

Gist of Discussion at the sixth meeting of the Distribution Utilities Forum

February 18, 2020, Hosted by BESCO at Bengaluru

A. Inaugural Session

1. **In the Chair: Mr. Gireesh B. Pradhan**, Honorary Chairman, Distribution Utilities Forum (DUF)
2. **Co-Chair: Mr. M. B. Rajesh Gowda**, Managing Director, Bengaluru Electricity Supply Company Limited (BESCO); also on the dais Mr. Jayant Kawale, independent consultant, former Chairman, MSEB and former MoP Joint Secretary.
3. The **sixth meeting of the Distribution Utilities Forum** was held on **18th February 2020** at **BESCO Headquarters, Bengaluru** under the chairmanship of **Mr. Gireesh Pradhan**. The theme of the meeting was **Electric Vehicles: Discoms' Perspective**. List of participants and agenda are enclosed.
4. In his welcome address, **Mr. Gowda**, Managing Director, BESCO highlighted the present power scenario in Karnataka referring to the available power generation capacity, changing dynamics of power purchase costs, and how these relate to disruptive innovations at the distribution level. He then gave an overview of BESCO operation and challenges faced by them and remarked how the Discom has been proactive in adopting new smart-grid technologies like energy storage, EVs, etc. He emphasized the importance of communication infrastructure for proper implementation of electric vehicle charging infrastructure (EVCI) and highlighted the need to address the challenges faced by Discoms so as to efficiently scale-up the uptake of Electric Vehicles (EVs) in the distribution network.
5. The Forum was introduced by **Mr. Gireesh Pradhan, Honorary Chairman, DUF**, as a unique platform for Discoms wherein key issues identified and prioritized by the Discoms are taken up for discussion after which the Forum comes out with discussion papers and reports containing the findings of the deliberations. Referring to the topic of the 6th meeting as timely and pertinent, he briefly described the present scenario around EVs and the apprehensions regarding charging infrastructure and its impacts on the distribution network, which was also identified as a matter of serious concern for the utilities in the previous DUF meeting. He appreciated the presence of MoP, BEE and EESL in the meeting, since they are the nodal ministry and agencies and play a pivotal role in building the EV ecosystem in India. He also appreciated the presence of other key stakeholders such as vehicle original equipment manufacturers (OEMs), charge-point operators (CPOs), fleet aggregators and EVCI manufacturers. Further, he highlighted the importance of considering different points of view and perspectives of all stakeholders concerned with the EV ecosystem to address the challenges regarding EVCI implementation and how to address them.

6. In his address, **Mr. Jayant Kawale** praised the DUF and highlighted its importance and role in advocating for and catalysing reforms required in the power distribution sector. Mr Kawale observed that the technological nuances of slow and fast charging and locational planning of EVCI are under the Discoms' control. However, battery swapping is emerging as a good model for charge management and can be piloted with two-wheelers and three-wheelers initially provided the required standards are followed, he said.

B. Presentations

The introductory remarks were followed by a set of presentations from stakeholders that set the context for the discussions that followed. Presentations were made by representatives from other stakeholder segments like nodal agencies, CPOs, EVCI manufacturers and research organizations including TERI and NRDC to highlight the major developments and related issues.

- The TERI team initiated the session with an introductory presentation to give a glimpse of the sector in India with a mention of global best-practices. **Mr. Alekhya Datta, Fellow TERI**, presented the EV eco-system in India including key points relating to EV charging standards and protocols, global policy landscape and central as well as state level policy initiatives in India.
- **EESL** highlighted their E-mobility program and the experience so far. EESL followed a demand-aggregation model in which they floated an international tender for procurement of 10,000 electric cars through open competitive bidding. Mahindra and TATA emerged as the winning EV suppliers and their models were provided to government departments at discounted rates. As of now, 1550 cars have been procured. Besides this, EESL has also procured 10 Hyundai's Kona electric car for senior officials such as secretaries on a trial basis. Different leasing models were discussed by **Mr. Mathew from the EESL**. He mentioned that DC and AC chargers have also been provided for captive usage.
- **HPCL** made a presentation on 'Mass-scale Deployment of EVs in India – Opportunities & Challenges' and showcased their efforts in e-mobility. The key focus of the presentation made by **Mr. Kushal Kumar Banerjee** was on the enthusiastic initiatives being taken by OMCs in promoting EVs leveraging their pan-India presence and the practical issues they are facing in implementing EVCS at their outlets. Additionally, he discussed the barriers to mass adoption of EVs such as high initial cost and range anxiety. Petroleum and Explosives Safety Organisation (PESO) guidelines and their relevance and important details regarding EV charging station development in retail fuel-outlets were also highlighted by him.
- **Mr. Ankit from Fortum** presented various solutions offered by **Fortum** in India presently. He apprised the Forum about potential business models for public charging infrastructure such as charge point operator model, turnkey model and

