

Operational Planning for EV integration with Distribution Networks: Insights from TERI study

Background:

Harbouring an ambition of 20% electric mobility share by 2030, India has recently joined the newly formed Zero Emission Vehicle Transition Council¹ (under the COP26) which will work towards accelerating the pace of global transition to zero emission vehicles. Earlier, the Government of India approved Phase-II of the FAME Scheme² with an outlay of Rs. 10,000 Cr. and out of the total budgetary support allocated, about 86 % of the funding is earmarked for demand incentives so as to create demand for Electric Vehicles (EVs) in the country, with a focus on electric 2-wheelers, 3-wheelers, buses and 4-wheeler passenger cars. As a complementary step, many State governments also came-up with their state-specific EV policies as well as notified tariffs for EV charging.

According to the IEA's Global Electric Vehicle Outlook 2020³, the global electricity demand will grow nearly 14-fold from 75 TWh in 2019 to 1,100 TWh in 2030 and the share of EVs in 'peak' electricity demand will grow to as high as 4-12% in major EV markets globally, including India in 2030. With increasing penetration of EVs in the coming years as well as multiple instances of un-coordinated charging, there will be many occurrences of 'rebound-peak' in the electricity distribution system if an appropriate framework is not in place such as controlled and smart charging and locational planning of EV Charging Infrastructure (EVCI) with use of renewable energy sourced power.

Therefore, it is imperative to assess the holistic impacts of EV charging at the distribution network level (especially at city-level) under different transition scenarios so as to come-up with appropriate mitigation techniques (such as smart charging etc.) and enabling mechanisms (such as time-of-use tariff etc.) to ensure a smoother integration of EVs in the network and better operation of the distribution system. In this regard, TERI has undertaken a study to develop a 'load-estimation model' in the first-phase as well as to create a framework for locational planning of EVCI using GIS (in the 2nd phase) Recently, the Government of National Capital Territory of Delhi (GNCTD) approved the 'Delhi Electric Vehicles Policy, 2020' which will drive the rapid adoption of Battery Electric Vehicles (BEVs) so that they contribute to 25% of all new vehicle registrations by 2024⁴. It also talks about establishment of a wide network of private and public charging stations as well as swappable battery stations in concessional locations through Energy Operators' (EOs) model⁵. In phase-1, TERI estimated the EV load-curve impact on the city distribution network of the NCT of Delhi (for the year 2025 & 2030), and currently a GIS-

¹ <https://www.gov.uk/government/news/joint-statement-of-the-zero-emission-vehicle-transition-council>

² <https://fame2.heavyindustry.gov.in/Index.aspx>

³ <https://www.iea.org/reports/global-ev-outlook-2020>

⁴ <https://ev.delhi.gov.in/>

⁵ https://transport.delhi.gov.in/sites/default/files/All-PDF/Delhi_Electric_Vehicles_Policy_2020.pdf

based locational planning tool is under development for New Town Kolkata Green Smart City⁶ with input from the load-estimation model.

With this background, TERI is hosting a virtual roundtable discussion (on 12th January, 2021) in-order to present the findings from Phase-1 study carried out for the NCT of Delhi so as to get valuable feedback and inputs from the key stakeholders as well as recommendations for cities to prepare adequacy of electricity distribution network and scientific planning of EV charging stations to facilitate this transition. The online workshop* will be structured as a roundtable discussion with the following agenda items:

- Introduction to the virtual roundtable & Opening Remarks by the Hon'ble Chief Guest: - 3:30 PM – 3:40 PM
- Presentation by TERI – EV Load Estimation Model for NCT of Delhi: - 3:40 PM – 4:00 PM
- Roundtable Discussion (Moderated by TERI's Expert) [4:00 PM – 4:55 PM]
 - State Policy Initiatives: DDDC/ Transport Dept.
 - Central Vision: NITI Aayog, EESL/ NTPC & BEE
 - DISCOMs' Perspective: BRPL, BYPL & TPDDL/ NDMC
 - OEMs' Perspective: M&M, Tata Motors/ MG Motors, SIAM & CharIN
 - Charge-point Operators' Perspective: Fortum/ Exicom, SmartE/ Sun Mobility/ Ola Electric & BluSmart/ Lithium Urban
 - Researchers' Views: NREL, OMI & DST/ BIS ETD-51
- Concluding Remarks – CIFF/ SSEF [4:55 PM – 5:00 PM]

*expected duration of this online/ web event will be 1.5 Hrs.

⁶ <https://www.newtowngreencity.in/>