The Road to Fleet Electrification

Eight ways utilities, regulators, and policymakers can enable fleet operators to electrify commercial transportation and reduce carbon emissions

A guide produced in partnership between the California Trucking Association and Ceres; funded by Amazon.
Published Q2 2020

Photo courtesy of Freightliner

Ceres
Sustainability is the bottom line.

California Trucking Association
We drive for a living. Safety is our priority.

NAVIGANT
A Guidehouse Company

Contents

List of Figures

This report was produced in partnership with the California Trucking Association and Ceres; and funded by Amazon.

Since 1934, the California Trucking Association has been serving the commercial motor carrier industry in California and the companies that provide products and services to the trucking industry. For more information, visit caltrux.org.

Ceres is a sustainability nonprofit organization working with the most influential investors and companies to build leadership and drive solutions throughout the economy. For more information, visit ceres.org.

Amazon is guided by four principles: customer obsession rather than competitor focus, passion for invention, commitment to operational excellence, and long-term thinking. For more information, visit amazon.com/about and follow @AmazonNews.

1 Executive Summary

Fleet operators have the potential to lead the transition to electrify transportation and reduce greenhouse gas (GHG) emissions at scale. Companies like Amazon,[1] DHL,[2] and Lyft,[3] and public transit agencies like LA Metro,[4] have ambitious sustainability goals and are deploying EVs to decarbonize business operations and address the challenge of climate change. Continuous improvements in EV technologies are producing lower costs, greater range, and faster charging, further enabling the use of EVs in the commercial transportation sector. Though the trend is encouraging, fleet operators face challenges that, if not confronted, may slow this progress.

To help fleet operators unlock the full benefits of fleet electrification, the California Trucking Association (CTA) and Ceres collaborated with the global research firm Navigant Research, a Guidehouse Company, to conduct a survey of companies with early fleet electrification projects. The survey identified common challenges fleet operators face when engaging utilities and recommended actions that can be taken to make fleet electrification faster, easier, better for the environment, and more affordable. These recommendations cover eight key areas where utilities, regulators, and policymakers can make an impact:

1. **Access to Renewable Energy –** Access to cost-effective, renewable energy is critical to enable fleet electrification. Fleet operators want assurances that electrifying their fleet will reduce carbon emissions, so the underlying electricity generation should come from renewable or zero-carbon sources.

2. **Alternative Rate Structures –** Access to time-variable and real-time, market-based rates can enable EV charging to benefit the grid and increase renewable energy integration. These rate structures can ensure fleet operator electricity costs are reasonable, while maintaining cost recovery. Fleet operators want options for rates that realize the benefits EV charging can have for the grid and environment.

3. **Upfront Information –** The right technology and tools allow fleet operators to optimize their electrification strategy from the outset of EV deployment. With online self-service tools to access and visualize grid data and estimate project and energy costs, fleet operators can make informed decisions at the speed of business.

4. **Reliable Electricity Supply –** A reliable fuel source is critical to fleet electrification and increasing the availability of commercial EVs. As companies scale investments in technology and infrastructure to "green" their operations, grid reliability will be a critical factor in the decision-making process. Fleet operators must have confidence in the electricity system in order to adopt EVs.

5. **Flexible Terms and Requirements –** Rigid designs for utility programs limit the addressable market of fleet operators. Choice and transparency ensure a fair agreement between the utility and fleet operator can be achieved across a wide range of fleet types.

6. **Streamlined Paperwork and Processes –** Expediting and streamlining paperwork and regulatory processing increases the probability of timely EV deployment.

[1] Elijah Shama. "Amazon is purchasing 100,000 Rivian electric vans, the largest order of EV delivery vehicles ever." *CNBC*. September 19, 2019.
[2] Aouad, Ayoub. "DHL will debut a fully electric delivery van in the US next year." *Business Insider*. December 2, 2019.
[3] Moon, Mariella. "Lyft adds 200 electric vehicles to its fleet in Denver." Engadget. November 15, 2019.
[4] Hyatt, Kyle. "Los Angeles' order of 130 electric buses is the largest in US history." *Roadshow by CNET*. November 13, 2019.

7. **Technology Interoperability –** Utilities and regulators can leverage their position to push adoption of open standards for hardware and software interoperability in the EV sector. This will allow fleet operators to invest in charging infrastructure that is future-proofed and scalable.

8. **Fleet Electrification Experts –** The utility is well positioned to provide a suite of electrification services. Consolidating the many capabilities of the utility within a dedicated team of utility transportation electrification experts improves the efficiency and accuracy of services traditionally segmented across a utility and reduces confusion for fleet operators during the fleet electrification process.

2 Fleets Want to Electrify

The move toward EVs across a wide range of fleets is on the rise. Motivated by growing corporate sustainability and customer environmental interests, many fleet operators want to decarbonize their transportation and logistics fleets and see EVs as an emerging technology to meet these goals while also reducing costs.

