DISTRIBUTION UTILITY MEET DUM 2023

02 - 03 November 2023

Le Meridien, Kochi

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ISGF India Smart Grid Forum

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DUM2023 OUTCOME REPORT

INTRODUCTION

Distribution Utility Meet (DUM) is ISGF's Annual Event for the Discom community with the motto of "Experience Sharing and Learning from Each Other". DUM provides a platform for the Discom community to share each other's experiences in dealing with the challenges of energy transition, grid modernization and digitalization on fast track. DUM is conducted in different states every year in collaboration with the local Discom(s). The first edition was held in collaboration with BESCOM in Bengaluru in November 2017, the second edition in Mumbai in collaboration with Tata Power and Reliance Infrastructure in 2018; the third edition in New Delhi in collaboration with TPDDL, BRPL and BYPL. The fourth and fifth editions of DUM were held virtually and the sixth edition was held in Bhubaneswar in collaboration with the Tata Power Discoms in Odisha in November 2022. The seventh edition of DUM was held in Kochi on 02-03 November 2023 in collaboration with KSEB Limited and the Energy Department of Kerala.

DUM 2023 was a hugely successful event which was attended by senior officials from all important states and 45 Discoms in India. There were 350+ participants and 20 exhibitors participated in DUM 2023.

DUM 2023 CONFERENCE THEMES

1. Parallel Licenses and other Emerging Opportunities to Discoms
2. Growth of RE and EV; and the Plan for Enhancing Grid Flexibility
3. Discom Collaboration Platform for Economic Procurement
4. Planning for Transport Electrification
5. Rollout of 250 million Smart Meters – Progress and Challenges
6. Disaster Management and Climate Readiness of Utilities
7. New Innovations for Net Zero Power Sector
8. Rise of the "Prosumer" and Prosumer Engagement Strategies for Net Zero Power Systems

KEY TAKEAWAYS FOR IMMEDIATE ACTION

• There is a huge potential for Discoms to save money by streamlining their procurement framework for important equipment and services. This is a low hanging fruit; but has not been leveraged effectively yet. Discoms may collaborate to aggregate the demand and standardize the equipment specifications of their most commonly used items. Standardization of equipment will help in maintaining low inventory as spares for one Discom could be borrowed from the nearby Discoms in case of emergencies. This helps during natural calamities and disasters as well. Hence it is important to create a Discom Collaboration Platform for procurements. ISGF and GeM could help in this initiative.

• The ongoing smart meter rollout program need mid-course correction. Most of the AMI Service Providers (AMISPs) who have been awarded muti-million-meter contracts have no prior experience with smart metering systems; majority of them are likely to fail in delivering successful AMI systems on time. MOP/REC/PFC should call all stakeholders for a brainstorming session to examine the situation. MOP may also appoint an international expert agency with hands-on experience in large AMI projects to study the status and suggest remedial measures. Another important point to take note is that there could be IPR fee claims by patent holders of 4G/5G/NB IoT technologies for using cellular connectivity for smart metering. Such claims have already happened in Europe; and the Discoms/AMISPs deploying cellular based connectivity for smart metering in India should keep a minimum provision of US$ 3-5 per meter as a lifetime fee to the IPR holders (Ericsson, Nokia, Huawei, Qualcomm etc).

• Frequency and severity of weather events are increasing every year and Discoms are struggling to maintain the network or restore the service after every weather event. It is recommended to create a resource pool of spare equipment, vehicles, tools and trained crew in each region that can be deployed on short notices in case of disasters. This could be created by sharing the cost by all the Discoms and Trancos in each region; and regulators may allot funds for building such emergency resource pools.

• There is an urgent need to revise the specifications and standards for grid equipment as the ambient temperature has gone up considerably in the last 2 - 3 Decades. The present specifications and standards were prepared 50-70 years ago when ambient temperatures were much less. The new equipment that we are adding every year on the grid should be able to withstand the higher temperatures and hence we must modify the standards and specifications.

• Transport electrification progressing at fast pace in the country calls for integrated planning of electric grid strengthening in close coordination between Discoms, transport companies and municipal authorities. Thousands of bus depots in the country would require MW-scale power connections soon; and the distribution grid strengthening under RDSS program should consider that requirement.

• Need for creation of a new tariff category for events (conferences, exhibitions, marriages etc). Most of the convention centres, marriage halls and hotels have taken minimum capacity electricity connections to save on their fixed monthly charges (demand charges). This minimum capacity is not sufficient for conducting a function for which diesel generator (DG) sets are hired from third parties and the rentals for the same are paid by event organizers/customers. Thousands of events are held across the country every day that are run on electricity from DG sets is a serious matter that should be addressed immediately. One unit (kWh) of electricity from a DG set today cost above INR 35 and it emits CO_2 and other polluting gases as well as noise pollution. The Discoms may allot separate electricity connections to the convention centres with single part tariffs – only energy charges for the kWh consumed and no fixed demand charges. New tariff category for events could be twice or thrice of that of commercial tariff which will be a Win-Win solution for Discoms and event organizers/customers.