cloud service only model in which Fortum's cloud services are subscribed by the PCS developer. Key drivers for public charging and home charging were also cited by him. Additionally, he mentioned technical showcase of battery swapping model at mall of India.

- **Mr. Akshaye Barbuddhe** from **Delta Electronics** brought the perspective of Electric Vehicle Supply Equipment (EVSE) standardization including major points considering safety. In his presentation, he described various charging modes and international safety standards followed for EV charging. Besides this, he highlighted Delta's technology and their initiatives towards installation of chargers worldwide, including a couple of projects with renewable energy and battery storage solutions in India. There were some discussions regarding power quality impacts of EV chargers and some concerns related to phase-imbalance and harmonics, which were addressed by Mr. Barbuddhe.
- **Mahindra Electric** highlighted their views on EV manufacturing in India.
- **Ms Charulata** from **NRDC** presented major findings of their study on EV charging infrastructure business models. Various scenarios on the utilization rates of public charging stations required in a major metropolitan city in India and the resulting revenue realization vis-à-vis Discom investment and government incentives/subsidies were presented. One of the major recommendations was policy interventions are needed to make the business case attractive so the utility and private capital will enter in the initial years to support EV growth.

C. Q & A session:

- **Mr. Nitish Arora** from **Ola Electric** discussed key issues regarding battery swapping and obtaining electricity connections for Public Charging Stations (PCSs), particularly the apprehensions regarding increased fixed charges in some states. He remarked that the fixed cost component of the tariff for HT category consumers should be reduced to zero or kept constant if operators (including fleet operators who also run and maintain their own PCS) upgrade the grid infrastructure at their own cost so as to ease the process of installing EVCI; otherwise, it should be considered as LT category. Additionally, he also proposed that the LT category should stretch to its maximum limit in order to allow EV charging stations as a consumer category in a suitable range. There was another proposal of making battery swapping stations eligible for charging EV tariff alongside a request that regulators should take initiatives for ensuring that PCS set up by private players avail EV tariff, as was seen to be reported in some cities. Besides this, demand aggregation in a distributed manner to procure electricity through open access was another suggestion that was put forth.
- **The OMCs** shared their concerns regarding adequate power infrastructure for their fuel stations to cater to the EV charging load. It was suggested that an economic

Model for EV Chargers at retail outlets needs to be analysed considering capex & and other opex costs based on the global scenario.

- **A major suggestion came from the Discoms** in this session—that the regulators should allow monitoring, storing and sharing of real time data of EV charging to the Discoms.

D. Post-lunch session

In the post-lunch session, the Forum meeting continued with two sessions that focussed on major outcomes of the studies being performed by Shakti Sustainable Energy Foundation (SSEF) and relevant to the context, and those carried out by TERI specifically to be presented and discussed at the Forum meeting.

- **Context Setting – Insights from SSEF’s on-going studies on the Business Models for EVs**

Ms Chetna Nagpal and Ms Akanksha Golechha from **SSEF** highlighted the key points of the roadmap prepared by them for distribution licensees in Uttar Pradesh for rolling out electric vehicle charging business and for electric vehicle charging infrastructure planning and rollout for Bangalore. EV charging patterns & impacts on Discom assessed by SSEF for existing EV users’ profile and their charging behavior were presented. This will be used to develop a methodology for Discoms to estimate demand at the distribution transformer (DT) level.