The environmental benefits of EVs include reduced greenhouse gas (GHG) emissions and improved local air quality, especially in congested urban centers and along highway corridors. Consequently, many local governments are adopting policies to promote EVs.[5]

The main cost of EVs - the battery - has declined as much as 80% over the last eight years. Further cost declines of over 50% are expected in the next decade, which should put upfront costs of many EVs below their conventional competitors by 2030.[6]

Some EVs are already more cost effective to own than gasoline or diesel-powered vehicles due to reduced recurring costs for fuel and maintenance.[7] The operational cost savings are amplified for fleets, which often use vehicles much more than the average individually owned vehicle.[8]

Innovations in batteries are also leading to improvements in durability allowing EVs to charge faster.[9] Lower costs and faster charging combined with reduced emissions mean the trend toward EVs is poised to expand beyond early adopting fleet operators to the rest of the fleet market.

Business Insider 12/2019

"DHL will debut a fully electric delivery van in the US next year"

Engadget 11/2019

"Lyft adds 200 electric vehicles to its fleet in Denver"

CNET 11/2019

"Los Angeles' order of 130 electric buses is the largest in US history"

CNBC 9/2019

"Amazon is purchasing 100,000 Rivian electric vans, the largest order of EV delivery vehicles ever"

Despite the benefits, fleet operators face notable challenges to electrifying commercial vehicles. To keep up with market demands, EV charge times must be minimized and predictable, and reliability must be consistent with conventional fossil fuel-powered vehicles. Fleet operators are also likely to have numerous contractual arrangements with facility property owners, vehicle leasing companies, and other service operators that can complicate electrification goals. While fleet operators are familiar with conventional petroleum supply chains, managing the cost and supply of electricity may be new to them.

Utilities can play a critical role in helping fleet operators electrify. However, the challenges fleet operators face engaging with utilities, and the pace of the utility-regulatory model relative to the speed of business, risks hindering fleet electrification efforts.

[5] In Europe, 24 cities are placing bans on diesel-powered cars or on both diesel- and gasoline-powered cars by 2030. Source: Berylls Strategy Advisors, July 2019.
[6] Union of Concerned Scientists. "*Electric Vehicle Batteries: Materials, Cost, Lifespan*." March 9, 2018.
[7] Kate Palmer, James E. Tate, Zia Wadud, and John Nellthrop. *Total cost of ownership and market share for hybrid and electric vehicles in the UK, US, and Japan*. *Applied Energy*. Volume 209, 1 January 2018, Pages 108-119.
[8] US Department of Energy, Alternative Fuels Data Center. *Average Annual Vehicle Miles Traveled by Major Vehicle Categories*. December 2018.
[9] Richard Truett. "*Solid State Batteries Show Promise*." *Automotive News*. November 24, 2019.

3 How Can Electric Utilities Work with Fleet Operators?

To decarbonize the transportation sector, utilities, regulators, and policymakers need to work together to support electrifying commercial fleet vehicles. The purpose of this guide is to unlock the full benefits of fleet electrification by identifying the common challenges fleets face when engaging with utilities on electrification projects and recommending actions that can be taken to make fleet electrification faster and easier. To do so, Navigant Research collaborated with the California Trucking Association (CTA) and Ceres to identify and interview contacts from nine companies (including Amazon) with leading roles in fleet electrification projects. The businesses were asked to provide insights across multiple subjects including electricity rate designs, renewable energy tariffs, and the structure of utility fleet electrification programs, among others.

The companies included major parcel and product distributors, independent logistics fleets, public transit agencies, mobility service providers, vehicle leasing companies, property lessors, and industry associations. Participants represent projects across the U.S. and internationally, including varied geographies and regulatory conditions. Specifically, participants had experiences in California, Florida, Illinois, Indiana, Iowa, Minnesota, New Jersey, New York, and Wisconsin, as well as in the EU and India. The types of EVs deployed in the identified projects included passenger cars, forklifts, medium-duty delivery trucks and vans, transit buses, and class-8 heavy trucks.

The survey indicated that utility programs need more transparency, flexibility, and speed. Fleet operators need data and information upfront to improve decision-making and to optimize their fleet electrification strategies. Fleet operators also need choices in utility programs to determine which charging solution is best for their business. And, they also need a contact or point person and EV expert(s) within the utility who can connect fleet operators to the suite of services the utility can provide in a timely and efficient manner. These responses were echoed across the eight identified priority areas where utilities, regulators, and policymakers can make an impact.

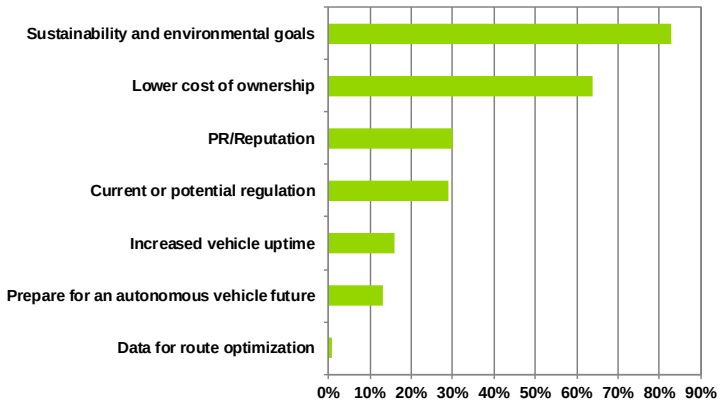
i. Access to Renewable Energy

"EVs are being deployed primarily for carbon reduction, so pairing utility EV programs with renewable options for additional EV deployments is key."

