PROJECTIONS, CHALLENGES, AND OPPORTUNITIES IN THE U.S. EV CHARGING NETWORK PART 2

In the first part of this two-part white paper, we looked at what the U.S. Department of Energy (DOE) and the National Renewable Energy Laboratory (NREL) anticipated in the next few years related to the EV charging infrastructure.

In this second part, we will look at the current status of the EV charging network nationwide, as well as the implications (both challenges and benefits) for electric utilities.

A 2024 NREL report, titled “Electric Vehicle Charging Infrastructure Trends from the Alternative Fueling Station Locator: Third Quarter 2023” (published February 2024), noted that EV charging infrastructure continues to rapidly change and grow. Using data from the U.S. Department of Energy’s (DOE’s) Alternative Fueling Station Locator (AFDC 2023), this more recent NREL report provided a snapshot of the state of EV charging infrastructure in the United States in the third calendar quarter of 2023 (Q3 2023) by charging level, network, and location.

The information is intended to help electric utilities, transportation planners, policymakers, researchers, infrastructure developers, and others understand the rapidly changing landscape of EV charging infrastructure.

In Q3 2023, the number of electric vehicle supply equipment (EVSE) ports in the Station Locator grew by 7.7 percent, or 12,986 EVSE ports, bringing the total number of ports to 181,026. Public EVSE ports, which account for most ports in the Station Locator (88.5 percent), grew by 8.4 percent, or 12,423 EVSE ports. Meanwhile, private EVSE ports increased by 2.8 percent, or 563 ports.

Among the public EVSE ports, Level 1 EVSE ports experienced the most growth in Q3 (15.5 percent), representing the addition of 132 EVSE ports. The growth in Level 1 EVSE ports is primarily attributed to installations at airports in Washington and California. Meanwhile, Level 2 and direct-current (DC) fast EVSE ports grew by 8.4 percent and 8.3 percent, respectively.

DC fast EVSE ports have the highest power output among the charging levels, allowing them to charge EVs in the least amount of time. One of the conclusions drawn from NREL's report is that deploying a dependable network of public DC fast chargers is essential for fostering consumer acceptance of EVs in the United States.

As such, it is important to highlight trends in the growth of DC fast EVSE ports in the Station Locator. The power output of DC fast EVSE ports ranges from 24 to 350 kW. While DC fast EVSE ports with power outputs of 50 kW and 150 kW are the most common, the number of DC fast EVSE ports at higher power levels is steadily increasing.

So what are the implications of all of this growth for electric utilities? A third report, "Driving for Benefits: The Utility Role in Transportation Electrification," published in mid-2023 by the Alliance for Transportation Electrification" (ATE), noted that one of the great economic and environmental stories of the last few years has been the exponential growth of EVs on the highways and byways of America.

This growth has many causes and many benefits, which are discussed below. But one of the major catalysts of growth in electrification of the transportation sector has been the involvement of the electric utility sector in paving the way for this growth. Utilities have a significant role to play in planning to ensure that the grid can handle the accompanying growth in electric use, making its customers aware of the benefits of EVs, providing incentives for the development of the infrastructure needed to charge the vehicles on the road, and in many cases directly investing in this infrastructure. Utilities have substantial experience in providing reliable infrastructure for electricity delivery and can put this expertise to work.

The purpose of this ATE white paper is to outline the utility's role in transportation electrification and discuss why it is so key to ensuring that benefits will be created both for the consumer and for the electric grid.

Utility involvement in transportation electrification (TE) is focused primarily in three areas:
1 - Investment in the grid (primarily in distribution systems but additional generation and transmission may be needed as well) that is needed to ensure that there is sufficient capacity to serve EV charging needs;
2 - Make-ready investment which encompasses the wiring and equipment needed between the connection with the utility's distribution system and the stub at which the charging ports will be installed; and,
3 - Possible ownership and operation of charging stations, often in partnership with private third-parties.

The needs for investment in all three areas, as outlined below, are so great that utilities have a critical role to play either in kick-starting the market, complementing third-party investment, and/or providing services to fill in gaps that will not be served by private third-parties.

Utility investment in the grid in advance of the significant demands that growth in EVs will place on the system is the most obvious area for a robust utility role. Given that upgrading the grid, and particularly distribution systems, can take years, it is imperative that utilities plan for and invest in these upgrades early. Utilities must work with state Public Utility Commissions (PUCs) to provide detailed, long-term forecasts of needs and justify cost recovery for these investments, a process often referred to as integrated resource planning.