I. Roundtable discussion among Electricity Distribution Utilities:

In this session, each of the Discoms, that consented to present, highlighted their major issues regarding EV charging, how are they addressing them and what have been their initiatives and experience, so far.

Dr. Shashank Vyas from **TERI** initiated the session by introducing the stakeholder interactions performed as a part of the study under the forum. He summarized the key points of the interactions held with the Discoms as well as with other stakeholders on these anticipated issues of EV charging. The major issues were categorized into technical/operational, financial and regulatory aspects. Representatives from respective Discoms then presented their perspectives on EV charging.

Representative from **BESCOM** highlighted their initiatives towards EV implementation and shared their journey as a pioneering Discom that was amongst the first utilities to adopt EVs. He shared **BESCOM’s** latest proposal for procuring additional 20 EV charging stations in Bangalore City in coordination with the Department of Commerce & Industries, Government of Karnataka. Besides this, he also highlighted the long-term challenges to EV adoption such as shift in peak load, increased peak demand, addition of a greater number of charging

stations under one DT/feeder, possibility of large number of EVs charging at same time, etc. Possible measures that can be taken by Discoms to address these issues like ToD tariff for EV charging stations, smart metering, V2G enablement, etc., were also highlighted.

Representative from **MPPMCL** began by highlighting the major points of the MP EV policy including incentives to the small, medium and large EV stations and suitable provisions for promoting EVCSs linked to RE sources. Additionally, the MP team remarked that state and central government grants might be needed for alternate and revenue business models.

MSEDCL representative highlighted their two pilot projects and 10 EVCS installed in phase I along with 40 EVCS in phase II and 450 EVCS in phase III to scale up the charging station network based on penetration of EV on roads. A separate ToD tariff for EV charging station has been fixed at INR 6/kWh by MERC. Additionally, integrated digital payment features in smart-phone applications have been developed, as reported by him.

Representative from **BYPL** highlighted the Discom's initiatives in e-mobility and presented the major findings of a network impact study commissioned by them recently. Tariff and regulatory interventions are also required. He suggested that demand aggregation should be Initially facilitated through cab/ fleet owners. Along with the need for regulatory and tariff interventions, he also suggested that an IT tool that would be integrated with the master data aggregation engine with the utility operations tool should be developed.

BRPL representative presented the EV charging network developed by BRPL along with the number of cars being used by their personnel. Use of a centralized monitoring system to view the real time status of network loading with the facility of remote monitoring and control of EV load was also showcased. highlighted NREL study based on public fleet owner. It was remarked that ToU/ ToD based tariff could be implemented to encourage EV charging during time slots of high RE generation. Additionally, financial and regulatory aspects for Discoms were reported by him.

CESC representative spoke about how Kolkata is already running the largest EV bus fleet in the county and how CESC is confident about the EV ecosystem in their state. He also apprised the Forum of a joint study with TERI on the impact of coordinated/ Smart EV charging scheme on network loading and power purchase costs. Besides this, he emphasized locational planning, smart metering, technical challenges anticipated in network operation, etc. Further, other financial and regulatory interventions from the government to support for EVCS development were emphasized upon and the need for finding alternative revenue and business models were remarked by him.

II. Insights from TERI's Studies on EV Charging

Mr. Neshwin Rodrigues and **Dr. Shashank Vyas** from **TERI** presented a set of studies performed by TERI on the impact of EV charging. The studies covered the impact of EV charging on a distribution network in terms of DT loading profile, power purchase cost and