- Parcel Distributor

Results from a 2018 UPS/GreenBiz Research study, shown in Figure 1,[10] demonstrate the leading fleet electrification motivators are sustainability and environmental goals.

Figure 1 Motivators for Fleet Electrification



(Source: UPS and GreenBiz)

Many companies are adopting ambitious goals to combat climate change and capture the business advantages of sustainability, including setting science-based targets to reduce GHG emissions. These goals require bold decarbonization strategies, such as powering their business and operations with 100% renewable energy. To attain these goals, companies are seeking to reduce transportation and logistics vehicle emissions, prompting fleet operators to increasingly look at electricity as a key solution.

As fleet operators continue to electrify, they need pathways to renewable energy, like markets that allow commercial customers to source from utility-scale renewable energy projects, utility facilitation of onsite generation, and green tariff programs. Many utilities are realizing the importance of these renewable energy pathways for commercial customers and are deploying programs accordingly. This trend must continue.

Additionally, companies and fleet operators expect utilities to meet the load growth from transportation electrification with new zero-emissions resources and will be reluctant to embrace EVs if it is met by building new fossil fuel generating units.

[10] GreenBiz. *Curve Ahead: The Future of Commercial Fleet Electrification*. United Parcel Service of America, Inc. (UPS). 2018.

ii. Alternative Rate Structures

"We need flexibility and we need multiple rate options for different site hosts."

- Mobility Service Provider

A major reason fleets are shifting to EVs is the cheaper cost of electricity compared to gasoline or diesel. Additionally, EV fleet electricity demands are often flexible, presenting an opportunity to shift load to off-peak times through smart technologies and managed charging. These approaches can increase grid efficiency and put downward pressure on electricity rates,[11] and can be used to increase integration of renewable energy and energy storage on the grid. Accordingly, many utilities have started to reexamine rate designs for fleets.[12] As these new rates are determined, it is unlikely there will be one design that works best for all fleet operators. Utilities should strive to provide a range of rate options, potentially considering the fleet as a new rate class. Elements to consider within future rate designs include:

- **Time-Variable and Real-Time Market-Based Rates:** Develop rates that send price signals to encourage charging at times that increase grid utilization and the use of renewable energy.
- **Rate Options without Demand Charges:** Recover the incremental capital costs of electrical capacity upgrades via fixed cost options, like spreading the cost over a contract period or allowing payment upfront, or through time-variable energy rates. Examples of rates without demand charges include:
    - Pacific Gas & Electric (PG&E) created a new rate class for commercial EV customers that replaces the demand charge with a monthly subscription fee. The fee is based on customer connection capacity levels and exceeding the capacity level induces overage charges.
    - Southern California Edison (SCE) created a rate that removes demand charges for DC fast-charging site hosts for five years. During that time costs are recovered through time-variable rates. Once the five-year period is complete, the demand charge is phased in over the next five years.[13]
- **Demand Charge Limits:** If demand charges are necessary, limit the effect of the demand charge on the customer's bill. Utilities are exploring this in the following ways:
    - Duke Energy divides the rate by the total kWh consumed during a billing period. If the rate exceeds a predetermined cap in terms of $/kWh, the bill is recalculated at the capped rate (kWh consumed * capped $/kWh rate).
    - Minnesota Power prohibits demand charges in excess of 30% of a DC fast-charging company's bill.[14]
    - Xcel Energy caps the demand charge component of a rate at an amount equal to the customer's energy consumption (kWh) divided by 100 hours.
- **Grid Services:** Develop offerings to incentivize fleet operators for contributions they can make to grid services, such as frequency regulation. When doing so, provide upfront estimates on the likely savings from program participation.

[11] Citizens Utility Board. *The ABC's of EVs*. April 2017.
[12] Union of Concerned Scientists. *Electric Utility Investment in Truck and Bus Charging*. April 2019.
[13] The Brattle Group. *Increasing Electric Vehicle Fast Charging Deployment*. Edison Electric Institute. January 2019
[14] Pilot project approved by regulators in late 2019

iii. Upfront Information

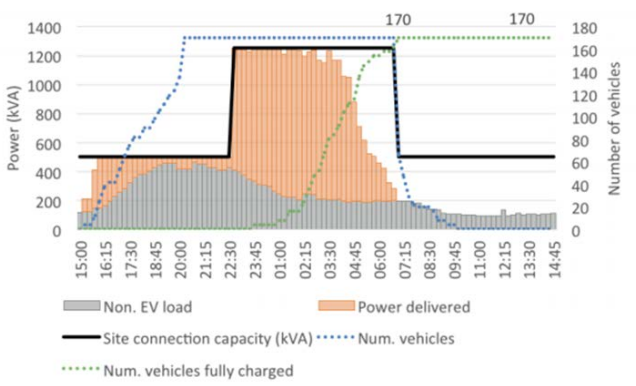
"It is difficult to estimate the benefit of utility programs in preliminary budgeting and decision making without some detailed operational planning and engineering analysis."