SPECIAL PLENARY

Session on Parallel Licenses and Other Emerging Opportunities to Discoms

INTRODUCTION

The landscape of electricity distribution in India is undergoing significant changes with the emergence of parallel licenses and other new challenges. This plenary session addressed key issues, including the promotion of parallel licenses for electricity distribution, the implications of consumer choice of alternate suppliers, the competitive impact on incumbent Discoms, and challenges related to electricity rules and consumer rights.

PARTICIPANTS

PK Pujari, Former Chairperson, CERC (Chair); Prabir Neogi, Mentor - FICCI Power Committee and Advisor-GMR Energy (Moderator); Raj Pratap Singh, Former Chairperson, UPERC; Satyendra R. Pandey, Member, GERC; Sanjay Banga, President T&D, Tata Power Company Limited; Manan Thapar, Director, Energy & Utilities, RTI-India

DISCUSSION POINTS

1. Promotion of Parallel Licenses

- Rationale for promoting parallel licenses inelectricity distribution sector
- Pros and cons of having multiple distribution entities in the same service area
- Regulatory frameworks governing parallel licensing

2. Consumer Choice of Suppliers

- Impact of consumer choice in selecting electricity suppliers
- Advantages for consumers in terms of services and pricing
- Considerations regarding market competition and consumer protection

3. Competitive Impact on Incumbent Discoms

- Effects of competition and parallel licensing on incumbent Discoms
- Strategies for incumbent Discoms to adapt, compete and retain the customers and employees
- International experiences with electricity market liberalization

4. Challenges of Electricity Rules and Consumer Rights

- Challenges posed by rules mandating compensation for power outages
- Implications for Discom's operations and financial sustainability
- Potential solutions to balance consumer rights and Discom viability.

KEY TAKEAWAYS

• The introduction of parallel license, initially promoted for rural electrification, has evolved to promote competition and consumer choice. Evaluating net benefits must be context-specific, as there is no universal case for or against parallel licensees.

• Parallel licenses are intended to create competition in a specified area; there is a need to consider structuring of the licenses and define roles of new licensees in order to provide a level-playing field, whether through carriage and content separation or through consumer choice.

• Amendments to the Electricity Act (EA) that were under discussion in the recent past had provisions for enabling carriage and content separation, however, the latest version of the EA provides for parallel licenses through wheeling from incumbent licensee without duplication of network. It is inefficient to duplicate the network, but it is a legal requirement under parallel licensing until the law is changed.

• As per the Supreme Court order on Chhattisgarh v/s Jindal Power, discretion is with the State Electricity Regulatory Commission (SERC) to identify a specified area for parallel license; however, the law mandates to allow parallel license if the applicant/application complies with all the specified requirements which limits SERC's discretion.

• The area of supply definition has been changed vide Distribution of Electricity (Amendment) Rules, 2022 and some state governments have also specified policies that make changes to the minimum area of supply, and the norms for creditworthiness and capital adequacy have been specified.

• The advantages of a parallel licensee lie in the competitive pressure it places on the incumbent, catering to specific needs like reliable and quality power for emerging technologies (Data Centers, Chip Manufacturing etc), and facilitating faster disaster recovery with a redundant network, albeit at a significant cost.

• Setting tariffs is a major hurdle for parallel licenses as they remain regulated. While ceiling tariffs might be considered, the risk of predatory pricing by financially stronger licensees could adversely impact the competition. A dynamic flow tariff linking performance metrics should accompany the parallel licensing approach.

• The incumbent licensee is typically the supplier of last resort, but as observed in the US, this role creates an undue competitive advantage and creates entry barriers for new entrants; it is to be ensured that the last resort supply is genuinely a final option, not an opportunistic one.

• SERCs can create a cross-subsidy fund. All cross-subsidies should be collected and then apportioned to each licensee based on the consumer base.

• Per 2020 Consumer Rules, Discom officials are represented on consumer grievance redressal forum (CGRF) which makes grievance redressal more difficult.

• Measuring the number, time and duration of interruptions needs smart metering. Without that reliability measurements and compensation are not possible.

• Data on behind the meter resources is not accessible to the Discom, which is a big impediment to harnessing it for improving Discom's performance or "smartness". There is a need for smart metering and a national registry for the distributed energy resources (DERs).

• A study by Florence School of Regulation (FSR) indicated that the switching rate between licensees is less than15%.

(I) Mumbai experience illustrates SERC mismanagement in overseeing parallel licenses, leading to challenges in providing affordable and reliable services; and from the Mumbai experience, parallel licensee model is unworkable and not an ideal solution for customers or Discoms.

(II) The primary focus should shift to achieving 24x7 affordable and reliable power supply, with a priority on reducing loss levels, as the emergence of the parallel license issue is driven by the current surplus of power and the interest of private generators exploring sales opportunities.

(III) Consumers should be compensated for interruptions, but its objective evaluation is difficult. In the Indian context, the rules can create perverse incentives.

• In Gujarat, deemed licensees can supply to SEZ area, warranting careful consideration of suitable areas for parallel licenses to prevent consumer migration to SEZ, impacting the state Discoms.

