	Assam Power Generation Corporation Limited, Government of Assam	bibhu.bhuyan@apgcl.org			
8	Shri Debajyoti Das	Managing Director	Assam Electricity Grid Corporation Limited , Government of Assam				
9	Dr. Jaideep Baruah	Director	Assam Energy Development Agency (AEDA)	j.baruah@aeda.in			
10	Ms Ammi Ruhama Toppo	Chief Engineer	Central Electricity Authority (CEA)				
11	Mr. Shravan Kumar	Chief Engineer	Central Electricity Authority (CEA)				
12	Smt. Rishika Sharan	Chief Engineer	Central Electricity Authority (CEA)				
13	Mr. Awdhesh Kumar Yadav	Chief (Engineering)	Central Electricity Regulatory Commission (CERC)				

20 YEARS Integrated Research and RADe Action for Development

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

Date: November 21st and 22nd, 2024 Venue: The Lily Hotel, Guwahati, Assam

S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 21st November	Signature DAY 2 22nd November
14	Mr. Alok Pratap Singh,	Chief Engineer	ERLDC, Grid Controller of India				
15	Mr. Sachin Kumar Singh	Manager (System Operation)	NERLDC, Grid Controller of India				
16	Mr. Dhruv Dhiman	Vice President -Business Development	Indian Energy Exchange Ltd				
17	Mr. Mayank Sharma	Chief Engineer	GNA Energy				
18	Dr. Kirit Parikh	Chairman	IRADe				
19	Dr. Jyoti Parikh	Executive Director	IRADe				
20	Mr. Pankaj Batra	Senior Advisor	IRADe				
21	Mr. Mohit Kumar Gupta	Sr. Project Analyst	IRADe				
22	Dr Navpreet Saini	Sr. Research Analyst	IRADe				
23							
24							
25							
26							

20 YEARS Integrated Research and RADe Action for Development

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

Date: November 21st and 22nd, 2024 Venue: The Lily Hotel Guwahati, Assam

S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 21st November	Signature DAY 2 22nd November
31	ANINDITA DAS	GM (IT)	AEGCL	anindita.das@aegcl.co.in	7002649012		
32	PALLAB BHUYAN	AGM	AEGCL	pallab.bhuyan@aegcl.co.in	7086276512		
33	Ranjan Goswami	AGM	AEGCL	—	9706524432		
34	Raj Sharma	GM	AEGCL	—	9864242502		
35	Bikram Bordoloi	DGM	AEGCL		9435558545		
36	Uday S. Nath	DGM	AEGCL	uday.nath@aegcl.co.in	9864126346		
37	Dhruv Dhiman	VP-BD	IEX	DHRUV.DHIMAN@IEXINDIA.COM	9971174084		
38	Rupjyoti Sarma	AGM	AEGCL		9678006691		
39							
40							
41							
42							
43							
44							

20 YEARS Integrated Research and RADe Action for Development

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

Date: November 21st and 22nd, 2024 Venue: The Lily Hotel Guwahati, Assam

S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 21st November	Signature DAY 2 22nd November
16	~~Santanu Bose~~	DGM	APDCL				
17	Ravi Kumar	DGM	APDCL	kumarasis@gmail.com	9957116448		
18	~~Indrajit Tahbildar~~	DGM	APDCL				
19	~~Paragjyoti Kalita~~	AGM	APDCL				
20	~~Bonita Das~~	DM	APDCL				
21	Er. Abenthung Ngullie	S.E. (E), Dimapur,	Department of Power, Nagaland				
22	Er. Aron Sema	E.E. (E), Chumoukedima	Department of Power, Nagaland		9		
23	Er. Rokobeito Iralu	S.D.O. (Trans), Dimapur	Department of Power, Nagaland		9436832020		
24	Er Arak Modi	AE(E) RWKSin, GroAP.	Dept of Power, A.P	arakmodi@gmail.com	7005888865		
25	Chandra Das	AGM -	APDCL				
26	MOMI BORAH	Dy. Manager	APDCL	borahmomi@gmail.com	9706076563		
27	DARSHAN KR. DAS	A.M (Com).	APDCL	darshan06das@gmail.com	9101487012		
28							
29	Rajesh Dawe	EE(E)	Power Agartala		6913502115		
30	Lilambar Das	AM (Com)	APDCL	lilambardas@gmail.com	99544 13454	21/11	22/11