- Industry Association

Utilities are well positioned to provide fleet operators with information critical for evaluating the cost and operational impacts of fleet electrification, and to make services and offers transparent and digestible with online self-service tools. Among other activities, these tools should allow fleet operators to accurately estimate the electricity costs of varying rate options, evaluate grid congestion and differing locational values, and estimate costs for grid upgrades to EV charging sites.

- **Electricity Costs:** Fleet operators need a tool to assess how their EVs will impact load profiles at various facilities and accurately predict electricity costs under differing rate options. The tool should generate a profile of new electricity consumption layered onto historic facility load at a given address by day, week, or month and at time-steps consistent with the demand charge interval of the utility rate design or, at a minimum, half-hour resolution. For example:[15]

Figure 2 Example: Load Profile of EV Fleet with 170 Vehicles Using Timed Connection



(Source: Cross River Partnership)

The load profile should then be able to be compared against available rate options, allowing the fleet operator to easily select the best option for the fleet. Here, utilities should consider partnering with data analytics vendors who are already providing similar tools to early EV-adopting commercial fleets.

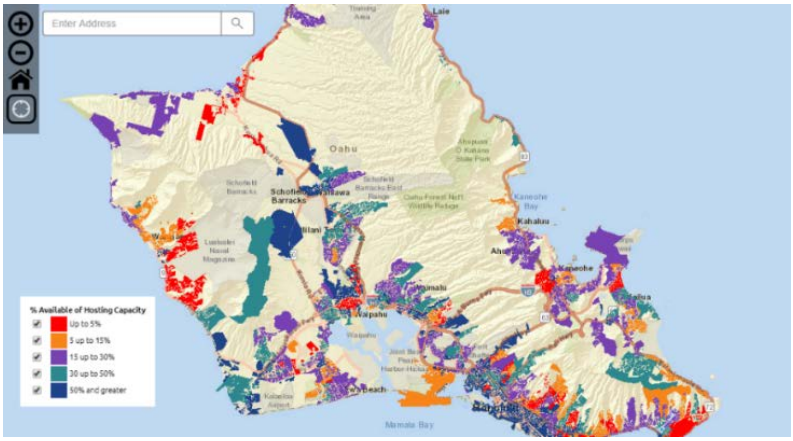
At minimum, fleet operators should be given access to historical electricity consumption data at half-hour resolution or better. This will enable them to assess the minute-by-minute fleet utilization schedule, and plan charging times against the facility load profile and subsequent impact on peak demand.

[15] Cross River Partnership. *Smart Electric Urban Logistics - Factsheet 4*. August 2019.

- **Grid congestion and locational value:** Provide fleet operators with a way to evaluate sites for EV deployments by creating a self-service tool with information such as available grid capacity and estimated interconnection costs. Hawaiian Electric Company (HECO) and National Grid U.K. have developed tools that show what this could look like, as seen in Figures 3 and 4.

    - The HECO Oahu Locational Value Map[16] presents data on available grid capacity as a percentage of hosting capacity. While it is designed for generation assets, theoretically the same principles could be applied to demand assets like EV fleets.

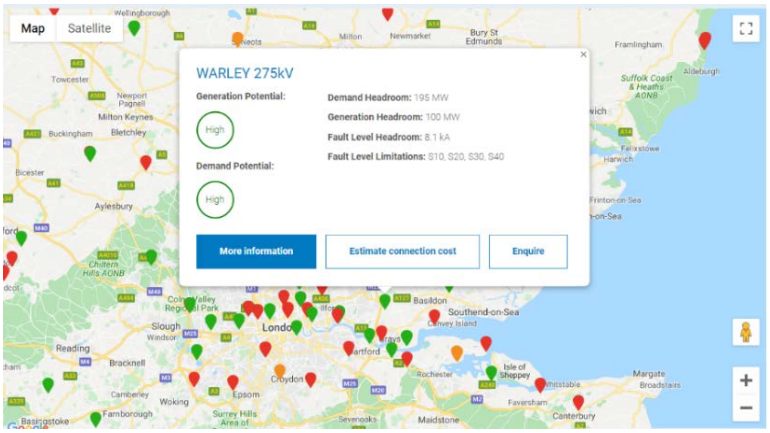
Figure 3 Example: Self-Service Tool for Evaluating Locational Value



(Source: HECO)

    - The National Grid UK Network Capacity Map[17] allows users to view available capacity for demand or generation assets at existing substations. Users can then estimate grid interconnection costs as a function of the type of demand (e.g., commercial, industrial), the required voltage (kV) at the connection, the required capacity (MW), the area type (urban, rural), and the distance from the connection to the substation.