Utilities should also work with Electric Vehicle Service Equipment owners and operators (called “EVSPs”, or EV service providers), site hosts, fleets, large work-centers, multi-unit dwellings, and other potential charging station developers and users to understand their future needs to the extent possible.

All this information should be used, along with forecasts of growth in other technologies and normal customer growth, to provide commissions with the information needed to get approvals for these critical investments.

Make-ready investments (which includes stepdown transformers, electric service panels, conduit, conductors (wire), switch gear and power conditioning units (for DCFC), mounting pads or brackets and other elements) are a common option for utility investment.

Many stakeholders in the EV ecosystem believe that, particularly at this early stage of market development when public chargers are needed to induce consumers to buy EVs but the profitability to potential EVSE providers may be lacking, utilities should directly invest in make-ready infrastructure or offer rebates for these costs and/or the costs of the chargers themselves.

These stakeholders believe make-ready investments placed in a regulatory asset or rate base approved by PUCs will have broad public policy benefits. Others, particularly consumer groups or advocates and some potential charging station developers, believe that ratepayers should not be burdened with the costs of equipment from which they receive no direct benefit (unless they own an EV). These arguments play out before state commissions in general rate cases or in evaluation of proposed utility EV programs.

Utility ownership and operation of EV stations, the third primary category of utility involvement in the EV ecosystem, has become a credible option for many utilities across different use cases. Yet some third-party EVSPs (not all) believe it is unfair competition for utilities to use rate-based funds to invest in chargers which will unfairly "compete" with them. They argue that utilities can build chargers, and, because they purportedly don't have to recover costs or earn a profit, they can undercut third-party chargers. Consumer groups and advocates usually make arguments like those they make when opposing certain use cases for utility make-ready investments, often arguing that non-participants will not benefit. Significant public policy questions arise and the role of utility investments beyond the normal distribution grid are at stake.

This paper also discusses in detail the arguments made by some third-party developers and some consumer advocates against either make-ready or ownership and operation (O&O) investment, and why the ATE believes these arguments fail to "win the day." There is little opposition to investment in the grid, as PUCs have normally allowed recovery of investments made by utilities to meet growth in demand of all kinds.

The ATE paper points out at the outset that there are many supporters of a utility role in EV charging beyond the grid, and in every state that has addressed the issue, utilities have been allowed to make investments in either make-ready or O&O, or both. There are multiple reasons such investments have been supported, one of the strongest being that the need for public charging is so great relative to the scale of potential utility investment, that there is little if any chance that utilities would crowd third-parties out of the market. Utilities also tend to focus their investments in areas that private third-parties are unlikely to invest in, such as disadvantaged communities, rural areas, multi-unit dwellings, and others.

Another important reminder that critics of utility investment seem to ignore is that utilities do not give away charging services for free, either for DC fast charging stations or public Level 2 chargers. Utilities charge drivers for charging at rates that must be approved by state PUCs. These rates either are high enough to recover the utility's cost of service, which is the traditional method for ratemaking, or in some cases may be based on a range of market prices in the area where the utility station is located.

Market prices have been commonly used, because, in this nascent stage of development of the market, the utility cost of service for chargers is not well known. In either case, utilities do not have the ability to set prices at whatever level they want in order to undercut third-party competitors.

There are many benefits to a robust utility investment role in EV charging. These benefits include:

• Increasing the pace and scale of infrastructure development by opening the market to utility capital expertise, and other resources.

• Utilities can fill immediate market needs which may take longer for third-parties to fill.

• Maintaining reliability, minimizing negative grid impacts, and optimizing required distribution and transmission system upgrades by coordinating with existing utility investment and planning processes.

• Utilities are more likely than others to place value on off-peak charging and achieving system benefits.

• Utilities are well positioned to smooth a key pain point in operating charging stations, namely ensuring reliability. Utilities have an obligation to reliably serve all customers and are accountable to regulators creating strong incentives to maintain reliability.

• Utilities have a proven ability to communicate with and educate customers through existing channels and creating incentives to promote vehicle charging at times that provide grid benefits.

• Providing more equitable access to charging infrastructure for all ratepayers and communities and increasing mobility for all through utility partnerships with transportation programs focused on serving disadvantaged and rural communities.

In summary, the Alliance believes that the EV charging infrastructure is developing too slowly, which creates market gaps and a hesitance by potential consumers to purchase an EV. A robust utility role is key to addressing these challenges in comprehensive infrastructure development, along with the federal and state governments, and private EV service providers.

Of course, for electric utilities that want to explore these opportunities (and challenges) in greater detail, Finley Engineering is available to help these utilities get started, as well as to create comprehensive, effective plans – both short-term and long-term.

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