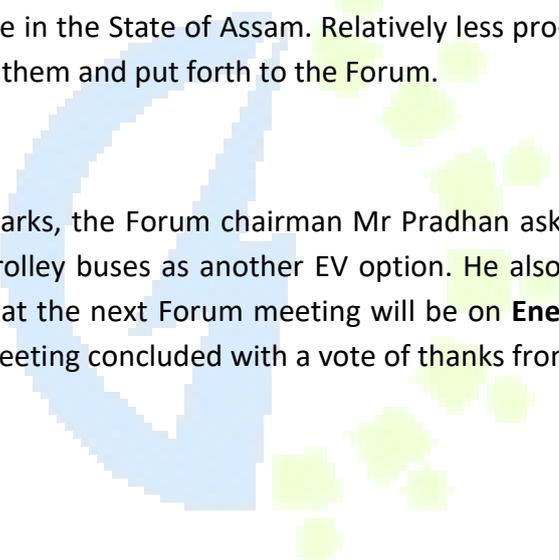
network congestion. A controlled and coordinating charging scheme optimizing the total cost of charging based on a composite charging tariff was presented for a feeder on the CESC network in Kolkata. The proposed composite tariff was designed to reflect utility-level loading through ToD tariff and the loading on the local network connected to the charging station. The results were appreciated by the utilities present and engaged the TERI team in a constructive discussion. Studies on the impact of EV charging on power quality performed through on-site measurements at different locations were also showcased. RE based solutions for bus charging for EV bus depots, benefits of the same with and without ToD tariff and an economic assessment of Discoms' investment into EV Charging Infrastructure and the impact on tariff were also presented.

E. Q & A Session

APDCL raised their concerns regarding low EV penetration level and lack of public EV charging infrastructure in the State of Assam. Relatively less pro-active efforts in developing EVCI was reported by them and put forth to the Forum.

F. Conclusion

In his concluding remarks, the Forum chairman Mr Pradhan asked the Discoms to consider electrically charged trolley buses as another EV option. He also informed the Discoms and other stakeholders that the next Forum meeting will be on **Energy Storage** with the venue to be decided. The meeting concluded with a vote of thanks from Mr. Pradhan.



Distribution Utilities Forum

Distribution Utilities Forum (DUF) - Sixth Meeting

18th February, 2020, BESCO Headquaters, Bengaluru

List of Participants - Stakeholders

Sl. No	Name	Designation	Organisation
1	Mr. Gireesh B. Pradhan	Honorary Chairman	Distribution Utilities Forum
2	Mr. Jayant Kawale	Managing Director	RattanIndia Power Ltd.
3	Mr. M. B. Rajesh Gowda	Managing Director	Bangalore Electricity Supply Company Limited (BESCOM)
4	Mr. Swamy Reddy S.	Director (IPC&RAC)	Southern Power Distribution Company of Telangana (TSSPDCL)
5	Ms. Malini H V	CGM (CA)	Bangalore Electricity Supply Company Limited (BESCOM)
6	Mr. Venkatesh Kumar	CGM (Ops)	Bangalore Electricity Supply Company Limited (BESCOM)
7	Mr. Prakash V	GM (Tech.) CESC	Bangalore Electricity Supply Company Limited (BESCOM)
8	Mr. C. K. Sreenath	DGM (SG&EV)	Bangalore Electricity Supply Company Limited (BESCOM)
9	Ms. Parvathi	AGM (SG&EV)	Bangalore Electricity Supply Company Limited (BESCOM)
10	Mr. Vishal	Manager (SG&EV)	Bangalore Electricity Supply Company Limited (BESCOM)
11	Mr. K. Neelagandan	Manager	Tata Power Delhi Distribution Limited (TPDDL)