Figure 4 Example: Self-Service Tool for Estimating Grid Interconnection Costs



(Source: National Grid)

[16] To view the Oahu Locational Value Map, see https://www.hawaiianelectric.com/clean-energy-hawaii/integration-tools-and-resources/locational-value-maps/oahu-locational-value-map-(lvm).
[17] To view National Grid's network capacity map, see https://www.nationalgridet.com/get-connected/network-capacity-map

iv. Reliable Electricity Supply

"A guaranteed level of service is essential, and if they don't do that, they're going to compel us to think about things like self-generating our own power."

- Public Transit Agency

Fleet operators are understandably sensitive when it comes to vehicle downtime during charging events. If utilities cannot assure a reliable energy supply and provide tools to manage inevitable outages, fleet electrification will be difficult and costly. There are several ways to address these concerns:

- **Grid Reliability Information:** Customers should be able to access information about the past and likely future reliability of an address or location on the grid. If a location is vulnerable to outages, some fleet operators may be able to pursue electrification at less vulnerable sites rather than pursue costly investments in redundant power resources or clean energy microgrids to support less reliable locations.
- **Better Outage Technology:** Utilities should continue to deploy advanced meters and grid automation technology to reduce outage response times. Utilities should also innovate communication interfaces with customers, such as online portals that can be used to respond to fleet operator requests and keep them abreast of efforts to resolve outages. Ideally, different levels of service should be provided so that fleet operators can self-identify their reliability requirements and the utility can offer options tailored to their needs.
- **Onsite Generation/Storage:** Utilities should streamline processes for the interconnection and operation of technologies to protect sites against temporary outages, such as onsite generation, storage, and connected microgrid technologies. Supporting customers in the adoption of these technologies may also be advantageous to the utility by deferring capacity upgrades at the fleet facility or further up the distribution grid.[18]
- **Grid Reliability:** Ultimately, there is an increasing concern that vulnerabilities within the existing grid may lead to outages lasting days. Under such circumstances, an onsite solar generation and/or storage solution will not be a viable solution for the fleet's energy needs, and full-load redundant power through fossil fuel generators is not cost-effective nor desirable for decarbonization efforts. This concern is not easily addressed. A larger conversation about grid reliability needs to take place and the fleet operator is an increasingly critical stakeholder in that conversation.

[18] A project in the UK involving a fleet of UPS delivery trucks used onsite battery storage and behind-the-meter (BTM) load balancing technologies to increase the number of fleet EVs that could be charged at the site from 63 to 170. Source: Innovate UK, Office for Low Emission Vehicles, March 2018.

v. Flexible Terms and Requirements

"Rigid terms for utility provided equipment make it easy for the utility to say yes, but harder for the customer."

- Parcel Distributor

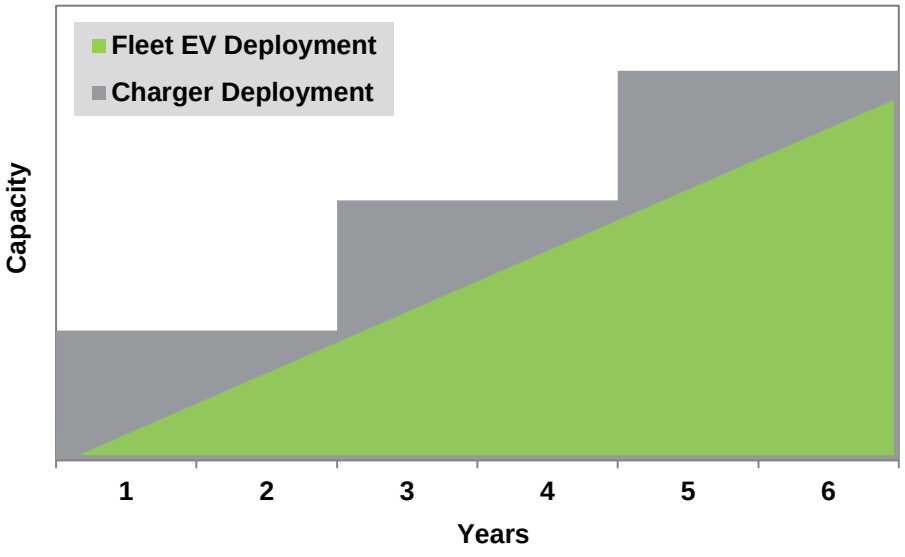
Transitioning from conventional transportation fuels to electricity is capital intensive. Upfront EV purchase prices are often higher than comparable conventional vehicles and charging equipment and installation costs require new capital expenses. In some jurisdictions, utilities may be able to speed fleet EV adoption through investments in facility charging equipment and installation. Where this is possible, fleet operators need flexible terms that do not unnecessarily limit the ability of many different kinds of fleets to participate, including flexibility on contract lengths, timely use, and exit provisions.