• A new compensation mechanism is essential, factoring in power purchase agreements (PPAs), network infrastructure, capex, regulatory assets, and cross-subsidy. The existing framework lacks this comprehensive evaluation.

• Ceiling tariffs proposed in present amendment have been generally applied in price or rate cap regulations in some jurisdictions and may not be workable in cost-plus frameworks; further in Indian context, power purchase cost being 70-80% of the utility revenue, there is little scope for price control and efficiency gains. Other factors to consider are:

(I) Cherry picking and network duplication are not in control of the incumbent Discom; their control lies in improving their efficiency

(II) A clean slate for incumbent utilities (like what was envisaged in the UDAY scheme) might be necessary before introducing a new player

(III) In the UK, the market share of the big 6 utilities is decreasing as renewable energy options are increasing for decarbonization

• Per 2020 Consumer Rules, Discom officials are represented on CGRF which makes grievance redressal more difficult.

• Measuring the number, time and duration of interruptions needs smart metering. Without that reliability measurements and compensation are not possible.

CONCLUSIONS

• Exploring innovative models for parallel licensees holds potential for enhancing operational efficiency.

• Considerations regarding network duplication costs may be addressed through strategic planning; and the regulatory challenges associated with cost-plus regulation may be overcome with careful implementation and monitoring.

• Appropriate amendments to the Electricity Act 2003 present an opportunity to unlock benefits and foster healthy competition in the market.

• Offering consumers, the choice of suppliers signifies a step towards a more dynamic and responsive electricity markets.

• In a political economy like India's, there are no strait-jacketed solutions of the desirable retail supply format that will provide the best customer choice and maximise social welfare; an added dimension is that the adopted model will need to accommodate the rights of prosumers as well in terms of the rules enacted by the GOI.

• In the context of decarbonisation, design of regulatory incentives and penalties will be necessary to drive demand side solutions, support innovations in service delivery and meet public policy goals of RPO compliance by Discoms; going forward, a set of regulatory tools that will tie a portion of Discom earnings to policy outcomes by layering incentives into Cost-of-Service Regulations will be worth considering.

• Retail competition in distribution should primarily serve the agenda of energy transition to be achieved through the overarching principles of decarbonisation, decentralisation and digitalisation; and the targeted solution is to be seen through the lenses of:
- financial viability that will ensure economy of scale and scope for market participants
- enabling regulations that will offer opportunities to innovate and foster competition among service providers
- customer empowerment enabling supplier switching, demand side participation and DER integration

• Public trust in power distribution reforms is essential. Panel concluded by stating that such initiatives of encouraging customer choice under retail competition, being economic reforms, would only succeed when they are "understood, believed and accepted" by all stakeholders; concurrently, safeguards of 'Universal Supply Obligation' and default tariff mechanism will be necessary to protect, in particular, the interests of small and marginal consumers.

SESSION 1

Session on Discom Collaboration Platform for Economic Procurement

INTRODUCTION

Efficient procurement practices are integral to the economic sustainability of the Discoms. This session explored the concept of a collaboration platform for Discoms, aimed at streamlining the procurement of major equipment and fostering economic efficiency. By standardizing equipment specifications, cost transparency, testing norms, and equipment performance sharing, Discoms can collectively enhance their procurement strategies and reduce operational costs.

PARTICIPANTS

Rajan N. Khobragade, Additional Chief Secretary and CMD, KSEBL (Chair and Moderator); PK Singh, CEO, GeM; VK Srivastav, Member, UPERC; Rajesh Sharma, Member, RERC; HC Sharma, Chief – Technical Services, Tata Power-DDL; Tripta Thakur, Director General, NPTI

DISCUSSION POINTS

1. Common Equipment Specifications
- Importance of standardizing the specifications of key distribution grid equipment
- Benefits in terms of cost savings and interoperability
- Successful case studies

2. Publishing Equipment Costs
- Transparency in publishing cost of equipment and its key specifications
- Impact on informed procurement decisions
- Addressing challenges in cost disclosure

3. Standardized Testing Norms
- Need for uniform norms in type tests and site acceptance tests
- Benefits in enhancing equipment quality and reliability
- Practical considerations for implementation

4. Sharing Equipment Performance
- Advantages of sharing equipment performance data
- Examples of collaborative performance monitoring
- Potential for benchmarking and improvement through shared insights

KEY TAKEAWAYS

• It is proposed to build a collaboration platform for the Discoms which will be a significant step forward, offering the potential in optimizing procurement practices and introducing efficiencies through robust supply chain management.

• The goal is to procure and use only what is necessary in a timely and efficient manner, contributing to overall cost-effectiveness and operational efficiency for the Discom.

• The concept of demand aggregation model, successfully applied in the health sector, presents an opportunity for implementation in other sectors; the health sector's Cancer Care model, utilizing the aggregation approach, demonstrates cost-effectiveness in acquiring high-value, standardized equipment.

• Similar examples of demand aggregation are in Ujala Program (LED lamps) and Electric Bus Program which are implemented by EESL under Ministry of Power.

• While there is already excellent collaboration on transmission-related matters, there is a desire to extend this collaboration to other themes, particularly procurement, to enhance the partnership amongst distribution utilities.