Sl. No	Name	Designation	Organisation
12	Mr. Mu. Vasanthan	Manager	Tata Power Delhi Distribution Limited (TPDDL)
13	Mr. B.S. Khanooja	CGM (Comml.-III)	Madhya Pradesh Power Management Company Limited (MPPMCL)
14	Mr. G.S. Khanooja	AGM (RO)	Madhya Pradesh Power Management Company Limited (MPPMCL)
15	Mr. F.K. Meshram	CGM (RM)	Madhya Pradesh Power Management Company Limited (MPPMCL)
16	Mr. M.S. Atre	CGM	Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited (MPMKVVCL)
17	Mr. S.P. Ingole	AGM	Madhya Pradesh Poorv Kshetra Vidyut Vitaran Company Limited (MPPoKVVCL)
18	Mr. Antim Jain	DGM (Works)	MP Paschim Kshetra Vidyut Vitaran Company Ltd (MPPaKVVCL)
19	Mr. Arjun Pratap Singh	Executive Engineer (Commercial)	Uttarakhand Power Corporation Limited (UPCL)
20	Mr. Vikas Gupta	Executive Engineer (R-APDRP-Part-A)	Uttarakhand Power Corporation Limited (UPCL)
21	Mr. Rohit Kumar Sekhri	Executive Engineer	Electricity Department (Chandigarh)
22	Ms. Bidisha Mahanta	Joint Manager (IT)	Assam Power Distribution Company Ltd. (APDCL)
23	Ms. Momi Borah	Assistant Manager	Assam Power Distribution Company Ltd. (APDCL)
24	Mr. Rajesh Kumar Mathuria	Executive Engineer	New Delhi Municipal Council (NDMC)
25	Mr. Rajib Kumar Das	DGM (Planning)	Calcutta Electric Supply Corporation (CESC)
26	Mr. M. M. Abdul Rahim	Deputy Chief Engineer (Electrical)	Cochin Port Trust
27	Mr. Johannesburg Hynniewta	SE (Shillong circle)	Meghalaya Power Distribution Corporation Limited

Sl. No	Name	Designation	Organisation
			(MePDCL)
28	Mr. Naveen Nagpal	General Manager (Renewables, Energy Storage and E-Mobility)	BSES Rajdhani Power Limited (BRPL)
29	Mr. Pradeep Aggarwal	DGM	BSES Rajdhani Power Limited (BRPL)
30	Mr. Devanshu Sharma	Deputy General Manager	BSES Yamuna Power Limited (BYPL)
31	Mr. S Soma Sekhar	Dy. EE	Andhra Pradesh Southern Power Distribution Company Limited (APSPDCL)
32	Mr. Chandramani Mishra	Executive Engineer	Maharashtra State Electricity Distribution Company Limited (MSEDCL)
33	Ms. D. Kalaimagal	Executive Engineer / Energy Conservation Cell/Demand Side Management Wing.	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)
34	Mr. R. Purushothaman	Assistant Executive Engineer / Energy Conservation Cell/Demand Side Management Wing	Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO)
35	Mr. R K Sharma	SE/ Commercial	Jaipur Vidyut Vitran Nigam Limited (JVNL)
36	Mr. Vaibhav Sharma	Lead Associate – New Business Services	Tata Power, Mumbai
37	Mr. Ch. Maruti Venkataratnam	Deputy Executive Engineer/Solar	Andhra Pradesh Eastern Power Distribution Company Limited (APEPDCL)
38	Mr. G.V.V.S. Vijay	Executive Engineer/Energy Conservation	Andhra Pradesh Eastern Power Distribution Company Limited (APEPDCL)
39	Mr. Chanchal Biswas	Superintendent Engineer (E)	West Bengal State Electricity Distribution Company Limited (WBSEDCL)
40	Mr. Bhudhadev Datta	Superintendent Engineer (REM)	West Bengal State Electricity Distribution Company Limited (WBSEDCL)

Sl. No	Name	Designation	Organisation
41	Mr. Anup Gupta	DGM (NTPC)	Ministry of Power (MoP)
42	Mr. Deepak Tripathi	Sector Specialist (Transport)	Bureau of Energy Efficiency (BEE)
43	Mr. Mathew	Engineer(Tech)	Energy Efficiency Services Limited (EESL)
44	Mr. Ankit Maheshwari	Chief Manager - EMobility	Fortum charge & Drive
45	Mr. Nitish Arora	Research and Policy Lead	OLA Electric
46	Mr. Akashye Barbuddhe	Business Head	Delta Electronics
47	Mr. Kushal Kumar Banerjee	General Manager (Business Development)	Hindustan Petroleum Corporation Limited (HPCL)
48	Mr. Vikas Kumar	Senior Manager	Mahindra Electric
49	Mr. Gunjan Dev	Deputy General Manager (Corporate Strategy)	Indian Oil Corporation Limited (IOCL)
50	Mr. Piyush Sakhare	Assistant Manager (Alternate Energy)	Indian Oil Corporation Limited (IOCL)
51	Mr. Rohit Kumar	DGM(Retail Sales)	Indian Oil Corporation Limited (IOCL)
52	Ms. Charulata	Lead Consultant, Electric Mobility & clean energy, India program	Natural Resources Defense Council (NRDC)
53	Mr. Mohammad Abdul Baari	General Manager - Operations	ETO Motors Pvt Ltd.

