

AMERICA'S LEADING FUEL MARKETERS

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CHARGING AHEAD

BY MAURA KELLER

Electric vehicles (EVs) are making inroads in the minds of consumers who are slowly embracing “going green” in their vehicle choice, while leaving a smaller carbon footprint. While the EV industry continues to be in flux as manufacturers modify their production goals in response to the ever-changing EV marketplace, within the convenience store and gasoline marketing industry owners and operations are evaluating the best way to be a part of this up-and-coming market—namely through electric vehicle charging stations.

Although the majority of drivers do most of their charging of EVs at home, the demand for charging elsewhere is predicted to rise, as the number of EVs on the roads increase. Currently, most public charging stations are located at parking facilities, office parking lots, or at retail facilities where the drivers park for an hour or more. However, as the number of EVs on the roads continues to grow, there is going to be an increased need for fast charging stations, which drivers typically use for about 30 minutes. These are expected to be found at traditional gas stations and c-stores, especially along highway routes.

According to Elaina Farnsworth, CEO of Skillfusion, an EV electrical certification company, the key considerations that gasoline marketers need to make as it relates to installing EV charging stations will be with the local utility.

“The local utility can help the site determine the amount of power available to supply EV charging stations and the cost and timing to supply that power,” Farnsworth says. “Upgrades to utility service are not inexpensive and if the utility does not have the necessary infrastructure already in place it could take years to provide the necessary distribution to get the site ready to supply EV charging.”

The local utility should also be well versed in incentives available. In addition to the National Electric Vehicle Infrastructure Formula (NEVI) funds for particular geographies, many utilities, especially those in states with high EV penetration, offer support for a wide range of considerations including distribution upgrade costs, installation, demand charge mitigation, and rebates on charging station costs.

Mike Rowand, senior advisor of EVs2Scale2030 at EPRI, an independent, nonprofit energy R&D institute says that, in the near term, c-stores need to understand the demographics of their current and targeted customers. For example, are customers primarily local drivers or travelers?

“A critical difference between fueling an EV versus a gasoline vehicle is that fueling can or will occur at home and at other non-traditional fueling locations such as grocery stores, shopping centers, etc. So, a c-store needs to view its ‘competition’ in a different way than with traditional fueling,” Rowand says. “As market penetration of EVs continues to increase, c-stores will

need to consider the change in size of their market base if they do not install EV chargers. There are also practical considerations such as space availability and existing infrastructure, which can make one location easier to install EV charging versus another.”

Key Concerns

According to Jim Dore, vice president, service solutions at Chateau Energy Solutions, as the momentum for electric vehicles (EVs) continues to grow, the prospect of integrating EV charging stations at convenience stores presents a promising yet challenging endeavor. Safety concerns loom large, with the coexistence of petroleum posing fire risks, while the daunting task of securing adequate power supply adds another layer of complexity. Dore has 25 years of experience in consulting, designing, selling, and funding energy efficiency and electric vehicle infrastructure projects and programs.

“Regarding safety, we have to be mindful of the risks associated with EV charging stations at convenience stores and gas stations,” Dore says. “With petroleum on-site and multiple consumers trying to charge, there’s a real concern for fire hazards, electrocutions, and accidents.”

Beyond safety, an issue many organizations, not just convenience stores, are facing is sourcing adequate power from the utility in a timely manner. As Dore explains, when it comes to utility and power supply, getting enough 480v three-phase power to each location can be a real challenge.



“It’s not just about the cost; it’s also about the time and effort needed to set up a scalable system given the current power generation and distribution issues,” Dore says. Working with an EV charging infrastructure expert can help as they collaborate with the utility and assist in streamlining the power upgrade and interconnection process.

As Farnsworth further explains, there are multiple EV charging station options available for installation, everything from lower power stations (called Level 2) up to DCFC stations. DCFC (DC Fast Chargers) require 480V and charge vehicles in tens of minutes. ►



“So, a major consideration is how long customers are expected, or desired, to stay at the charging location,” Rowand says. Appropriately sized DCFC chargers can fuel the newest EVs up to about an 80% state-of-charge in the time it takes for a restroom break and a drink.

“Assuming the facility would want quicker customer throughput, we would recommend that a c-store consider chargers in the range of 150 kW,” Farnsworth says. These stations would provide typical EV drivers 300 to 450 miles of travel for one hour of charging – it is important to note that most EV drivers would be looking to “top off” their driving range and charge, on average, for about 30 minutes maximum.

“There are also multiple EV charging service providers that, depending on the site’s geography, may offer to install, own, and operate the station,” Farnsworth says. This would minimize or eliminate the upfront cost to the site, however, it would require ceding control of the station to the operator. If the site is interested in attracting EV drivers to alternative services like restaurants or a c-store, this might be a viable option.

