EV ADOPTION STRATEGY FOR FLEET: WHAT ARE THE WAYS AND STRATEGIES TO TACKLE COMPLEX FLEET ELECTRIFICATION CHALLENGES?

Electrification of vehicle fleets has gained considerable momentum as many companies involving urban mobility in their operations are committed to reducing their carbon footprint. On the one hand, reduced battery costs, innovative business models, and policy incentives are driving the transition to electric vehicles (EVs) from fuel-powered ones. On the other hand, high purchase costs, limited range, and lack of a well-established charging network continue to be major roadblocks. To overcome these challenges, efficient fleet operation and planning strategies need to be adopted.

FLEET PLANNING AND MANAGEMENT

The operation of EVs significantly differs from that of traditional fuel-powered vehicles. While traditional vehicles have to be refueled (a few minutes), EVs need to be recharged, which translates into a longer downtime (a few hours). This, accompanied by poor charging infrastructure, necessitates efficient operational planning for EVs so that uninterrupted and reliable services are realized. The fleet should be deployed on predictable routes such that the battery range can be maximized and vehicles can return to the charging station before their batteries discharge. Further, the schedules should be planned to accommodate sufficient charging times.

LOCATING CHARGING INFRASTRUCTURE

Optimal siting of charging infrastructure is essential for the smooth adoption of EVs by fleet operators. Identifying suitable locations to fulfil the charging requirements of a fleet depends on the nature of its operations. For last-mile delivery operations with smaller route lengths (up to 30 kilometres) that follow a hub and spoke model, the charging infrastructure should ideally be installed at the hubs. For fleets with longer routes (100 kilometres and above), the charging infrastructure can be installed at major origins and destinations.

Further, for passenger fleets that do not operate on fixed routes, the infrastructure should be installed in major activity areas such as commercial hubs and public spaces. Finally, fleet operators should explore various charging technologies (such as plug-in charging, battery swapping, and inductive charging) that best suit their operations.

SMART CHARGING SYSTEMS

Often, actual battery performance is significantly different from the stated performance. The actual performance is usually dependent on traffic and battery conditions. Therefore, fleet operators should adopt smart charging systems that use real-time data to monitor the operations of EVs and the batteries powering them.

These systems can control when and where an EV needs to be charged. Such an approach can address the concerns regarding battery discharge and range anxiety. In addition, these systems can be used to estimate the energy demand at a charging location and check whether the associated supply would be enough.

The charging systems should be interoperable with various charging technologies that exist currently or may evolve in the future.

Grid load management

For EV fleets to operate smoothly, the demand should not exceed the grid load capacity. To ensure this, fleet operators could adopt stacked charging times while planning their operations. Alternative on-site power sources such as photovoltaic systems could also be considered to support the grid load, wherever necessary.

Collaborating with DISCOMs

A robust charging infrastructure requires an understanding of the on-site power capacity and projection of future requirements. In this regard, engagement with local power distribution companies (DISCOMs) becomes crucial.

Their expertise can help fleet operators plan and evaluate efficient charging strategies. The EV ecosystem is complex with a wide range of stakeholders, including manufacturers, suppliers, operators, drivers, power distributors, and the government.

Collaborating and engaging with these players during the early deployment stages of a fleet, irrespective of its size, is essential for its successful operation. The implementation of the abovementioned strategies while deploying urban EV fleets can provide valuable lessons on vehicle deployment, charging management, and driver preparedness, which could be used for other larger vehicle segments as well.

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