- **Contract Lengths:** Utilities can provide a mix of usage and ownership terms, such as electricity sales, the number of EVs deployed, or a fixed time period. The fleet should be able to complete the term-length requirement as a function of whichever metric is achieved first. Having only one requirement, like a fixed time period, unnecessarily penalizes certain types of charger deployments, such as those likely to see high rates of utilization and thereby more quickly justify the investment in charging infrastructure.

- **Reasonable Term of Use:** It is reasonable for utilities that make investments through customer programs to require fleet operators to use equipment installed on their behalf in a timely manner. However, any time requirements should account for the constraints faced by fleet operators, such as EV availability and the rate at which fleets acquire new vehicles and retire old ones.

  Transitioning a commercial fleet is typically going to be a years-long process integrated within the vehicle replacement schedule. Meanwhile, EVs in numerous vehicle classes are just beginning to come to market. Due to the costs and time required to upgrade facility and distribution capacity, utilities should provide fleet operators flexible terms that allow for the installation of charging infrastructure up to two years ahead of guaranteed use.

Figure 5 Illustration: Charge Capacity Build vs. EV Fleet Deployment Timeline



(Source: Navigant Research)

- **Exit Provisions:** Penalties for early exits or failing to meet program requirements must be fair. As with the terms for contract lengths, utilities should consider which metrics are the most appropriate to calculate fair penalties for early exits. Fleet operators understand that exit provisions and penalties may be necessary, but those penalties should be transparent, simple, and able to be calculated using self-service tools in the earliest stages of project evaluation.

Other terms may present what appear to be unnecessary complications to the fleet operator. These include requirements for metering and billing and data collection.

- **Metering and Billing:** As with all aspects of the utility engagement, fleet operators want choices. They want to choose the metering scheme for their business, as a new service and meter may not be in the fleet's best interest. For example, if a customer plans to add a single charger to support an electric yard hostler at a large facility, it is likely impractical and uneconomical to add a new meter for one charger. However, if a customer plans to add dozens or hundreds of chargers to support a fleet of vehicles, a new meter may be the best option.

  Notably, some chargers have embedded meters. Here, utilities and regulators have had reservations about charger metering capabilities leading some to require installation of additional meters in smart-charging pilot programs. Xcel Energy was one such utility, and as of 2018 it removed the additional meter requirement.[19] If utilities and regulators continue to have reservations about metering capabilities, then programs should incorporate an objective standard against which to validate charger metering capability. This would require a comparison of metering technologies and thereby allow fleet operators choices while also contributing to industry learning.

- **Data Needs and Use:** Data is a sensitive subject for fleet operators and may include business-sensitive information. For example, data on route schedules and vehicle location tracking is often considered business sensitive. Fleet operators need clear details concerning what data is being collected and how it is used. The utility should convey their data needs to the fleet operator by 1.) detailing the program learning objective, 2.) spelling out specific data points for collection, and 3.) having clear guidelines for reporting and processing.

[19] Xcel Energy. New electric vehicle pilot program rolls out to Xcel Energy customers. August 2018.

vi. Streamlined Paperwork and Processes

"A big constraint has been, unfortunately, the utility programs require some pretty firm easements… the easement and some of the contractual terms are kind of deal breakers for property owners aiming to maintain flexibility of the real estate."

- Property Lessor

The permitting requirements to make upgrades to fleet facilities can be a cumbersome hurdle. It is important to note that in addition to requirements for utility access, fleet operators have other permitting obligations like building permits. Complications also exist for property lessors, who will find rigidly designed terms for new access agreements a significant hurdle to overcome. When detailing requirements for a utility program, utilities, regulators, and policymakers should strive to minimize new permitting requirements as much as possible by following these recommendations:

- **Avoid additional access requirements:** Use existing legal access rights in tariffs or add access rights for utility-owned EV charging equipment into future updates to tariffs. Categorize utility investments for fleet EV charging on either side of the customer meter as any other traditional investment would be categorized, such that additional legal review is not required by the customer or the property lessor.
- **If additional access requirements cannot be avoided, use flexible terms to secure access:** The perpetuity and rigidity of easements is difficult for property lessors. Consider working with property lessors to determine more flexible terms for utility access such as licenses.

Some fleet electrification efforts may require upgrades at the substation level of the distribution grid, creating further delays. Utilities, regulators, and policymakers should mitigate potential delays by creating expedited regulatory review processes for transportation electrification related upgrades.

vii. Technology Interoperability

"I would love to see the industry come together and standardize the charging ports… that would make our lives a lot easier."

- Logistics Provider

The fleet operator may be managing a varied number of vehicle types, including forklifts, trucks, passenger cars, and delivery vans, among others. The possibility of these vehicle types having multiple competing technology standards is worrisome and presents unnecessary complications for designing the fleet-charging solution and minimizing EV charge-time. Fleet operators want utilities, regulators, and policymakers to help move the industry and markets toward standardization and interoperability for both hardware and software. Areas to pay attention to are vendor lock-in, connection standards, and smart-charging communication standards.