From the investment side, the upfront capital costs for installing EV charging stations at a large number of convenience stores can be pretty steep. “We’re talking about \$65,000 to \$150,000 for each DC fast-charging station, and that’s not factoring in switchgear, permits, and other expenses,” Dore says.

Indeed, according to McKinsey the cost to install these stations can range from \$40,000 to \$150,000 per charger depending on logistical factors and utility service available. The hardware cost can range from an additional \$45,000 to \$100,000 per charger. As Rowand explains, initial costs to install chargers fall into several categories. Depending on your existing utility service, there may be costs for the utility to increase the size

of the electric service to your facility. In addition, most convenience stores do not have the electrical infrastructure to provide power to DCFC systems, which may be 10x or more the power requirements of the existing building.

Finally, the charging equipment itself must be installed. “Depending on the location, there may be utility programs or other incentives that can offset some of these costs,” Rowand says. “If you are considering the installation of EV chargers, it is important to contact your local utility as early as possible – even if it is just something being considered.”

Installations also will typically require communications infrastructure. The communications infrastructure is needed for customer interface and billing systems, as well as for the station owner to monitor the status/health of the charging station and ensuring power requirements do not exceed desired levels.

John Garrett, vice president of electrical vehicle services at Maverick Corporation, a full-service power and communications network infrastructure engineering, procurement, and construction company, says the choice of chargers either Level 2 or Level 3 (DCFC) will directly impact cost and the number of chargers. “Out of pocket costs are the number one factor facing gasoline marketers’ adoption of EV charging,” Garrett says.

However, there are incentive programs emerging to entice c-store owners and gasoline marketers to make the investment in EV charging infrastructure. “For example, in Massachusetts Eversource and NGRID have very robust incentive programs which, on average, pay for 80% to 100%, depending on the area,” Garrett says. “Considering convenience stores and gasoline marketers customers are quick-stop shoppers, this would suggest DCFC would be best choice.



When deciding on DCFC, the voltage needed would be 480v which would mean another service on the property.”

According to Farnsworth, a good portion of the installation cost is driven by the cost to get power from the utility transformer to the charger location.

“Obviously, placing chargers close to where power is supplied to the facility will minimize cost,” Farnsworth says. “However, the site needs to be prepared to provide at least two ‘EV Only’ parking spots for each charger and would be advised to install a minimum of two stations per location.”

Luckily, the basic electrical equipment, such as transformers, switchgear, and wires, requires very little maintenance. However, as Rowand points out, the charging station itself, including the cable and “plug” for the car do require routine maintenance. This includes simple tasks such as filter changes, as well as the repair of electronic components and replacement of damaged items.

Of course, reliability is the cornerstone of any solid EV charging station and is currently at the forefront of EV owners’ minds. According to a new research by a Harvard Business School fellow Omar Asensio, the climate fellow at HBS’s Institute for the Study of Business in Global Society (BiGS), the study indicates that EV owners experience deep frustration with the state of charging infrastructure, including unreliability, erratic pricing, and lack of charging locations.

Specifically, current EV drivers don’t see “range anxiety” as a significant issue. Rather, many have “charge anxiety,” a fear about finding charging stations for their EVs and whether those chargers will be functioning. The research study examined more than one million charging station reviews by EV drivers across North America, Europe, and Asia and determined that these drivers described how they “regularly encounter broken and malfunctioning chargers, erratic and secretive pricing, and even ‘charging deserts’ – entire counties that don’t have a single public charger and that have even lost previously available chargers.”

J.D. Power also recently found that one out every five visits by customers at both Level 2 charging and DCFCs ends without charging.

Because reliability and functionality is top-of-mind for EV consumers, this area of EV charging is an opportunity for gasoline marketers and c-store owners and operators to truly shine. So, while maintenance may be minimal, ensuring that the hardware, software, and overall functionality of EV charging stations are operational is paramount in improving reliability standards.

The Future of EV Adoption

Electric vehicle adoption in the United States is here to stay, but Dole says the EV infrastructure lags behind the traditional gas vehicle infrastructure. “Consequently, the current lack of nationwide charging stations could pose a concern for potential EV buyers,” Dore says. “However, the good news is that one day soon you will see most c-store and gas stations with DC Fast charging stations. While challenges remain in achieving scalable EV infrastructure deployment, progress is steadily underway, offering an encouraging outlook for EV enthusiasts.”

Over time, Rowand says most c-stores may want to install EV chargers so they don’t miss out on the opportunity to serve a growing segment of the market. However, the need will vary from store to store depending on location and demographic information.

“For example, in areas with single-family homes with garages and driveways, the majority of EV charging will likely occur at home. In areas without dedicated at-home charging, c-stores will have the opportunity to serve fueling needs as they do today,” Rowand says. “For c-stores positioned on traveling corridors, EV charging presents an opportunity to capture additional traveling customers and make up for lost customers that no longer drive internal combustible vehicles.” ★