20 YEARS Integrated Research and RADe Action for Development

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

Date: November 21st and 22nd, 2024 Venue: The Lily Hotel Guwahati, Assam

S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 21st November	Signature DAY 2 22nd November
1	Jwngsar Boro	AGM	APGCL	jwngsar.boro@apgcl.org.	9859163034		
2	Satyajit Deori	AGM-PP	APGCL	Satyajit.deori@apgcl.org	7086896296	Satyajit Deori	Satyajit Deori.
3	Leena Mili Taye	DM	APGCL	leenamili@apgcl.com	8812033935	21/11/2024	22/11/2024
4	Sri Pronay Borah	JM	APGCL	Pronay.Borah@apgcl.org	8135049261	21/11/2024	22/11/24
5	Abhijit Pathak	AM	APGCL	abhijit.pathak@apgcl.org	7002380124		
6	Sushil Hazarika	AM	APGCL	Sushil Hazarika @gmail.com	9435156515		
7	Mantu Rangson	JM	APGCL	mantu.rangson1414@gmail.com	7002844840	Mantu Rangson	M. Rangsan.
8	Jayashree Devi	CGM, PP&D	AEGCL				
9	Balabanta Basumatary	CGM, O&M, CAR	AEGCL				
10	Pragyan Saikia	CGM, SLDC	AEGCL				
11	Palash Jyoti Mahanta	CGM, TC&C	AEGCL				
12	Mukesh Sharma	CGM, F&A (i/c)	AEGCL	mukeshcma1985@gmail.com	9864010635		
13	Ankur Pratim Das	GM (M&PR) & HR(i/c)	AEGCL	a.pratimdas1234@gmail.com	9854274353		
14	B. Debbarma	Project Director	TREDA	treda agartala@gmail.com			
15	Kabyashree Dutta	Jre. Scientific Officer	AEDA	assamrenewable@gmail.com	7896817492		

Integrated Research and RADe Action for Development

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

Date: November 21st and 22nd, 2024 Venue: The Lily Hotel, Guwahati, Assam

S.No	Name	Designation	Organization	Email id	Mobile	Signature DAY 1 21st November	Signature DAY 2 22nd November
50	Hari Narayan Hazarika,	DGM	APGCL	harinarayen.hazarika@apgcl.org	7005728410		
51	Pritam Khanikar	AGM(PP)	APGCL	pritam.khanikar@apgcl.org	8471802790		
52	Pranoy Sarma	DM.	APGCL	pranoy.sarma@apgcl.org	98648 03708		
53	Dulesvar Borooah	P.E	AEDA	borooah.d90@gmail.com			
54	Amal K. Bordoloi	AGM	APHCL				
55	Banashri Choudhury	AGM	APGCL	banashri.choudhury@apgcl.org		21/11/2024	
56	Rita Bare	AM	APGCL	rita.bare@apgcl.org			
57	Lipika Das	AGM	APGCL	lipika.das@apgcl.org			
58	Mitul Das.	JM	APGCL	mitul.das@apgcl.org.	9859259477		
59	Keleshwar Bikash	AGM	APGCL		9435126469		
60	Zahid Khan Karmakar	DM	APGCL		8638063578		
61	Nayan Jyoti Saikia	JM	APGCL		9706480449		
62	*Rupjyoti Sarma	AGM	AEGCL		9678 [illegible]		
63							

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)
Sewa Bhawan, R. K. Puram, Sector-1, New Delhi, 110 066
Tel.: 91 (11) 26732201 / 2222
Our Websites and Social Media Handles: www.cea.nic.in

@CEA_India

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)
C-80 Shivalik, Malviya Nagar, New Delhi - 110017
Tel.: 91 (11) 2667 6180, 2667 6181, 2668 2226
Our Websites and Social Media Handles:
www.irade.org
www.sari-energy.org

@IRADe_Delhi IradeDel hiIndia irade-new-delhi-28001916