• Discoms should collaborate in standardization of technical specifications and procurement aspects. ISGF may take lead in this collaboration, may be starting with the Southern states under Sothern Regional Power Committee (SRPC). The objective is to not only strengthen regional partnerships but also to elevate the collaboration to a national level; and ISGF is ideally suited to play the catalyst role.

• While tariff considerations are a traditional avenue, the challenge lies in being cost-effective; and exploring non-tariff avenues becomes crucial, with a focus on enhancing procurement efficiency.

SESSION 2

Session on Rollout of 250 Million Smart Meters – Progress and Challenges

INTRODUCTION

The ambitious goal of deploying 250 million smart meters across India as part of the Revamped Distribution Sector Scheme (RDSS) is a revolutionary initiative in the modernization of the electricity distribution system of India. This session highlighted the challenges faced by the Discoms, Advanced Metering Infrastructure Service Providers (AMISPs), and Original Equipment Manufacturers (OEMs); and explored the potential new services that can be offered to customers with the integration of smart meters and presented recommendations for the way forward.

PARTICIPANTS

Vivek Kumar Dewangan, CMD, REC (Chair); Reji Kumar Pillai, President, ISGF (Moderator); Sanjay Dubey, Additional Chief Secretary-Energy Department, Govt of Madhya Pradesh; Ashish Kumar Goel, Chairman, Uttar Pradesh Power Corporation Limited; Saurav Shah, Executive Director, Power Finance Corp Ltd; Anil Rawal, Managing Director, IntelliSmart; Atul Bali, Director, National Smart Grid Mission; Ashish Sahay, Country Manager- India and SE Asia, Wirepas; Sandip Sinha, Vice President – Sales, Trilliant Networks

DISCUSSION POINTS

1. Smart Meter Rollout Status under RDSS

- Current status and achievements of the Smart Meter Rollouts under RDSS
- Scope, scale and pace of the rollouts in different Discoms

2. Challenges Faced by Discoms

- Key challenges encountered by Discoms in smart meter deployment
- Issues related to infrastructure readiness, data management, and customer engagement
- Best practices for overcoming these challenges

3. Challenges Faced by AMISPs

- Challenges for AMISPs in smart meter rollout and network management

4. Challenges Faced by OEMs

- Challenges faced by OEMs in smart meter production and supply
- Quality control, production capacity, and supply chain constraints
- Collaboration opportunities to meet demand efficiently

5. New Services for Smart Meter Customers

- Envisioning new services enabled by smart meters
- Possibilities like Time of Use (TOU) or real-time tariff schemes, demand response, and customized billing
- Customer empowerment and enhancement of grid efficiency

- Issues like communication system reliability, technology integration, data security, and scalability
- Issues with maintaining the SLAs and threat of penalties
- Strategies to address AMISP-specific challenges

6. Recommendations and Way Forward

- Recommendations for addressing challenges and accelerating the smart meter rollout
- Policy adjustments, regulatory support, and incentives for stakeholders
- A strategic roadmap for the program's continued success

KEY TAKEAWAYS

- Majority of the AMISPs empanelled for the smart metering program have no prior experience in smart metering which is a major cause of concern.

- AMISPs are finding it difficult to raise capital for the rollout as 85% of the capex is to be borne by the AMISPs.

- Bringing 100% consumers on prepayment mode is not technically and commercially practical. High-value consumer's meters cannot be operated with remote connect/disconnect switches. Consumers may be given choice to opt-in or opt-out of the prepayment mode. State Regulators and Discoms should have the final say on which categories of consumers may be brought under prepayment mode.

- Need to develop user friendly interfaces that are accessible to all consumers regardless on their socio-economic background; Discoms and AMISPs should ensure enough offline recharge centres are available for non-tech savvy consumers to recharge their prepaid meters.

- Integration touchpoints/data flow diagram of existing IT and automation systems in the Discom should be clearly incorporated in the RFP itself.

- Discoms to clearly identify the RACI (Responsible, Accountable, Consulted, Informed) Matrix for the integration process jointly with System Integrator (SI) of the existing IT systems in the Discom and the new AMISP(s).

- Selection and adoption of most appropriate communication solution for smart metering is very important in meeting the SLAs envisaged in the standard bidding document (SBD).

- Comprehensive awareness campaigns to be taken up with consumers and it should be explained to them what benefits consumers will achieve from the smart meters and how to leverage such benefits.

- Tariff restructuring need to be undertaken in most states according to pre-paid system.

• Cyber security is very important and the cyber security measures to be adopted for smart metering is specified in detail in the SBD. Discoms to ensure that AMISPs and their sub-vendors are strictly adhering to all provisions prescribed in the standard bidding document (SBD) during the entire contract period.

• Regularly update and patch smart meter firmware to address security vulnerabilities.

• Data protection and data privacy policies are also prescribed in the SBD; and Discoms should ensure its compliance by AMISPs and their ecosystem partners.

• Consumers should be given the option to opt-in or opt-out of data sharing with third parties for marketing purposes.

• Build technical competency in the industry; and increase minimum local content in smart meter manufacturing.

• Predefine SOPs with AMISPs for phase-wise installation of meters.