List of Participants - TERI and Shakti Sustainable Energy Foundation

Sl. No	Name	Designation	Organisation
1	Ms. Gayatri Ramanathan	Associate Director (Projects)	Shakti Sustainable Energy Foundation (SSEF)
2	Ms. Akanksha	Program Manager	Shakti Sustainable Energy Foundation (SSEF)
3	Ms. Chetna Nagpal	Program Manager	Shakti Sustainable Energy Foundation (SSEF)
4	Mr. Alekhya Datta	Fellow	The Energy and Resources Institute (TERI)
5	Mr. Narayankumar Sreekumar	Fellow	The Energy and Resources Institute (TERI)
6	Mr. Shashank Vyas	Associate Fellow	The Energy and Resources Institute (TERI)
7	Mr. Balaji Raparthi	Associate Fellow	The Energy and Resources Institute (TERI)
8	Mr. Neshwin Nigel Rodrigues	Research Associate	The Energy and Resources Institute (TERI)
9	Mr. Rishabh Sethi	Research Associate	The Energy and Resources Institute (TERI)
10	Ms. Jyoti Sharma	Project Consultant	The Energy and Resources Institute (TERI)


Distribution Utilities Forum



Distribution Utilities Forum

6th Distribution Utilities Forum (DUF) Meeting

Theme: ELECTRIC VEHICLES: A DISCOM'S PERSPECTIVE

Venue: BESCOC HQ, Bengaluru

Date: Tuesday, 18th February 2020

AGENDA

09:30 AM: - **Registration & Tea/ Coffee**

10:00 AM: - **Introduction to the EV Eco-System in India: TERI**

10:30 AM: - **Mass-scale Deployment of EVs in India – Opportunities & Challenges: EESL**

10:45 AM: - **EV Charging Infrastructure – Standards & Business Models: Fortum & Delta Electronics**

11:15 AM**: - **Mass-scale Deployment of EVs in India – Opportunities & Challenges: IOCL & HPCL**

11:45 AM: - **Views on EV Manufacturing in India: Mahindra Electric Mobility Limited**

12:00 PM: - **Sustainable Financial Models to accelerate investment in charging infrastructure: NRDC**

12:15 PM: - **Q&A Session**

Lunch Break: 01:00 PM – 1:45 PM

1:45 PM: - **Context Setting – Insights from SSEF's on-going studies on the Business Models for EVs**

2:00 PM: - **Roundtable discussion among Electricity Distribution Utilities (MoP/ BEE):**

- a) Presentation from DISCOMs (MPPMCL, BRPL, MSEDCL, BYPL, BESCOC & CESC)
- b) Deliberations on Key issues: reference from draft 'Discussion Paper' (TERI)
 - EV charging impacts on distribution network operation
 - Formulation of appropriate Tariffs – ToD/ ToU
 - Connectivity Regulations, Metering and Billing
 - Safety aspects & Standardization
 - Business Models & Institutional Arrangements
 - Capacity Building & Awareness Programme

3:45 PM**: - **Insights from TERI's Studies on EV Charging:**

- a) Modeling & simulation study on impact of controlled/ smart EV charging, and charging schedule optimization (Study with CESC Limited)
- b) On-site power quality impacts of EV charging (Discussion on NDMC/ BRPL/ WBTC-CESC site specific observations for 4-W & e-buses charging)
- c) Impact on ARR due to investment in Public Charging Infrastructure, and the Case for RE plus Storage-based EV Charging Model

4:15 PM: - **Summary & Way Forward**

4:30 PM: - **Topics for next DUF Meetings (Energy Storage, Smart Metering, DSO & Markets etc.)**

4:45 PM: - **Site visit to EV Charging Infrastructure at BESCOC HQ**

** Tea/ Coffee to be served inside.