- **Avoid Vendor Lock-in:** Like a cell phone, many chargers can be connected by a networking platform to a central management system. Equipment providers that have adopted the open charge point protocol (OCPP) allow owners of their equipment to use the network platforms of other vendors. The utility can help fleet operators by providing guidance and, if operating a fleet electrification program, by requiring the use of OCPP compliant vendors.
- **Connection Standards:** The commercial EV market is much more diverse and much less mature than the consumer EV market. Standards for heavy-duty EV charging systems are still in development. Fleet operators want to be sure that the connection standard they pick will have a wide variety of compatible charger and vehicle vendors supporting it. Utilities, regulators, and policymakers can help fleet operators in this decision-making process by advocating the use of open, rather than proprietary, standards.
- **Smart Charging Communications:** To enable EV fleet charging to benefit the grid, the utility needs to be prepared to communicate with a diverse range of EV charging technologies. OpenADR is a leading standard in the field of demand-response communications, which can be applied to EV charging. It has over 150 members, with significant adoption among EV charging providers. As with OCPP, the utility can support fleet operators through guidance and partnering with OpenADR members.

viii. Fleet Electrification Experts

“Anytime utilities can bring around programs or resources that really help lead you through the process, it’s important, it’s especially important early on.”

- Mobility Service Provider

A fleet operator’s needs span all areas of the utility business: generation, transmission and distribution, and retail. This complexity is a considerable challenge, as different needs are likely addressed by different internal utility teams. Ultimately, fleet operators want to work with a dedicated fleet-electrification contact to access the whole suite of utility services, rather than deal with a series of one-off elements housed in different internal teams. Utilities should train a dedicated team of EV experts to be the face of the utility’s fleet-electrification effort and provide a point of contact for transportation electrification.

- **Consolidate EV programs:** Utilities tend to have multiple programs for vehicle electrification designed to address specific charging use cases, e.g., public charging, workplace charging, and fleet charging. These programs should overlap. For instance, a fleet operator may engage the utility to electrify a fleet and also deploy charging infrastructure to employees working at the facility depot. Such a circumstance should not require the fleet operator to engage two separate utility teams. Rather, the utility should house all transportation electrification programs within one team and create a seamless experience for fleet operators.

- **Train a Dedicated Team of Experts:** Fleet operators are learning to engage their utilities early when considering electrification.[20] The utility response should be unified and comprehensive. The utility team should be able to address a fleet operator's needs across all relevant utility departments. Team member functions should include the following:

Generation

- ✓ Proactively engaging with the fleet operator in planning requests for renewable energy sourcing.
- ✓ Advocating for fleet operator concerns regarding the structure of the utility's renewable energy offerings.

Transmission and Distribution

- ✓ Taking the fleet operator through the entire planning and engineering processes for all different types of EV charging needs.
- ✓ Providing timely guidance and support to meet terms and requirements for all utility support programs.
- ✓ Expediting permitting and legal requirements as efficiently as possible.

Retail

- ✓ Addressing fleet operators' inquiries concerning how fleet electrification affects electricity costs and what rate options are available.
- ✓ Advising on technologies that can speed deployment, lower energy costs, and improve service reliability.

[20] Edison Electric Institute. *Preparing to Plug-in Your Fleet*. October 2019.

Looking Ahead

The EV market is evolving quickly. EVs for commercial fleets are just beginning to become available, and fleet operators are eager to deploy them to achieve sustainability and environmental goals and to save money. In this time of transition, there is a learning curve for all parties: fleets, utilities, regulators, and policymakers. To help this ecosystem of stakeholders learn, the fleet operator voice must be included in the design of a utility's fleet electrification program.

As fleet operators learn a utility's requirements and processes for deploying chargers to their EV fleets, utilities can learn about fleet operators and their business models.

Utilities should take steps early and often to 1.) consult fleet operators on how fleet electrification program designs will impact their electrification considerations, and 2.) determine how to structure commercial vehicle electrification offerings to best meet the needs of fleet operators within the construct of the regulated utility business model.

Policymakers should incorporate the needs of fleet operators into EV charging programs and policies. Policymakers can reference this report when reviewing utility EV charging plans and require that utilities report on how they are meeting the eight recommendations for fleet electrification.

The electrified fleet can be an asset for a more efficient and environmentally friendly grid. It can be used to increase grid utilization and balance grid supply with demand while increasing the renewable resource share on the grid. These benefits present opportunities to reduce costs for everyone.

Fleet operators, utilities, regulators, and policymakers can achieve these benefits through closer collaboration to resolve issues such as validating EV smart-charging technology performance, setting smarter electricity rates for EVs, offering self-service tools to explain rates and grid capacity, and securing pathways for providing renewable energy.

The future of fleet electrification offers opportunities for the environment, business, and all electricity customers.