• Utilize healthy static meters (non-smart electronic meters) removed for routine activities till roll-out of smart meters in entire Discom service area is completed and gradually reduce the procurement of non-smart meters.

• Constitute Smart Metering Department within Discoms with members from Metering, IT and Commercial departments; and build expertise in AI and ML to derive value out of the smart meter data for other operational aspects of the Discom.

• Need to establish strong PMU and smart meter operations centre (SMOC) in Discoms to manage the smart meter rollouts.

• In Europe, the patent holders of cellular technologies (4G/5G/NB IoT) have started claiming IPR licence fees for deployment of smart meters on cellular connectivity. They will claim the same in India too. Discoms/AMISPs deploying cellular solutions may keep a minimum provision of US$ 3-5 per meter as the license fee payment for lifetime.

SESSION 3

Session on Disaster Management and Climate Readiness of Utilities

INTRODUCTION

The electric utilities in most parts of the world are experiencing major disruptions caused by climate changes – frequent cyclones, floods, forest fires, prolonged draughts, earth quakes and tsunamis etc. With increasing frequency and intensity of extreme weather events and constant rise in ambient temperatures, the resilience of utility services, including electricity distribution, is facing unprecedented scrutiny. Climate change is no longer a distant threat; it is a present-day reality that necessitates proactive measures to safeguard critical infrastructure and ensure uninterrupted service delivery. This session deliberated on the complex and multifaceted nature of the challenges utilities face, emphasizing the need for strategic planning, innovation, and collaboration to address these challenges effectively. This session served as a comprehensive exploration of disaster management and climate readiness for the electric utilities with assets distributed over vast geographies. It emphasized the urgent need for a multifaceted and forward-thinking approach; and should address equipment standards, infrastructure redesign, advanced forecasting, collaboration, and strategic investment to better prepare utilities to withstand the growing threats posed by climate-related disasters and maintain their ability to provide reliable services to their customers.

PARTICIPANTS

Ravi Seethapathy, ISGF WG Chair and GSEF Ambassador for Americas (Chair and Moderator); Killian McKenna, Senior Research Engineer, NREL, USA; Amit Tripathi, Advisor-Power Sector, Coalition for Disaster Resilient Infrastructure (CDRI); RR Mehta, Former MD, Reliance Infrastructure; Saloni Goel, Director-Projects & ESG, Religare Enterprises Ltd; Raj Kumar Rastogi, Chief of Operations, TP Central Odisha Distribution Limited; Ashutosh Sharma, Senior Principal Consultant & Team Lead, Grid Asset Management & Studies, DNV SEMELA; Vyshali Sagar, Lead-Startups and Sustainability Charter, Amazon Web Services

DISCUSSION POINTS

1. Equipment Standards for Changing Weather Patterns

- Ambient temperature adjusted power equipment rating
- Dynamic power equipment rating (ambient temperature and load adjusted)
- Updating equipment standards to align with evolving weather patterns
- Prioritizing resilience and adaptability in equipment specifications
- Strategies for timely revision of standards

2. Infrastructure Redesign for Flood Protection

- Redesigning infrastructure for flood protection
- Innovative engineering solutions
- Balancing climate resilience with cost-effectiveness
- Successful case studies

3. Cyclone-Resistant Pole and Tower Designs

- Designing cyclone-resistant utility poles and towers
- Robust materials and engineering practices
- Practical examples of cyclone-resistant designs

4. Undergrounding Distribution Lines

- Evaluating the merits and challenges of undergrounding distribution lines
- Urban planning considerations
- Lessons from successful undergrounding projects
- New methods of cabling – snap pipes
- Cost management strategies

5. Advanced Weather Forecasting and Emergency Plans

- Leveraging advanced weather forecasting for disaster preparedness
- Developing comprehensive action plans based on accurate forecasts
- Role of communication and coordination in emergency response
- Effective disaster response examples

6. Collaboration and Resource Sharing

- Promoting cross-utility collaboration in addressing climate emergencies
- Sharing best practices in resource allocation and mutual assistance agreements
- Benefits of inter-utility cooperation
- Overcoming collaboration challenges

7. Investment in Emergency Equipment and Reserves

- Importance of proactive investment in emergency equipment
- Establishing regional equipment reserves for rapid disaster response
- Financial and logistical considerations
- Long-term benefits of disaster resilience investments.

KEY TAKEAWAYS

- There is much work need to be done in India to “define” and “rate” various disaster categories; redressal and mitigation will follow that.
- There appears little impetus on “re-definition” or deratings of equipment standards due to the impact of climate change by Standards Development Organizations (SDOs). This could lead to asset stranding. A few utilities have taken upon themselves to address this - what about the rest?
- Climate change will impact dynamic thermal rating concept on all major grid elements (transmission and distribution lines, transformers, generators, motors, etc.). We need to institute these in our current assets and instal systems for real-time monitoring.
- Many technologies (AI, LIDAR, etc.) are being used to augment prediction of asset conditions. Mitigation can be done generically using digital twins or on such assets themselves in real-time.
- Collaboration amongst utilities in each region for sharing and maintaining specialized equipment (mobile substations, high-capacity cranes, insulated platforms, advanced drones etc) and spares is the need of the hour. In case of a disaster in one utility, the neighbouring utilities can support the affected utility with equipment, spares and technicians. This is feasible through regional collaboration platforms and allocation of responsibilities and provisioning budgets. Certain level of equipment standardization will also help in having uniform spares.

