

Electric vehicle
charging and
opportunities
for utilities

Various studies and research show that the transport sector currently accounts for 23% of global energy related GHG emissions. Regulations are being introduced in a number of countries, setting targets banning the use of fossil fuel vehicles. Countries such as China have set aggressive targets and a number of local manufacturers have launched electric vehicles in the market. This presents a huge opportunity to global automobile manufacturers; it also puts them at risk of losing market share in one of the fastest growing market segments—to the local Chinese electric vehicle manufacturers. Global manufacturers have fast tracked their plans and launched electric vehicles in the recent past, as well as announced aggressive plans to launch electric vehicles in the coming years in different markets and covering multiple segments. Some have also announced plans to curtail and stop further development of fossil fuel vehicles.

While electric vehicles are not yet price competitive compared to their fossil fuel equivalent, government subsidies, falling battery prices and increasing awareness of

climate change and willingness to contribute through lifestyle changes is driving electric vehicle demand. However, lack of electric vehicle charging infrastructure is seen as an impediment for electric vehicle adoption.

To address range anxiety and drive the electric vehicle demand (resulting in de-carbonisation/reduction in GHG contributed by the transportation sector), electric vehicle charging infrastructure is being commissioned and managed by different industry segments.

Electric Vehicle Supply Equipment (EVSE) manufacturers are manufacturing different types of charging stations and investing in setting up charging station networks at different locations to deliver charging services. Electric vehicle users are able to avail these services through a mobile app that provides functionality such as finding the charging stations, controlling the charging (switch on and off) and facilitating payments. EVSE manufacturers are also catering to the consumer segment by manufacturing and selling personal/residential charging stations through different channels.





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Electric vehicle manufacturers are collaborating with charging station network providers (typically EVSE manufacturers) to provide free charging minutes per day at public charging stations. This is mainly to address the range anxiety of electric vehicle users and make it more competitive in comparison to conventional fossil fuel vehicles.

Governments/councils are encouraging SME business segments to set up charging station infrastructure through their Smart Cities initiative.

Utilities see an opportunity to increase revenue due to increase in energy consumption/demand. A few utilities have launched their own brand of charging stations while others are collaborating with charging station network providers. A key focus for utilities is to deliver a seamless experience to their customers by developing charging friendly tariff plans for electric vehicle users/customers regardless of where charging takes place, such as at home, the workplace or public charging stations. Utilities are also exploring the use of vehicle to grid (V2G) integration technologies as a distributed energy resource (leveraging the electric vehicle battery), as a mechanism to address network imbalance.

Shifting from the use of conventional fossil fuel vehicles to electric vehicles results in reduced market share for oil marketing companies (or downstream business of integrated oil companies). To protect and/or to expand their

wallet share and brand, oil and gas companies are acquiring charging station network providers (who are predominantly EVSE manufacturers) in order to continue to serve automobile users.

Impact on the energy system

The energy consumed for charging an electric vehicle is roughly equivalent to the energy consumed by a small home per day. An electric vehicle in a neighborhood is equivalent to adding another house to the distribution network. For the installation and setup of multiple charge points at a charging station or fast charging points, the distributor needs to evaluate the load patterns and provision the last mile connectivity. Depending on when charging takes place at public charging stations, simultaneous charging of multiple electric vehicles and the amount of energy that is drawn can result in an imbalance in the energy system. System operators need to exercise balancing mechanisms such as frequency response, STOR, or energize reserve capacity if required. Such imbalance also causes energy prices to fluctuate.

Utilities treat public charging station service providers and/or the charging station networks established by EVSE manufacturers as B2B customers. Utilities currently do not have the visibility on customers using the charging network. The charging station network providers hold the information about when and where an electric vehicle user is charging his/her electric vehicle. Charging station operators are still

establishing the demand patterns of electric vehicle charging at public charging stations. The processes to manage the energy system (both physical and commercial) are designed to keep the energy system in balance. Utilities have designed the rate structure to keep the demand in-line with the consumption profile and not for businesses that cause sporadic surge in demand, which is the case in public charging networks. Studies conducted by RMI along with eVGo have shown that on-demand electricity charges form a significant portion of the OPEX cost of running a charging station.

Potential ways to address the challenges


Utilities and electric vehicle charging network providers can collaborate to use micro-generation capabilities at the charging stations, by deploying solar PVs backed with a battery bank. Use of locally generated and stored power to charge electric vehicles normalizes the surge in demand and reduces the frequency of network imbalance situations. It helps the electric vehicle charging network providers reduce their OPEX, leading to less use of energy based on on-demand tariffs.

Utilities can deploy a solution to exchange information about electric vehicle users' tariff plans with the electric vehicle charging network providers. This would enable the electric vehicle charging providers to charge the EV users based on their utility EV tariff plans. The electric vehicle charging provider can work with the utility, along with a usage/access fee for the charging station. This will enable the utility to provide a unified energy tariff to customers.

Another area that would benefit electric vehicle charging network providers and the utilities is the ability to predict when and where charging will take place. This is achieved by gaining insights from the historical charging records as well as having a connected car platform that provides real-time battery status in the electric vehicle.

Additionally, utilities and EV charging network providers can implement a process to track the amount of renewable energy used (either from the locally generated source or from the grid) to charge an EV. This can be used to report and claim de-carbonization incentives.



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