4 Sources

Aouad, Ayoub. “DHL will debut a fully electric delivery van in the US next year.” *Business Insider*. December 2, 2019. https://www.businessinsider.com/dhl-brings-electric-vehicle-pilot-to-us-2019-12?r=US&IR=T

Citizens Utility Board. *The ABCs of EVs*. April 2017. https://citizensutilityboard.org/wp-content/uploads/2017/04/2017_The-ABCs-of-EVs-Report.pdf

Edison Electric Institute. *Preparing To Plug In Your Fleet*. October 2019. https://www.eei.org/issuesandpolicy/electrictransportation/Documents/PreparingToPlugInYourFleet_FINAL_2019.pdf

Green Biz. *Curve Ahead: The Future of Commercial Fleet Electrification*. United Parcel Service of America, Inc. (UPS). 2018. https://sustainability.ups.com/media/UPS_GreenBiz_Whitepaper_v2.pdf

Hyatt, Kyle. “Los Angeles’ order of 130 electric buses is the largest in US history.” *Roadshow by CNET*. November 13, 2019. https://www.cnet.com/roadshow/news/los-angeles-bus-byd-largest-ever/

International Council on Clean Transportation. *Emerging Best Practices for Electric Vehicle Charging Infrastructure*. International Zero-Emission Vehicle Alliance. October 2017. https://theicct.org/sites/default/files/publications/EV-charging-best-practices_ICCT-white-paper_04102017_vF.pdf

International Council on Clean Transportation. *Literature Review on Power Utility Best Practices Regarding Electric Vehicles*. International Zero-Emission Vehicle Alliance. February 2017. https://theicct.org/sites/default/files/publications/Power-utility-best-practices-EVs_white-paper_14022017_vF.pdf

Jossi, Frank. “Minnesota utilities offer to lessen demand charges on EV fast chargers.” *Energy News Network*. November 6, 2019. https://energynews.us/2019/11/06/midwest/minnesota-utilities-offer-to-lessen-demand-charges-on-ev-fast-chargers/

Kate Palmer, James E. Tate, Zia Wadud, and John Nellthrop. *Total cost of ownership and market share for hybrid and electric vehicles in the UK, US, and Japan*. *Applied Energy*. Volume 209, 1 January 2018, Pages 108-119.

Moon, Mariella. “Lyft adds 200 electric vehicles to its fleet in Denver.” Engadget. November 15, 2019. https://www.engadget.com/2019/11/15/lyft-denver-express-drive-electric-vehicles/?guccounter=1&guce_referrer=aHR0cHM6Ly93d3cuZ29vZ2xlLmNvbS8&guce_referrer_sig=AQAAANNVHZENLDhM7Ff5kMQZ5xFXURI54ivaVkepJxt_XJ0tfTNgVUKiBTFq2mFAklsvSCBlEi3f-FLY0ukpG-b3TKKBnu02gEAPgXUrSZFI08YreV2i4_YMy_CePHLe5AX0vU-TlF9ab3-DI8-0RTV7hlgiX102exCTtrggWuB0jX21

Shama, Elijah. “Amazon is purchasing 100,000 Rivian electric vans, the largest order of EV delivery vehicles ever.” *CNBC*. September 19, 2019. https://www.cnbc.com/2019/09/19/amazon-is-purchasing-100000-rivian-electric-vans.html

The Brattle Group. *Increasing Electric Vehicle Fast Charging Deployment*. Edison Electric Institute. January 2019. http://files.brattle.com/files/15077_increasing_ev_fast_charging_deployment_-_final.pdf

Union of Concerned Scientists. *Electric Utility Investment in Truck and Bus Charging*. April 2019. https://www.ucsusa.org/sites/default/files/attach/2019/04/Electric-Utility-Investment-Truck-Bus-Charging.pdf

Union of Concerned Scientists. “Electric Vehicle Batteries: Materials, Cost, Lifespan.” March 9, 2018. https://www.ucsusa.org/resources/ev-batteries

Xcel Energy. “New electric vehicle pilot program rolls out to Xcel Energy customers.” August 27, 2018. https://www.xcelenergy.com/company/media_room/news_releases/new_electric_vehicle_pilot_program_rolls_out_to_xcel_energy_customers

5 Acronym and Abbreviation List

BTM ..... Behind the Meter

EU ..... European Union

EV ..... Electric Vehicle

GHG ..... Greenhouse Gas

kWh ..... Kilowatt-hour

OCPP ..... Open Charge Point Protocol

PG&E ..... Pacific Gas & Electric

SCE ..... Southern California Edison

About Guidehouse

Guidehouse is a leading global provider of consulting services to the public and commercial markets with broad capabilities in management, technology, and risk consulting. We help clients address their toughest challenges with a focus on markets and clients facing transformational change, technology-driven innovation and significant regulatory pressure. Across a range of advisory, consulting, outsourcing, and technology/analytics services, we help clients create scalable, innovative solutions that prepare them for future growth and success. Headquartered in Washington, DC, the company has more than 7,000 professionals in more than 50 locations. Guidehouse is led by seasoned professionals with proven and diverse expertise in traditional and emerging technologies, markets and agenda-setting issues driving national and global economies. For more information, please visit: www.guidehouse.com.