SESSION 4

Session on Growth of RE and EV; and the Plan for Enhancing Grid Flexibility

INTRODUCTION

The Indian energy landscape is undergoing a profound and transformative evolution, driven by the determination to achieve Net Zero by 2070. Central to this transformation being electrification of all plausible sectors. Two dynamic and interrelated trends that have garnered global attention - the unprecedented growth of renewable energy (RE) resources and the swift adoption of electric vehicles (EVs). These trends stand as the vanguards of India's energy future, heralding a departure from fossil fuel dependence towards cleaner and more efficient alternatives. This session served as a pivotal platform for examining these trends, assessing their impact, and formulating strategies to further their integration with the national grid.

PARTICIPANTS

Alok Tandon, Chairperson, JERC (Chair); Ravi Seethapathy, ISGF WG Chair and GSEF Ambassador for Americas (Moderator); Killian McKenna, NREL, USA; Zakir Rather, Associate Professor, IIT MUMBAI; Hans Peter Waldl, Managing Director, Overspeed GmbH, Germany; Sharvari Patki, Program Head, Electric Mobility, WRI India; Sainath Bandhakavi, Principal Solutions Architect - Power & Utilities, Sustainability, Amazon Web Services (AWS); Vishal Kumar, BU Manager-IMA, Phoenix Contact; Nilesh Kane, Chief-Mumbai Distribution, Tata Power Company Ltd; and Narayankumar Sreekumar, Associate Director - Electric Mobility Program, Shakti Sustainable Energy Foundation.

KEY TAKEAWAYS

• The session discussed India's significant growth in renewable energy, particularly solar power, and the increasing adoption of electric vehicles. Government initiatives like the FAME scheme and the National Electric Bus Program were mentioned as key drivers. The session also touched upon the challenges and forecasts related to EV adoption and the importance of developing standards for inverter-based resources for grid stability.

• Grid Flexibility and Integration Challenges: Speakers discussed the need for enhancing grid flexibility to accommodate the growing share of intermittent RE resources and the fast-increasing power demand for EV charging.

• The importance of proper communication protocols and connectivity for integrating renewable energy resources with the grid was emphasized, along with the potential of various aggregator models and vehicle-to-grid (V2G) applications.

• Grid flexibility is key to renewables integration, resiliency, and disaster recovery. “Load-following-RE Generation” attributes becomes vital in the emerging power systems with larger share of intermittent RE resources; and feature of asynchronous islanding and reconnection back to grid will be a beneficial feature.

• “Control Architectures” could include a home, a building, a campus or a utility service area; and segregating interruptible and non-interruptible loads enables better response.

• Important to have efficient systems for quick capture of RE surpluses when it occurs and then release to loads when needed

• Technical and Regulatory Aspects: The session deliberated on the technical and regulatory requirements for the adoption of V2G technologies, including the need for technical regulations alongside commercial ones. The discussion also highlighted the importance of cybersecurity in the energy sector and the specific guidelines provided by standards like IEC 62443.

• Innovative Solutions and Future Directions: Speakers presented innovative solutions and projects, such as using electric buses as energy storage systems and peer-to-peer (P2P) energy trading. The role of utilities in adapting to changing consumer demands and the potential of distributed energy resources like rooftop solar PV were also discussed. The session concluded with insights from the experts, emphasizing the need for a collaborative approach to address the challenges in integrating RE and EVs into the grid.

SESSION 5

Session on Planning for Transport Electrification

INTRODUCTION

In pursuit of environmental sustainability and energy efficiency, the electrification of transport sector has emerged as a central tenet of the energy transition strategy in most countries. Transport electrification, primarily through the adoption of electric vehicles (EVs), holds the promise of reducing carbon emissions, curbing air pollution, and decreasing the nation's reliance on fossil fuels. However, the successful implementation of this transition relies heavily on meticulous planning, robust infrastructure development, and seamless collaboration among multiple stakeholders.

This session explored the multifaceted aspects of planning for transport electrification encompassing a holistic view, from distribution grid planning and power supply to public charging stations (PCS) and bus depots, to fostering partnerships between Discoms, public transport operators, city governments/municipalities, and the original equipment manufacturers (OEMs). The panel deliberated on key challenges, best practices, and the roadmap for a sustainable and efficient electric transportation ecosystem in India.

PARTICIPANTS

KR Jyothilal, Additional Chief Secretary, Department of Energy, Government of Kerala (Chair); Girish Ghatikar, ISGF WG Chair on Flexibility and Electric Mobility (Moderator); Arvind Jadhav, Former Chief Secretary, Govt. of Karnataka; Mukesh Dadhich, Head (Business Development, Sustainability and Clean Technology), BSES Yamuna Power Limited; Ramkrishna Singh, Head of Business Operations - EV Charging, Tata Power Company; Arindam Maitra, VP, L&T PTD Digital Energy Grid Services and SK Senapati, Head- Sales and Commercial Services, L&T PTD Digital Energy Solutions; Ariel Dosetareh, Business Development Manager, Electreon.

DISCUSSION POINTS

1. Distribution Grid Planning for Transport Electrification

- Grid capacity optimization and load management- smart charging of EVs to minimize capex for grid upgrades
- Addressing unique requirements of power supply to PCS and bus depots through meticulous planning of the distribution grid upgrades

2. MW-scale Power for Bus Depots and Public Charging Stations

- Emerging need for MW-scale power connections in bus depots and PCS
- Distribution grid planning for reliable MW-scale connections
- Overcoming the municipal challenges
- Addressing the power quality and reliability issues

3. Collaboration Amongst the Stakeholders

- Importance of collaboration amongst Discoms, transport operators, governments, and OEMs
- Effective collaboration models
- Policy support for cross-sector cooperation.

KEY TAKEAWAYS

- Proactive power planning and operations for demand from electric transportation is crucial for grid balancing, and the integration of demand optimization technologies is essential to effectively manage charging demand.

- Collaboration among the charging station OEMs, charging station operators, and automotive OEMs is critical to ensure interoperable charging, charger reliability, enable roaming platform, etc., and instils consumer confidence in transitioning to electric transportation.

- Electric buses that serve large population need charging infrastructure and siting in concert with the grid operators. GOI is spearheading a program to rollout 50,000 electric buses on fast track. Thousands of bus depots in the country would require MW-scale power connections soon which calls for integrated planning of electric grid strengthening in close coordination between Discoms, transport companies and municipal authorities; and the distribution grid strengthening under RDSS program should consider this requirement.

- The source of electricity plays a critical role in overall reduction of emissions. Therefore, regulations must emphasize on-site and offsite renewable generation, signals for emissions content, coupled with managed charging for battery electric vehicles (EV), is the suggested way-forward.

- Regulators must craft effective policies to drive EV adoption, Discoms utilities should that can establish robust electrical infrastructure, and finally, OEMs of EVs, and charging stations and software solutions should collaborate with Discoms to ensure that entire ecosystem can be integrated with the grid

- Among the emerging technologies, data analytics and artificial intelligence (AI) can be a disruptive force. All stakeholders in the electric mobility domain must study and assess how AI can play a pivotal role in optimizing various aspects of their operations.

- Electric transportation provides utilities with a new revenue generation opportunity, and address local pollution from tailpipe emissions, which has potential to lower the “most-polluted” status for many Indian cities.

• Wireless charging, which applies to specific cases, facilitates EV charging while driving, and reduce battery capacity and charging times. Opportunity charging at bus depots, terminals, ports, etc., lowers the cost of economy-wide transportation electrification.

• Charging infrastructure investment for EVs is a long-term commitment. While immediate cost recovery may not be realized, the strategy to reduce operational costs and improve charger reliability can reduce the capital expenditure burden, and the need for subsidies.

• Collaboration of various government departments, such as transport, environment, and power, with regulators is required for economy-wide transport electrification. Funding the transport electrification can be more efficient with better coordination.

SESSION 6

Session on New Innovations for Net Zero Power Sector

INTRODUCTION

In the pursuit of a net-zero carbon future, the power sector is witnessing a surge of innovative technologies and approaches. This session explored cutting-edge innovations that are poised to revolutionize the power sector's journey towards sustainability. It highlighted the applications of Artificial Intelligence (AI), Machine Learning (ML), and Blockchain, as well as advancements in Grid Edge Technologies, new Cabling Methods, and the concept of Grid-Integrated Energy Positive Buildings. This session served as a platform to showcase and discuss innovations that are reshaping the power sector. These innovations collectively contribute to the power sector's transition towards sustainability and a net-zero carbon future.

PARTICIPANTS

Sanjay Dubey, Additional Chief Secretary-Energy Department, Govt of Madhya Pradesh (Chair); Reena Suri, Executive Director, ISGF (Moderator); Devanand P, Chief (Tech Services & PSCC) and Chintamani Chitnis, Head Power System Control, Tata Power Company Ltd; Gopal Nariya, Head - Project Monitoring, BSES Rajdhani Power Limited; Pritam Muppuri, Business Development Manager, AWS India; Manish Patel, Sr. General Manager – Business Development, APAR Industries Limited; Sunil Kumar, Head of Business Segment and SK Senapati, Head - Sales & Commercial Services, L&T PTD Digital Energy Solutions; Meenakshi Vashisht, Co-Founder & CEO, TekUncorked; Vetrivel Kuppusamy, Sr. General Manager, Schneider Electric; Rahul Sethi, Founder, Metaverse911.

DISCUSSION POINTS

1. AI, ML and Blockchain in Power Sector

- Transformative potential of AI and ML in power sector
- Use cases like predictive maintenance and demand forecasting
- Blockchain's role in enhancing transparency and security in energy transactions

2. Grid Edge Technologies

- Role and significance of Grid Edge technologies
- Exploration of decentralized energy resources and microgrids
- Impact on grid stability, efficiency, and resilience

3. New Cabling Methods

- Highlights of innovations in power cabling methods using snap pipes
- Benefits of underground cabling
- Considerations regarding environmental impact and costs
- Benefits of high current carrying conductors

4. Digital Twins, AR, VR, Metaverse

5. Assisted Reality Tools and its Application in the Utility Sector

Key Takeaways

The session emphasized the transformation of the power sector towards achieving a Net Zero carbon future that will witness profound shift in how power is generated, distributed, and managed, with a strong focus on reducing carbon emissions and enhancing sustainability. The discussions highlighted several cutting-edge technologies reshaping the power sector which included:

• Artificial Intelligence and Machine Learning: Utilization of AI and ML tools for predictive maintenance, demand forecasting, and optimizing grid operations.

• Blockchain Technology: Implementation in areas like energy trading and securing transactions; and cyber security.

• Grid Edge Technologies: Advanced solutions for managing energy demand and supply at the grid's edge, closer to the consumers.

• New Cabling Methods: Innovations for faster and cheaper work methods for laying under-ground power cables to improve reliability and efficiency; and reduce losses of the distribution network.

• Energy-Positive Buildings: Integration of smart buildings into the grid in a way that they generate more energy than they consume; and increase the flexibility of the grid.

• Immersive Technologies such as Virtual Reality, Augmented Reality, Assisted Reality and Metaverse: The use cases of the immersive technologies such as digital twins, AR, VR, and metaverse solutions in the utility sector were presented. These technologies offer new ways to visualize, design, and manage power systems, enhancing operational efficiency, planning, training, remote support for field activities etc.

• The session provided a platform for experts to discuss the new innovations and their applications in the power sector especially in the context of increasing reliance on renewable energy resources, and the potential of these technologies to lead the sector towards a sustainable, Net Zero future.

SESSION 7

Session on Rise of the “Prosumer” and Prosumer Engagement Strategies for Net Aero Power System

INTRODUCTION

The rise of the "prosumer," an entity that is both consumer as well as producer of electricity, is transforming the power system landscape. This session focused on the implications of prosumer growth, particularly how it impacts the operations of the Discoms and explored engagement strategies. It also delved into peer-to-peer (P2P) transactions of solar energy among prosumers and consumers, shared international case studies, and examined the benefits of real-time or time of use (TOU) tariff schemes. The discussions shed light on the growing role of prosumers in the power system and strategies for engaging them in the Discom’s journey towards Net Zero power systems. The goal is to encourage proactive engagement with prosumers while ensuring the continued stability and sustainability of the power grid.

PARTICIPANTS

Rahul Tongia, Senior Fellow, CSEP (Chair and Moderator); Anand Menon, Director, Digital Grid Projects, Powerledger; Anjali Vishwakarma, Executive Engineer, MPPKVVCL Indore; Alok Mishra, Business Lead- Power Grid APAC, DNV; Birendra Choudhary, DGM-IT, NPCL.

DISCUSSION POINTS

1. Distributed Energy Resources (DER) and its Impact of Prosumer Growth on Discoms

- Analyzing the impact of prosumer growth on Discoms' technical and financial operations
- Challenges related to grid management, revenue, and load balancing
- Strategies for adapting the grid stability and maintaining financial viability

2. Peer-to-Peer (P2P) Transactions of Green Energy and Local Energy Markets

- Exploring the concept of peer-to-peer (P2P) transactions of solar energy among prosumers and consumers
- Dynamics and the benefits of Local Energy Markets (LEM)
- Regulatory frameworks and technological solutions for P2P energy trading and LEMs

3. Prosumer Engagement Strategies and Case Studies

- Innovative strategies for Discoms to engage with prosumers effectively
- International case studies showcasing successful prosumer integration
- Best practices for involving prosumers in grid management and sustainability initiatives

4. Real-time or Time of Use (TOU) Tariff Schemes

• Advantages of real-time or Time of Use (TOU) tariff schemes in encouraging pro-sumer participation

• Dynamic pricing and its role in energy conservation and load shifting

• Examples of utilities successfully implementing TOU tariffs.

Key Takeaways

• Global experiences indicate that prosumers will rise in volume and consequently its impact on the grid will also grow over time in India.

• The regulatory policy regime under which rooftop solar will operate (e.g., net metering vs gross metering) is the most important factor for determining the impact, both on consumers and on the Discom.

• Time of day pricing or other regulations that recognize differences in time value of solar power are going to be important for Discoms to evolve.

• Edge-based transactions like peer-to-peer (P2P) need to be enabled which could help consumers; if these are aligned with Discom supply challenge periods, it can be a win-win.

• Blockchain technologies are a useful tool for managing P2P transactions; contrary to popular belief, not all blockchain technologies are complex or require high computational power or high energy consumption.

• Each Discom should devise their prosumer engagement strategiesOne challenge for this space is asymmetry in which type of consumers will likely be prosumers. For example, commercial and industrial (C&I) consumers moving to prosumers will have larger revenue impact for the Discoms.

• Consumers need simplicity in tariffs and practical support on how to become a successful prosumers, which also needs an ecosystem around delivering quality service.

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